SUMMARY AND RESPONSE TO PUBLIC COMMENTS

Permit No:	Temporary Aquifer Protection Permit (APP) P-106360
Facility Name:	Florence Copper Project Production Test Facility
Applicant:	Curis Resources (Arizona) Inc.
Permit Action:	Response to comments received during the public comment period: 10/25/12 – 1/22/13
Prepared By:	Arizona Department of Environmental Quality (ADEQ) Groundwater Section 1110 W. Washington Street Phoenix, Arizona 85007
Date:	July 5, 2013

A. INTRODUCTION

Summary

On September 28, 2012, ADEQ issued a Temporary Individual APP to Curis Resources for the Florence Copper Project Production Test Facility (PTF). The purpose of the PTF is to conduct a pilot test for in-situ recovery in order to develop the data needed to demonstrate that the in-situ process could be operated in compliance with the applicable rules and statutes of the APP Program. Curis proposes to construct and operate the PTF over a two-year period, consisting of a 14 month leaching phase and a 9 month rinsing phase. The PTF will contain a total of 24 wells and consist of 4 Underground Injection Control (UIC) Class III injection wells, 9 recovery wells, 7 observation wells and 4 multilevel sampling wells.

Public Notice, Public Meetings and Public Hearing Comments

The public comment period began on October 25, 2012 and ended January 22, 2013. Publication of this decision to issue the Temporary Individual APP and the associated public hearing were published in the Florence Reminder on October 25, 2012. A public hearing was held at Florence High School in Florence, AZ, on December 5, 2012. This summary is prepared in accordance with the Arizona Administrative Code (A.A.C.) R19-9-109.

Comments received during the public comment period are summarized below. The comments are followed by ADEQ's response shown in blue *italics*. Comments are organized as follows:

Commenter #	Source	Method
1	Bob King	Written
2	Barry Towns	Written
3	Roula Aujani	Written
4	Mark Alexander	Written
5	Melanie Amegatse	Written
6	Everett Henning	Written
7	LuAnn DeMoss	Written
8	Jeff Masterson	Written
9	Jim Harder	Written
10	Robert Thomas	Written
11	Krystyna Worwag	Written
12	Terry Makdad	Written
13	E John Carlson	Written
14	Ryan Dary	Written
15	Marilyn Callahan	Written
16	Robert Stover	Written
17	Richard Posner	Written
18	Coag Edwards	Written
19	Kathy Fretwell	Written
20	Al Kerestes	Written
21	Lucy Oxenhandler	Written
22	Audrey Wishart	Written
23	Thomas Anderson	Written
24	John Anderson	Written
25	Gayle Gordon	Written
26	Stanley Sachak	Written
27	Deborah and John Stanton	Written
28	Rodney Lawson	Written
29	Barbara Colvin	Written
30	Manuela Rehm-Bowler	Written

31	Bob King	Written
32	Peter Boothby	Written
33	Mary Battle	Written
34	Santiago Coronado	Written
35	Jan Blaha	Written
36	Katy Beebe	Written
37	David Rinehart	Written
38	John Westmoreland	Written
39	Lyle Gilbertson	Written
40	Mike Shoppell	Written
41	Barbara Reed	Written
42	Laura Wingenter	Written
43	Brad Roberts	Written
44	Lou Severino	Written
45	Joseph A. Callahan	Written
46	Pat Cosentino	Written
47	Sue Hetherington	Written
48	Judy Aliberto	Written
49	James Holeman	Written
50	Rick Barsness	Written
51	Brenda Brooks	Written
52	Vicki D'Elia	Written
53	Karen Shoppell	Written
54	Ferdinand & Audrey Sobota	Written
55	Jerry Ravert	Written
56	Terry & Nancy Thornton	Written
57	Curtis Haynes	Written
58	Ruth F. Wloczewski	Written
59	Richard and Carol Biallas	Written
60	Harvey Sherlin	Written
61	Shirley Cardwell	Written
62	Wes Moraes	Written
63	Michael George	Written
64	Arne L. Hawkins	Written
65	Jan Roberts	Written
66	David Porter	Written
67	Doug Heller	Written
68	Bill Brown	Written
69	Ed Venetz	Written
70	Rich Rochel	Written
71	Russell Clark	Written
72	Angela Chicoine	Written
73	Janis Clark	Written

74	Armand Young	Written
75	Ruth and Tom Morrow	Written
76	Tony Srnicek	Written
77	N. Allan Borggard	Written
78	Mike O'Hara	Written
79	Colleen Borggard	Written
80	Diana Regazzi	Written
81	Victoria Sportelli	Written
82	William Brayden	Written
83	Bob Mielke	Written
84	Rod Morrice	Written
85	Nancy Freeman	Written
86	Dave Stagg	Written
87	Doris Whipps	Written
88	Melanie Solliday	Written
89	Joyce Evans	Written
90	Stewart and Janice Green	Written
91	Wayne and Brenda Stubstad	Written
92	Valerie Blaser	Written
93	Renee Aquino	Written
94	James Pruter	Written
95	Anne Jones	Written
96	Karen Bennett	Written
97	Robert Johnson	Written
98	Frank and Jill Fishella	Written
99	Carl and Judith Anderson	Written
100	Dr. Fred Armeni	Written
101	Jorganne and Robert Cochran	Written
102	James Grab	Written
103	Ray Merkel	Written
104	Robert Wloczewski	Written
105	Sharon Reid	Written
106	Mary Jean Cirrito	Written
107	A.J. Smith	Written
108	Don Bisson	Written
109	Betty Pimentel	Written
110	Emmett Maguire	Written
111	Frank Annin	Written
112	Gary Rose	Written
113	Larry Olson	Written
114	Kerry Quimby	Written
115	Christina Dumal	Written
116	Roger Featherstone	Written

117	Annette Kankelfritz	Written
118	Larry Olson	Written
119	Mary and Charles Hughes	Written
120	Cheryl and Jack Hoisington	Written
121	Deborah and John Stanton	Written
122	Robert Johnson	Written
123	George Staby	Written
124	Deborah and Craig Walters	Written
125	Janet Senn	Written
126	Renae Specht	Written
127	Robert Allen and Dorothy Mize-Allen	Written
128	Linda and Billy Cromwell	Written
129	Cheryl and Michael O'Donnell	Written
130	Douglas J. Casad	Written
131	Carolyn Gerber	Written
132	Joseph Hildesheim	Written
133	Sharon Reid and Roy Faulhaber	Written
134	Janice and John Burdette	Written
135	Hal Neuenswander	Written
136	Dale and Sharon Gastaldin	Written
137	Donna and Jeffrey Johnstone	Written
138	Jane Nadeau	Written
139	Carole Waite	Written
140	Vicki and Michael O'Hara	Written
141	David R. Rawls	Written
142	Joan and Roland Moyneur	Written
143	A.J. Smith	Written
144	Karen and John Wall	Written
145	Mary Jen Cirrito	Written
146	Cynthia Smith	Written
147	Keith Flygare	Written
148	Suzanne Davis	Written
149	Donna Dunsey	Written
150	Bill Brown	Written
151	Armand Young	Written
152	Douglas J. Casad	Written
153	Sue and Lee Schoetker	Written
154	Sierra Club, Grand Canyon Chapter	Written
155	D. Lee Decker	Written
156	Gregory Mendoza	Written
157	Helen Jones	Written
158	Robert and Rose Heathfield	Written
159	Keith Kinney	Written

160	Sr. Rose Marie Cummins	Written
161	Gene and Val Vollmin	Written
162	James Nadeau	Written
163	William J. Polakowski	Written
164	Larry M. Brown	Written
165	Dennis and Barbara Manning	Written
166	Terry Larson	Written
167	Evelyn Davis	Written
168	Vicki Marsh	Written
169	Sue and Lee Schoetker	Written
170	Michael E. Timm	Written
171	Denny Knudsen	Written
172	Dennis and Barbara Manning	Written
173	Randall and Donna Cook	Written
174	Harry Oxenhandler	Written
175	Armand Young	Written
176	Bruce Huillet	Written
177	Beth and Darrel Randkley	Written
178	Dan R. Scheff	Written
179	Patricia and Arthur Schaff	Written
180	Fred E. Breedlove III	Written
181	Southwest Value Partners	Written
182	Town of Florence	Written
183	Tom Rankin	Oral
184	Tom Smith	Oral
185	Tom Celaya	Oral
186	Bill Hawkins	Oral
187	Michelle Whitman	Oral
188	Gerald Mahone	Oral
189	Armand Young	Oral
190	Brad Glass	Oral
191	Steve Hildebrand	Oral
192	Dan Johnson	Oral
193	Dan Hodges	Oral
194	Alvin Wilson	Oral
195	Kevin McCormick	Oral
196	Denise Kollert	Oral
197	Richard Conally	Oral
198	Yvette Stack	Oral
199	Barbara Manning	Oral
200	Karen Wall	Oral
201	Wilbur Freeman	Oral
202	Larry Putrich	Oral

203	Bob Harris	Oral
204	Tom Merrifield	Oral
205	Seraphim Larsen	Oral
206	Bruce Marsh	Oral
207	Lee Decker	Oral
208	Jim Burns	Oral
209	Greg Brown	Oral
210	Sharon Reid	Oral
211	Justin Merritt	Oral
212	Don Kempton	Oral
213	Jim Pajer	Oral
214	Eric Barcon	Oral
215	Sue Shoetker	Oral
216	Brett Tanner	Oral
217	Philip and Irene Capana	Oral
218	Christopher Rod	Oral
219	Vicki D'Elia	Oral
220	David Rawls	Oral
221	Rick Grinnel	Oral
222	James Del Coure	Oral
223	George Johnson	Oral
224	Jerry Kenyon	Oral
225	Debra Bates	Oral
226	Cori Hoag	Oral
227	Mark Nichols	Oral
228	Christina Duval	Oral
229	Dennis Tucker	Oral
230	Eric Cantlin	Oral
231	Sydney Hay	Oral
232	Stacy Brimhall	Oral
233	Gary Gilchrist	Oral
234	Robert Kozlowski	Oral

Comments may have been shortened or paraphrased for presentation in this document; a copy of the unabridged comments is available upon written request from ADEQ Records Center, recordscenter@azdeq.gov.

B. AMENDMENTS TO THE PERMIT UNDER ARIZONA ADMINISTRATIVE CODE (A.A.C.) R18-9-210.D.3

A number of typographic errors were corrected and clarifying language edits made in the amended permit that are not reviewed in detail here. Conforming language changes were made to condition permit requirements on the effective date of the permit, rather than the issuance date. Substantive changes to the permit include:

1. Section 2.2.3 & Section 3.0 – New requirement that boreholes within 150 feet of the Process Water Impoundment and the Runoff Pond be plugged and abandoned.
2. Section 2.2.4 – Removal of incorrect requirement regarding the establishment of maximum injection pressure (maximum injection pressure is established in Table 4.1-8); addition of language allowing use of injection wells as recovery wells.
3. Section 2.5 – Removal of QAPP requirements to provide consistency with the latest APP framework for Individual permits.
4. Section 2.6.4.6 – Change from sixth to third sampling event for initiating hydrogeologic report.
5. Section 2.7.4.4(2) – New requirement for submittal of potentiometric groundwater contour maps for the Production Test Facility (PTF) well field as a component of demonstrating hydraulic control, requiring a monthly evaluation of the minimum, average and maximum inward hydraulic gradients, to be reported quarterly in accordance with Section 2.7.4.4.
6. Section 2.7.4.4(14) – New requirement for submittal to ADEQ of copies of Reports submitted to the Environmental Protection Agency (EPA) as required by the Underground Injection Control (UIC) Program permit.
7. Section 3.0 – Clarifying the due date for several items to indicate the items are required to be completed within certain number of days from the effective date of the permit.
8. Section 3.0 – Reduction of time frame allowed to complete the installation of MW-01. The timeframe was changed from 90 days of the effective date of the permit to within 45 days of the effective date of the permit for the installation of MW-01.

C. WRITTEN COMMENTS

Written comments received on the official record were received during the Public Comment period.

#1, Bob King -
The commenter submitted an email with the following three comments:

(1) "A demonstration at the ADEQ public hearing showing the destructive effects of pouring sulfuric acid over copper into our drinking water. As well, the grave safety concern of even opening a container of sulfuric acid. As stated previously, Leslie's Pool Supply wouldn't let me open the gallon of sulfuric acid to perform the test. I had to take it off premises, out of the building, off the property limits. And I only poured about 1 oz. over the copper fitting..... a far cry from 100,000,000 gallons."

"The destructive effect on the concrete was unbelievable. I can't imagine what the acid-laden water would do to the stomach lining of those who drink the contaminated water."

ADEQ Response –

Commenter does not indicate the strength of the sulfuric acid used in the referenced demonstration. The lixiviant to be used in the pilot project is a dilute sulfuric acid, with strength comparable to vinegar. According to Schlumberger the sulfuric acid solution (lixiviant) will range from one to ten percent by volume of water to sulfuric acid (H_2SO_4), not 0.5 percent.

(2) "The fact that over time, Curis plans to inject nearly 100,000,000 gallons of sulfuric acid near our water aquifer. As stated previously this volume of acid would fill up Firebird Lake, a huge man-made lake at the Firebird Raceway in Chandler, AZ 5 times. And with data showing the voids and permeability of the soil between where the acid is injected and the water aquifer is located clearly demonstrates that the acid will flow to the aquifer and contaminate it."

ADEQ Response –
See the previous response. The oxide unit which is targeted for in-situ leaching is a separate and distinct geologic unit from the Lower Basin Fill Unit (LBFU) drinking water aquifer. The volume of solutions extracted from the PTF well field will be greater than the volume of solutions injected.

(3) "Additionally, my home is directly in the flow line between the proposed injection point for the sulfuric acid and the water aquifer. The soil is quite sandy and permeable and water flows through it readily. I am having issues keeping water around plant roots in my back yard. And there is data indicating that large underground voids and fissures exist in this general flow line which essentially guarantees that the acid will flow to the water aquifer and contaminate it. As well the acid will be injected above the water aquifer so the force of gravity further increases the probability of the sulfuric acid getting to the water aquifer and contaminating it."

ADEQ Response –
The injection zone is located in the oxide unit and in-situ leaching solutions shall be contained within the oxide unit as required by the permit. The oxide unit is located stratigraphically below the LBFU.

#2, Barry Towns –
The commenter submitted an email with the following comment:

"My concern is why the urgency and what is the reason to issue a temporary APP in advance of EPA's decision to issue a SDWA UIC Class III permit to Florence Copper."

ADEQ Response –
The APP application process is independent of the Environmental Protection Agency (EPA), Underground Injection Control (UIC) Program process. ADEQ's review of this application is subject to the requirements of the licensing time frames (LTF) statute under Arizona Revised Statutes (A.R.S.) §41-1072 through §41-1079 and the LTF rules under Arizona Administrative Code (A.A.C.) R18-1-501 through R18-1-525.

#3, Roula Aujani –
The commenter submitted an email requesting denial of the Curis permit due to unspecified environmental and public health threats.

ADEQ Response –
The ADEQ Aquifer Protection Program (APP) is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and conformance with the Arizona Mining Best Available Demonstrated Control Technology (BADCT) Guidance Manual, in order to obtain the necessary permit required to discharge.

If ADEQ has reason to believe that conditions in the permit are or have been violated, ADEQ will take action, as provided in Arizona Administrative code (A.A.C.) R18-9-110.

#4, Mark Alexander –
The commenter submitted an email with the following comment:

"Our groundwater is at risk, and once the water is contaminated, what will we do? We would not even be able to sell our houses and move somewhere else. Please do not allow this mining operation to continue."

ADEQ Response –
See response to commenter #3.

#5, Melanie Amegatse –
The commenter submitted an email with the following comment:

"I am not reassured by Curis' assurances that our drinking water will not be affected. Please revoke the temporary permit on their test facility so that our drinking water is protected."

ADEQ Response –
See response to commenter #3.

#6, Everett Henning –
The commenter submitted an email with the following comment:

"The thought of our water supply possibly being polluted with acid and caustic chemicals from mine drilling operations causes us great concern. Is Curis Resources prepared to buy our home should our water supply be polluted when samplings reveal contamination? The contaminants from their operation have to go somewhere. Common sense tells us that there can be no benefit to the environment as a result of their mining

testing activities. For residents like us who are doing our part to reduce groundwater contamination, it makes no sense to us why you would even consider this toxic risk."

ADEQ Response –
See response to commenter #3.

#7, Craig and LuAnn DeMoss –
The commenter submitted an email with the following comment:

"We are adamantly against issuing permits to Curis Resources for the mining of copper in Florence, Az. This will result in the possible contamination of our drinking water. ADEQ needs to revoke the permit they issued to Curis Resources. There will be a lot of cost to residence in San Tan Valley to keep their water usable and drinkable if they are allowed to mine. Arizona has already lost a lot of residents due to the poor economy; can they really afford to lose more because of unsafe water?"

ADEQ Response –
See response to commenter #3.

#8, Jeff Masterson –
The commenter submitted an email in support of the project due to a perceived economic benefit to the region.

ADEQ Response –
The comment is noted.

#9, Jim Harder –
The commenter submitted an email with the following comment:

"This process by its very nature is an environmental nightmare at the best of times and in this case with residential to the north, it is appalling that it is even being considered. Let's not put "progress" ahead of good judgement. Please be responsible with the environment and count me 100 per cent against this project."

ADEQ Response –
See response to commenter #3.

#10, Bob Thomas –
The commenter submitted an email with the following comment:

"I am asking that you deny this proposed Insitu copper mining by Curis. There is no possible way that this cannot cause the introduction of acid's into our surface water, to include drinking water, whether it is into Florence or some other location."

ADEQ Response –
See response to commenter #3.

#11, Krystyna Worwag –
The commenter submitted an email requesting denial of the Curis permit due to unspecified environmental and public health threats.

ADEQ Response –
See response to commenter #3.

#12, Terry Makdad –
The commenter submitted an email with the following comment:

"I am concerned that we are going to allow a Canadian company that is a subsidiary of a larger Canadian company that has already said it has no liability for any adverse effects from the Florence mining operation. Once our ground water is contaminated then we as taxpayers will be the ones to clean up the mess and also will be required to find a new costly source for our household water supply I urge that the AZDEQ deny all permits for this mine including the pilot test facility. Once the chemicals are pumped into the ground it will be too late to save the water supply."

ADEQ Response –
See response to commenter #3.

#13, E. John Carlson –
The commenter submitted an email with the following comment:

"Pouring millions of gallons of chemicals into the ground that are harmful to humans and animals is tremendously unsettling and it is only obvious that those chemicals must go somewhere and that it is impossible for anyone to predict where they will show up and what damages they will cause. I realize we need copper, but not at that price!"

ADEQ Response –
See response to commenter #3.

The Applicant developed a numerical, three dimensional (3-D) groundwater flow model to predict groundwater conditions during and after the proposed pilot test. ADEQ accepts that groundwater modeling is a useful tool to predict groundwater geochemistry. Extensive groundwater monitoring and sampling from on-site wells will be required as part of the permit to substantiate the groundwater modeling claims and assumptions.

#14, Ryan Dary –
The commenter submitted an email with the following comment:

"I do not think it is appropriate for the government to give approval for any entity to poison the environment in this manner. We need to protect what we have left, and ensure that we keep a clean and safe environment for many generations to come."

ADEQ Response –
See response to commenter #3. The applicant has satisfied the requirements of the APP Program, A.R.S. Title 49, Chapter 2, Article 3, and A.A.C. Title 18, Chapter 9, Articles 1-4.

#15, Marilyn and Joe Callahan –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

"What proof do we, the citizens of Florence and surrounding populated areas, have that the cement casings used for the copper project will not fail? The failure can begin at day one; the contamination can begin at day one (long before ADEQ gets the test results); the contamination of water can begin whether there is one test well or 400 wells in operation."

ADEQ Response –
The Class III injection wells are additionally permitted by the Environmental Protection Agency (EPA), Underground Injection Control (UIC) Program. In accordance with the APP permit, all Class III injection wells shall be drilled, cased and cemented according to the requirements of the UIC permit. Prior to commencement of operation, all new Class III injection wells shall meet the mechanical integrity testing (MIT) requirements of the UIC permit. If an injection well does not pass the MIT testing requirements, the injection well can not be put into operation. In the event an unexpected loss of fluid in the injection/recovery wells occurs, within two hours of initial discovery, Curis must cease injection in the affected area and/or adjust flow rates at injection/recovery wells until an inward hydraulic gradient is reestablished and excess In-Situ Copper Recovery (ISCR) solutions are recovered. The permittee shall not resume injecting or discharging until repairs of any failed structure are performed and tested as applicable.

We are well aware of the fact that ADEQ's budget has been radically cut and consequently they are half-staffed. Recently, we had a scare of water contamination in our area because of lab errors. If the copper project is permitted, what proof do we have that further lab mistakes will not be made?"

ADEQ Response –
ADEQ has sufficient personnel to administer the APP Program and take enforcement action, where necessary, for permit violations. Samples are analyzed and reported by Arizona Department of Health Services (ADHS) licensed labs. If the laboratory produces an anomalous or unusual sampling result, the sample in question will be re-analyzed by the lab or additional samples would be collected and analyzed, to confirm or deny results. There are numerous checks and balances typically referred to as Quality Assurance/Quality Control (QA/QC) that can determine if an anomalous sampling result is a laboratory error, a sampler error, etc.

#16, Robert Stover –

The commenter submitted an email containing the following four questions about the design of the PTF well field:

(1) "Your recent flyer says the feed pumps will be injecting into bedrock. If true, how are the injection pumps going to get the product to the return pumps if they all sit in solid bedrock?"

ADEQ Response –
The subsurface area (oxide zone) where solution will be injected is rubblized, meaning the bedrock has been broken-up due to natural processes. The lixiviant will move through fractures and pore spaces in the bedrock during the injection and recovery process.

(2) "Grunfos makes a great deep well submersible, but the product contains copper particulate and therefore abrasive material (?). There will inevitably be a number of failures in return pumps (the only pumps actually in the wells), not so much from the seals but from wear on the impellers, diffusers, and shafts. In fact as I visualize the application, you'll have a lot of failures, a potentially big problem with 1200 pumps on site. I have no experience as a pump puller, but I'm guessing it'll take 3 or 4 hours to pull 460 to 1200 feet of pipe, remove the pump, install another (perhaps rebuilt?) pump, and drop the system into the well again, 20' section by 20' section. I assume the injection pump will be turned off for that period? What if a sensor fails during that time and you get full injection pump flow through the gap due to the absence of a return pump, especially those on the downstream side?"

ADEQ Response –
The permit requires that unexpected events, such as pump failures, are dealt with by the contingency measures outlined in permit (Sections 2.6.3.4, etc.). In the case of a sensor failure, the recovery pumps will be operated continuously so that the amount of fluid recovered is in excess of the amount of fluid injected during a 24-hour period.

(3) "There will be leakage past the 4 return pumps. I don't see how they could possibly catch all of it. I assume the grouping will be staggered so that downstream pumps will catch leakage past upstream ones? But what if the inevitable leakage is on the last several rows of return systems, so no pumps will be positioned to catch the leakage?"

ADEQ Response –
The 5-Spot Leaching Method has been designed so that solution recovery is optimized. This includes the use of a center recovery well along with closely spaced outer recovery wells in a nearly circular pattern. Beyond the recovery wells are the observation wells, in a circular pattern, which can be pumped if necessary. The permit requires that the total volume of solution recovered is greater than the volume of solution injected.

(4) "Given the inevitable catastrophic failure of sensors/pumps/motors (there's a lot of pressure on motors 1200 feet down… in fact about 2800 psi), what is the ratio of flow in

the stream that the product water would seep/flow into, compared to the potential leakage that could slip by?"

ADEQ Response –
Based upon the groundwater modeling performed, and the cones of depression created by the recovery wells, the lixiviant is not projected to slip by the recovery well network. Any minor amounts of lixiviant remaining in remote pore spaces and fractures at the end of rinsing operations will be buffered by the surrounding groundwater. None of the down-hole submersible pumps will be anywhere near 1200-feet below ground surface (ft. bgs.). We are not completely sure what is being asked by this question of ratio between what appears to be injected fluids into the rubblized material and any fluid which may enter other subsurface areas. The ratio of loss, if this is the question, would be extremely small due to the cone of depression already created by extraction pumping.

#17, Richard Posner –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

"Remember that BP "guaranteed" the safety of its oil rigs and the Tokyo Electric Power Co. "guaranteed" backup safety measures for the Fukushima Daiichi power plant. In fact, Curis CANNOT guarantee that our water, air and soil won't be damaged. And when they pull out, having extracted their profits, the impacted area may no longer be suitable for agricultural, residential, retail or even employment development."

ADEQ Response –
See response to commenter #3.

#18, Coag Edwards –
The commenter submitted an email in support of the project due to a perceived economic benefit to the region.

ADEQ Response –
The comment is noted.

#19, Kathy Fretwell –
The commenter submitted an email in support of the project due to a perceived economic benefit to the region.

ADEQ Response –
The comment is noted.

#20, Al Kerestes –
The commenter submitted an email in support of the project due to a perceived economic benefit to the region.

ADEQ Response –

The comment is noted.

#21, Lucy Oxenhandler –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#22, Audrey Wishart –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#23, Thomas Anderson –
The commenter submitted a letter attachment to an email that contained the following questions:

"How did ADEQ independently determine that the aquifer in that are does not currently serve as a source of drinking water either now or in the future?"

ADEQ Response –
The use of a Pollutant Management Area (PMA) for in-situ leaching, allows the permittee to place pollutants within the injection zone, as long as Aquifer Water Quality Standards (AWQS) are met at the Point of Compliance (POCs) or no further degradation occurs relative to those pollutants. AWQS are set to protect groundwater as a source of drinking water.

"How did ADEQ independently determine that the aquifer in that area will not be adversely affected by this project given that studies done by the U.S. Geological Survey as recently as 2009 have determined that "to date, no remediation of an ISR operation in the United States has successfully returned the aquifer to baseline conditions.

ADEQ Response –
ADEQ has determined that the project, as proposed, satisfies the requirements of BADCT (A.R.S. §49-243(B)), and the protection of AWQS at the points of compliance (A.R.S. §49-243(B)(2-3)). It is not required that the groundwater be restored to pre-mining conditions, as long as the AWQS are met at the points of compliance (POCs) and/or there is no further degradation of the aquifer relative to that pollutant at the POCs. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant. The permit contains required contingency actions that will be implemented if alert levels are violated at the points of compliance. Violation of an AWQS or Aquifer Quality Limit (AQL) at a point of compliance is a permit violation.

Given that no restoration procedure to date has been successful, how will ADEQ insure that Curis' remediation process at the end of operations will restore the aquifer to its baseline configuration? Does Curis have a new methodology that soil scientists throughout the United States are currently unaware of or is ADEQ only requiring that the aquifer be restored to a lesser standard than its original baseline?"

ADEQ Response –
The APP regulated facilities at Curis have been evaluated for conformance with ARS §49-241 through §49-244, and A.A.C. R18-9-A201 through A209. These facilities have been designed to meet BADCT requirements and the Point of Compliance wells located downgradient of the injection and recovery zone have been selected to monitor the effectiveness of the design.

Although this doesn't mean zero discharge, it does mean that ADEQ has required the permittee to meet the regulatory requirements for protecting groundwater. Section 2.9 of the permit addresses the PTF closure requirements and mine block rinsing. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant.

"Is ADEQ aware of any commercially successful in-situ copper mines in North America that are of the type proposed by Curis? If not, how did Curis, a new Canadian company that has never developed nor operated a commercially successful mine of any type and therefore has no prior experience utilizing in-situ mining in its short history as a foreign company operating in the United States, demonstrate to ADEQ's satisfaction that the deposit contains minerals that are expected to be commercially producible by use of their proposed and untested methodology?"

ADEQ Response –
The focus of the APP Program is on the protection of groundwater quality at the points of compliance. The risk associated with the production of economical quantities of copper is borne by Curis, and is not a consideration in the APP process.

"How will ADEQ monitor and protect the citizens of Florence and the surrounding environment from this type (TENORM) of contamination?"

ADEQ Response –
Table 4.1-7 lists the constituents to be monitored in the POC wells for compliance with aquifer water quality standards, which includes commonly encountered radionuclides. The permit requires groundwater analysis for gross alpha, adjusted gross alpha, radium 226+ radium 228, uranium isotopes and total uranium.

"Has Curis complied with each and every additional requirement and/or request for data set forth in ADEQ's letter to Curis dated September 7, 2011?"

ADEQ Response –
The September 7, 2011 Request for Additional Information from ADEQ to Curis was in reference to a significant amendment application to APP P-101704 (LTF # 52202). Curis has since requested that ADEQ suspend processing that amendment application, pending the outcome of the pilot test.

"In granting the subject permit what consideration did ADEQ give to the Town of Florence's August 2012 public safety ordinance that limits how much sulfuric acid any non agriculture enterprise can have or use within a certain distance of Florence Town limits or was this ordinance a non-factor in ADEQ's decision?"

ADEQ Response- –
On August 6, 2012, the Town of Florence adopted Ordinance 583-12, which made operating an in-situ mine on land over which the Town has jurisdiction a class 1 misdemeanor. A.R.S. § 49-243(O) prohibits ADEQ from issuing a permit if the land on which the operations will be conducted does not comply with the applicable zoning ordinances and regulations. Because the PTF is being conducted on Arizona State Land, and not privately owned land, the Town of Florence Ordinance 583-12 was not considered when making a permitting decision regarding the PTF.

"What financial bonding has ADEQ required of Curis to insure that if Curis goes bankrupt, there are financial protections and guarantees in place to clean up any environmental problems that may be discovered either during or at the end of this project?"

ADEQ Response –
The closure/post closure cost estimates have been determined to be adequate in accordance with A.A.C. R18-9-A201(B)(5). Pursuant to A.A.C. R18-9-A203(C)(2), the applicant has satisfied the requirement for a financial assurance mechanism.

As stated in the APP and Factsheet, the financial requirement was satisfied through a surety bond for $3,487,743. The cost estimates were prepared based on current market costs for typical activities associated with closure of discharging facilities of the size and number found at the Curis PTF. The cost estimates are available as part of the Curis Temporary APP application file for review.

"Why does ADEQ believe that the BHP data is still valid given the increased residential development?"

ADEQ Response –
The results of the proposed pilot test will be independently reviewed relative to previous tests conducted outside the state land boundaries by other owners.

"Has ADEQ ever permitted an in-situ mining facility that is located adjacent to a residential property?"

ADEQ Response –
ADEQ has not permitted other mining sites that are adjacent to residential properties. ADEQ is currently reviewing the Broken Hill Proprietary (BHP) Miami Operations APP Application' which uses Class V injection wells to conduct in-situ leaching, and is located near residential areas in the Town of Miami. Other in-situ test sites, such as Asarco Santa Cruz 3-Spot and 5-Spot, have been previously permitted by ADEQ.

"Would ADEQ have approved a permit for this project if it was on state and/or land immediately adjacent to a Phoenix residential neighborhood or other large metropolitan area?"

ADEQ Response –
An application for an APP in the areas indicated would be required to follow the same statutes and rules used in the review of the Curis temporary APP.

"Did ADEQ receive any political pressure from any state officials to reach a favorable decision on the Curis permit?"

ADEQ Response –
No, ADEQ did not. Regardless, ADEQ makes permitting decisions based on the requirements of statute and rule.

"As part of the permit approval process did ADEQ perform any sort of benefit/burden analysis as regards the benefit to Curis of obtaining an approved permit as opposed to the burden placed on the citizens of the surrounding communities if the project subsequently caused significant environmental damage?"

ADEQ Response –
This type of analysis is not done as part of the APP process. Significant environmental damage to the surrounding community is avoided through the protection of groundwater quality at the points of compliance, and the BADCT provisions of the permit.

"How does ADEQ intend to monitor Curis' operations if ADEQ staff is reduced?"

ADEQ Response –
Any reduction of ADEQ staff will have no effect upon the legal requirements imposed on Curis by the provisions of the temporary APP. All permit requirements will remain in place. Exceedances of alert levels and aquifer quality limits under the permit monitoring schedules will result in permit contingency actions and notification to ADEQ.

#24, John Anderson -
The commenter submitted an email which contained the following questions:

(1) Does ADEQ have any experience with in-situ mining in the state of Arizona?

ADEQ Response –

Currently under ADEQ review, is BHP Miami Operations APP Application which uses Class V injection wells to conduct in-situ leaching. Other in-situ test sites, such as Asarco Santa Cruz 3-Spot and 5-Spot, have been previously permitted by ADEQ.

(2) If so, have such mines maintained safe drinking water levels within 300 yards of the in-situ wells?

ADEQ Response
ADEQ requires that AWQS will be met at the POCs or no further degradation will occur at the POCs, which are located no further than 750 feet from the PMA.

(3) Is there any record on any in-situ mining operation in Arizona or anywhere in the U.S.A. where the aquifer has been restored to safe drinking water standards after the site has been abandoned?

ADEQ Response –
ADEQ has determined that the project, as proposed, satisfies the requirements of BADCT (A.R.S. §49-243(B)), and the protection of AWQS at the points of compliance (A.R.S. §49-243(B)(2-3)). It is not required that the groundwater be restored to pre-mining conditions, as long as the AWQS are met at the points of compliance (POCs) and/or there is no further degradation of the aquifer relative to that pollutant at the POCs. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant. The permit contains required contingency actions that will be implemented if alert levels (ALs) are violated at the points of compliance. Violation of the AWQS or an AQL at a point of compliance is a permit violation.

(4) How many boreholes are located within the Curis owned land?

ADEQ Response –
Approximately 208 coreholes, boreholes and wells are located within the Curis owned property. The location of most exploration coreholes and geotechnical borings are based on historical site data provided by previous owners.

(5) How many boreholes are located within the state owned land?

ADEQ Response –
Since the 1960's, approximately 127 coreholes have been drilled in the Oxide Zone on the State Parcel Land.

(6) How many boreholes are active and abandoned?

ADEQ Response –
It is unclear what the commenter means by "active borehole." ADEQ assumes "active borehole" implies open corehole. The wells or coreholes that are within 500 feet of the PTF will be abandoned in accordance with UIC and Arizona Department of Water

Resources (ADWR) requirements. According to ADEQ records approximately 31 exploration coreholes, geophysical borings, monitoring well, test well and or irrigation wells are proposed to be abandoned within 500 feet of the PTF well field, prior to injection. The Application indicated approximately 13 coreholes and one non-POC well were abandoned by Magma Copper Company in the 1970's, for coreholes and wells that fall within the current PTF 500 foot buffer zone.

(7) What is the process for abandoning boreholes in Arizona?

ADEQ Response –
The wells or coreholes that are within 500 feet of the PTF injection wells will be abandoned in accordance with UIC and ADWR requirements which are specified in a Plugging and Abandonment Plan in the Application-Exhibit 16A.

(8) Were they abandoned to state standards?

ADEQ Response –
ADWR is the state lead on well abandonment requirements.

(9) If so, was the abandoned process certified by an independent source?

ADEQ Response –
Well abandonment is subject to ADWR requirements.

(10) If there are open bore holes, who is responsible for properly abandoning these on Curis owned property? On state owned land?

ADEQ Response –
For the purposes of the pilot test, Curis is responsible for abandoning boreholes within 500 feet of the PTF boundary in accordance with Section 2.2.3 and Section 3.0. This 500 foot boundary was determined to be the Area of Review (AOR) as required by the UIC Application. ADEQ assumes that EPA intends to maintain this radius from the PTF well field, for the plugging and abandonment of boreholes and wells. ADEQ adopted the EPA directive for the 500 foot abandonment requirement. Based on the 500 foot distance from the PTF, most of the boreholes fall on the State Trust Land; however, there are a number of coreholes within that 500 foot boundary that are on Curis privately owned property.

(11) I was told there was an open shaft mine on the property at one time, has this been properly abandoned?

ADEQ Response –
The mine shaft has not been abandoned and is not proposed to be abandoned for the pilot test. The shaft will be monitored for water level elevations and will be sampled in a depth specific manner throughout the duration of the pilot test and into closure and post-closure.

(12) If the temporary permit is approved, who shall be responsible for any contamination caused to the land or aquifer after the temporary testing is completed? What type of bond are Curis and the State of Arizona establishing to deal with a potential contamination to the environment?

ADEQ Response –
Curis is responsible for, and must take corrective action for, any permit violation, including an exceedance of an AQL in a POC well. The Arizona Revised Statutes (A.R.S.) (49-243(N) and Arizona Administrative Code (A.A.C. R18-9-A203) provide ADEQ authority to require closure and post-closure cost financial assurance for APP facilities. The performance surety bond submitted by Curis Resources satisfies the financial assurance requirement in accordance with A.A.C. R18-9-A202(C)(2) in the amount of $3,487,743. The cost estimates have been evaluated by ADEQ and determined to be adequate for closure and post-closure of the APP facilities at the Florence Copper Project PTF.

(13) Does the land owner, in this case the State of Arizona, assume the overall responsibility for damages that will be caused by the use when Curis cease to exist?

ADEQ Response –
The permittee is responsible for meeting the terms and conditions of the APP. The permittee is required to have a lease agreement with the Arizona State Land Department in order to occupy the land. The terms of the lease agreement between Curis Resources and the State Land Department are outside the scope of the APP.

(14) Does the liability for the proposed testing cover the potential property value loss in the event there are environmental issues which may affect nearby home values?

ADEQ Response –
The financial demonstration and resulting instrument are to cover the costs of the closure of the APP regulated facilities and any post-closure monitoring or maintenance. They do not cover potential losses in nearby home values.

(15) According to the Johnson Utilities representatives, the aquifer that the mine will be in is the same aquifer that their wells are located, is this true?

ADEQ Response –
ADEQ is aware the Johnson Utilities Wells would mostly likely be screened in the LBFU. The injection test will occur in the Oxide Unit, a separate and distinct geologic unit from the LBFU.

(16) The report by the mine opposition is that there are over 6,000 boreholes. Is that true, will not there be a large chance that both the upper and lower aquifer may be cross contaminated?

ADEQ Response –

ADEQ is aware that approximately 686 coreholes have been drilled regionally, of which approximately 208 coreholes have been drilled on the Curis owned property and approximately 127 coreholes were drilled on the State Land parcel.

Curis is responsible for correctly locating and abandoning all corehole and wells within 500 feet of the PTF. The coreholes, boreholes, and wells within 500 feet of the PTF are required to be abandoned before the pilot test in accordance with Section 2.2.3. The wells or coreholes that are within 500 feet of the PTF will be abandoned in accordance with UIC and ADWR requirements which are specified in a Plugging and Abandonment Plan in the Application-Exhibit 16A. Proper abandonment of coreholes and wells within the area immediately surrounding the PTF will minimize the chance that the upper and lower aquifer would be contaminated. In addition, numerous BADCT considerations for hydraulic control at the PTF well field (such as pumping more solution out than goes in, maintaining an inward hydraulic gradient, maintaining fracture gradients, injection exclusion zones) will additionally control in-situ leaching solutions from escaping the Oxide zone. Coreholes and or wells located outside of the 500 foot radius, whether on State Land or privately property, are outside the Area of Review (AOR) and do not pose a significant risk as a source of potential excursions from the PTF.

(17) Is it true that the aquifers flow in a North West direction toward the Johnson Utilities wells in Anthem on Hunt Highway?

ADEQ Response –
The groundwater flow direction in the vicinity of the site is generally to the northwest.

(18) What is the flow rate of these aquifers?

ADEQ Response –
The horizontal hydraulic conductivities used in the groundwater model were as follows:
Upper Basin Fill Unit (UBFU) = 20 to 130 feet per day (ft/day)
LBFU= 5 to 25 ft/day
Oxide=0.1 to 1.0 ft/day

(19) Based on the flow rate will the monitor wells for the temporary test wells be close enough to get adequate readings for monthly or by monthly testing, if approved?

ADEQ Response
Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. Monthly testing of MW-01 is required for pH, sulfate and TDS.

(20) Are the monitor wells the same depth as the injection well(s)?

ADEQ Response –

Yes. MW-01 is located just outside of the PTF and will be screened to the same depth as the injection well(s). POCs M22-O and M54-O will be screened at a level equivalent to the depth of injection.

(21) Curis has presented in several meetings that their proposed process is a self-contained system and there is no way the solutions they are pumping into the aquifer can escape into the adjoining aquifer. Is that not a shared aquifer that is constantly flowing?

ADEQ Response –
The oxide unit which is targeted for in-situ leaching is a separate and distinct geologic unit from the LBFU drinking water aquifer. The permit indicates in-situ solutions shall be contained and be limited to the Oxide Unit for injected solutions as described in Section 2.3.1. The recovery rates for the PTF well field shall be sufficient to contain solutions within the test block.

(22) Is there any way that an in-situ mine can guarantee that they can contain their injected acids to a limited area?

ADEQ Response
ADEQ has reviewed the components of BADCT and believes that injected solutions will be contained within the PMA.

(23) Will the proposed testing simulate the mining process and stacking as described in the original Curis application?

ADEQ Response –
The subject of the temporary APP is the Production Test Facility. The Production Test Facility does not include full scale commercial mining operations. The Production Test Facility well field will be limited to conducting tests, on approximately 2.2 acres of land, within the State Trust Land parcel, to provide data which might be used in an application for a permanent individual aquifer protection permit. Following the completion of the Production Test project, Curis will have the option to submit an application to ADEQ for a significant amendment to the existing permanent individual APP to allow mining, and that the amendment would be subject to all of the requirements for public participation and appeal. Review of this application will include an evaluation of pilot test results. The design to be employed for commercial operation has not yet been approved by ADEQ.

(24) By definition, injecting any foreign substance into the aquifer is pollution. Sulfuric acid is a well-known dangerous solution. What is ADEQ position on planned known pollution of the aquifer?

ADEQ Response –
The permit states that Aquifer Water Quality Standards (AWQS) can not be violated at the applicable points of compliance (POCs), or if an AWQS for a pollutant has been exceeded in an aquifer at the time of permit issuance, that no additional degradation of

the aquifer relative to that pollutant, and as determined at the applicable POC, occurs as a result of the discharge from the facility.

The application has satisfied the requirements of the APP Program, A.R.S. Title 49, Chapter 2, Article 3, and A.A.C. Title 18, Chapter 9, Articles 1-4.

(25) How many active drinking water and agriculture wells are within 5 miles of this proposed test well(s)?

ADEQ Response –
AAC R18-9-A202(A)(1) requires that a map showing all known water wells within one-half mile of the facility, and a description of the well construction details and well uses, if available. ADEQ was aware that a potential drinking water well may be located approximately 1.2 miles downgradient from the PTF facility. Because of the potential downgradient well within 1.2 miles, the Groundwater Section-Mining Unit (GWS-MU) requested that an expanded well inventory search be completed for the area and included up to 1.5 miles away from the PMA boundary. At the time the Application was submitted, approximately 127 wells were registered with ADWR, within 1.5-mile radius of the PMA. Of those approximate 127 registered wells, two wells were listed as domestic water use, numerous wells were listed as irrigation wells, and no wells were listed as agricultural water use.

(26) Curis Resources reported to the EPA on January 23, 2012 a notification of alert level (AL) exceedances for a well at the Florence Copper Project site. Attached is a copy of this letter. This letter also stated a copy was sent to ADEQ. Is this notice not enough proof of the danger of this in-situ mining process to dictate the disapproval of further mining testing on the site?

ADEQ Response –
Curis is in compliance with all APP requirements for AL exceedances.

By letter dated January 23, 2012, Curis Resources, Inc. reported exceedances of Alert Levels for three indicator parameters, magnesium, sulfate and total dissolved solids (TDS), in samples obtained from Point of Compliance (POC) monitoring well # P49-O. Curis Resources also discussed the continued exceedance of a sulfate AL in POC monitoring well M24-O. There are no numeric Aquifer Water Quality Standards (AWQS) for these parameters. There are no permit discharge limitations or Aquifer Quality Limits (AQLs) for these parameters in the permit. Curis notified ADEQ of the AL exceedances within 5 days of becoming aware of the exceedance and provided a report within 30 days of becoming aware of the exceedance, as required under their APP. Curis is in compliance with all requirements under the APP.

Exceedance of an AL is not a discharge violation. ALs are set so that the permittee can conduct investigations and take corrective actions before an exceedance of an AQL occurs. For example, exceedance of an AL may be the result of an equipment

malfunction, or a change in sampling methodology, as opposed to an actual increased concentration of a constituent in the aquifer.

(27) If we are seeing negative results from testing that was done 30 years ago, is that not significant?

ADEQ Response –
See above response. The proposed pilot test for Curis is at a separate location, approximately 1,600 feet northwest of the former test site conducted by BHP Copper Company.

ADEQ has determined that the project, as proposed, satisfies the requirements of BADCT (A.R.S. §49-243(B)), and the protection of AWQS at the points of compliance (A.R.S. §49-243(B)(2-3)). It is not required that the groundwater be restored to pre-mining conditions, as long as the AWQS are met at the points of compliance (POCs) and/or there is no further degradation of the aquifer relative to that pollutant at the POCs. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant). The permit contains required contingency actions that will be implemented if alert levels are violated at the points of compliance. Violation of the AWQS or an AQL at a point of compliance is a permit violation.

(28) What were the results of the testing that was done on this site by the previous owners of this site? Can I get a copy of those test results?

ADEQ Response –
Any document related to the test that was completed by the previous owner, BHP Copper Company, is available for review as part of the Florence Copper Project APP File P-101704. To set up an appointment for a file review, please contact ADEQ Records Center at (602) 771-4380.

(29) Did the previous owners abandon their project because ADEQ disapproved their application for in-situ mining on the site?

ADEQ Response –
No, ADEQ has not disapproved an Application for in-situ mining on the site.

(30) If the State of Arizona approves the temporary testing and/or long term mining on state property, the State is assuming responsibility for any costs that the local utilities may incur to clean up the drinking water when the aquifer is poisoned by the mining process. Is the state prepared to subsidize the water utilities that may be impacted by this mining process in future years?

ADEQ Response –

ADEQ believes that the Temporary APP issued to Curis will be protective of groundwater. Any violations of permit conditions will be subject to enforcement requirements under A.A.C. R18-9-110 and failure to comply with any permit conditions.

(31) Which Curis corporation is applying for this permit? There are at least two corporate entities with the Curis name? The land surrounding the State land is not titled to a Curis entity. Has ADEQ performed a background check on the applicant to determine true ownership and financial responsibility?

ADEQ Response –
Curis has filed all necessary documentation required under APP regulations to apply for an Aquifer Protection Permit. Curis Resources (Arizona) Inc. is on file as an Arizona Corporation with the Arizona Corporation Commission.

(32) Which will be the major influence on ADEQ in making a decision for a temporary permit: a.) business/political pressures or b.) Environmental Quality?

ADEQ Response –
Environmental quality, specifically compliance with the statutes and rules of the APP Program, A.R.S. Title 49, Chapter 2, Article 3, and A.A.C. Title 18, Chapter 9, Articles 1-4.

#25, Gayle Gordon -
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#26, Stanley Sachak –
The commenter submitted an email in support of the project due to a perceived economic benefit to the region.

ADEQ Response –
The comment is noted.

#27, Deborah and John Stanton –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#28, Rodney Lawson –
The commenter submitted an email in support of the Curis project.

ADEQ Response –
The comment is noted.

#29, Barbara Colvin –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#30, Manuela Rehm-Bowler –
The commenter submitted an email in support of the Curis project.

ADEQ Response –
The comment is noted.

#31, Bob King –
The commenter submitted an email with the following three objections to the Curis Project:

(1) There is absolutely nothing out there that will inhibit the sulfuric acid from getting to the water aquifer, in fact gravity will greatly assist it to flow to the aquifer. All of the talk as to the number of monitoring wells and plugging underground holes is superfluous discussion.

ADEQ Response –
ARS 49-243(B) part 1 states "The facility shall be so designed, constructed and operated as to ensure the greatest degree of discharge reduction achievable through the application of BADCT..." The applicant has successfully demonstrated that the facility will meet this requirement. The applicant has proposed pre-operational requirements, liners, storm water controls, operational practices, maintenance and facility monitoring that will greatly limit the pollutants potentially released from the facilities. The applicant has evaluated the potential migration of pollutants from the facilities and estimated a discharge impact area (extent of impact on the aquifer) based on hydrogeologic conditions at the site. Through this evaluation, the applicant has shown that the methods used to limit the impacts to the groundwater will be effective and constitute adequate measure to protect groundwater.

(2) The monumental volume of acid planned to be injected over time is beyond belief. The water aquifer has absolutely no chance of surviving this onslaught.

ADEQ Response –
See response to commenter #3.

(3) Sulfuric acid is nasty, repulsive stuff and banned by most insurance companies. In fact contractors, under strictly controlled conditions, use it to cleanse concrete that has been subjected to contact with oil, gasoline and other hydrocarbons. To be dealing with H2SO4 is absolutely unconscionable. We cannot even consider associating this with our drinking water.

ADEQ Response –
The proposed In-Situ Copper Recovery (ISCR) process involves injecting a lixiviant (99.5% water mixed with 0.5% sulfuric acid) through injection wells into the oxide zone of the bedrock beneath the site for the purposes of dissolving copper minerals from the ore body. The oxide unit which is targeted for in-situ leaching is a separate and distinct geologic unit from the LBFU drinking water aquifer.

#32, Peter Boothby –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#33, Mary Battle –
The commenter submitted an email suggesting the Temporary APP be revoked.

ADEQ Response –
See response to commenter #3.

#34, Santiago Coronado –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#35, Jan Blaha –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#36, Katy Beebe –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –

See response to commenter #3.

#37, Dave Rinehart –
The commenter submitted an email making the following statements in opposition to the Curis Project:

"I am sure you are familiar with the "theoretical" efficacy of the proposed in situ mining process. The problem is that this process's efficacy is *only* theoretical.
Due to a permit being granted BEFORE hearings being held, a great potential peril threat to our ground water will be created to test Curis' theory, at the potential expense of the local population. I maintain that it is a theory because there is *no instance* of in situ mining ever returning any aquifer to baseline conditions in the United States. Sadly, the granting of this permit is indicative of the lack of strength or will by the state government agencies that exist presumably to assure the welfare of our population."

ADEQ Response –
The public hearing process was held in accordance with Temporary Individual Permit rule AAC R18-9-A210. ADEQ has determined that the project, as proposed, satisfies the requirements of BADCT (A.R.S. §49-243(B)), and the protection of AWQS at the points of compliance (A.R.S. §49-243(B)(2-3)). It is not required that the groundwater be restored to pre-mining conditions, as long as the AWQS are met at the points of compliance (POCs) and/or there is no further degradation of the aquifer relative to that pollutant at the POCs. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant). The permit contains required contingency actions that will be implemented if alert levels are exceeded at the points of compliance. Violation of an AQL at a point of compliance is a permit violation.

"Due to Curis' clever business structure there will be no recourse of any consequence to Curis, or their shareholders once the damage is done, and the homeowners and farmers will have to contend with prohibitively expensive water treatment technologies, in perpetuity. The net worth of the entire county will suffer as real estate prices reflect extraordinary water costs. Has there been any thought how the residents of the area in question will be compensated for AZDEQ's expediency?"

ADEQ Response –
See response to commenter #24(12).

#38, John Westmoreland –
The commenter submitted an email expressing concern about the Curis Project:

"If the risk with the Curis Project didn't have such potentially serious consequences when a catastrophic failure does occur, I don't believe there would such a swell of opposition. We all want a prosperous community, with good-paying jobs, along with the benefits that come with good jobs come. Also, we do *not* want what a catastrophic failure at the Curis Copper Project will bring us."

ADEQ Response –
See response to commenter #3. The APP is designed to protect AWQS at the points of compliance, and has detailed provisions for monitoring and inspections, and contingency actions to be implemented if alert levels are exceeded.

#39, Lyle Gilbertson –
The commenter submitted an email opposing the Curis Project which listed the following:

"1. The groundwater pollution issue is of great concern, simply because the aggregate amount of sulfuric acid that is intend(ed) to be pumped into the ground, absolutely can not all be removed, as Curis tends to imply. The fact may be that the acid is being injected is into a layer far below the current ground water reserves, but there is no way to know how these layers of the earth interact between on(e) another, nor if the acids corrosive ability is able to permeate the different layers. The risk to both current, and future, ground water is huge, and far to(o) big of a risk to take for any sensible person. There are simply no guarantees that its safe for eternity, much less for the reasonable future! Additionally, and very importantly, Curis is a shell corporation with no significant assets at risk, should there ever be a serious issue, or if the price of copper should "tank" and they decide to just abruptly stop the operation. There's no long-term bond in place to insure the cost of such restoration, should it be needed. And, I haven't even touched on the potential for the corrosive acid interacting with radio active minerals know(n) to exist in this area, and the potential to release them in any kind of harmful fashion; again, no financial security bond in place to guarantee restoration if needed."

ADEQ Response –
See response to commenter #3 and #24(12).

"2. We also have great concern for the huge amount of added acid truck, and copper trailer truck, traffic that will be brought onto Hunt Highway. The environmental concerns are both the greater potential of a serious corrosive acid spill, as well as the large addition of diesel truck exhaust added to the quite clean air that we now have in this part of Pinal county."

ADEQ Response –
Spills of hazardous materials on traffic corridors and air quality issues are not within the jurisdiction of the APP Program. The APP Program issues permits to protect groundwater quality.

#40, Mike Shoppell –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#41, Barbara Reed –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

"The mine is simply too close to residential areas to risk polluting the groundwater."

ADEQ Response –
See response to commenter #3.

#42, Laura Wingenter –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

"There are not enough safeguards in place nor is Curis or the State of Arizona offering to be held accountable in this matter. Florence has already voted "NO" to this mining project and we expect our government to back that decision."

ADEQ Response –
See response to commenter #3.

#43, Brad Roberts –
The commenter submitted an email in support of the Curis project.

ADEQ Response –
The comment is noted.

#44, Lou Severino –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#45, Joseph Callahan –
The commenter submitted an email expressing opposition to the Curis project for the following reasons:

"1. The proposed POC wells do not compare to the mine when in full operation since they are inadequate in terms of numbers, depth or location. **If** they are able to detect groundwater pollution, it will not be in a timely manner to protect our drinking water."

ADEQ Response –
Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be adequately

located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP.

"2. Curis states that its PTF will require 2 years of leaching & rinsing, a 5-year post-closure monitoring period and a potential post-closure monitoring extension for another 5 years. It would appear that ADEQ has authorized a temporary permit that will allow for a potential 12-year operation. This is NOT a definition of "temporary". It is my understanding that temporary permits are limited to no more than one year plus a one year extension."

ADEQ Response –
The project will consist of a 14 month leaching phase and a 9 month rinsing phase. The time period extending past the two-year period is for post-closure monitoring of groundwater quality to evaluate the effectiveness of closure activities. The closure and post-closure activities will be amended into existing APP P-101704.

Following the completion of the Production Test project, Curis will have the option to make an application to ADEQ for an amendment to the existing permanent individual APP to allow mining, and that an amendment would be subject to the public participation requirements for an amendment of an individual APP. Review of this application will include an evaluation of pilot test results. The design to be employed for commercial operation has not yet been approved by ADEQ.

"3. Since it is highly unlikely that Curis will be able to locate and abandon **all** 40-year old bore holes through which contaminates could migrate, how can this Curis test project produce proof that it is safe?"

ADEQ Response –
The APP facilities at Florence Copper Project have been evaluated and determined to meet the design requirements of A.R.S. §49-243, R-18-9-A202, and the Arizona Mining BADCT Guidance Manual.

Detailed records are available for the site since exploration work began in the 1960's. Curis is responsible for abandoning coreholes and wells in accordance with Section 2.2.3.a and Section 3.0. The wells or coreholes that are within 500 feet of the PTF will be abandoned in accordance with UIC and ADWR requirements which are specified in a Plugging and Abandonment Plan in the Application-Exhibit 16A. According to ADEQ records approximately 31 exploration coreholes, geophysical borings, monitoring wells, test wells and or irrigation wells are proposed to be abandoned within 500 feet of the PTF well field, prior to injection. The Application indicated approximately 13 coreholes and one non-POC well were abandoned by Magma Copper Company in the 1970's, for coreholes and wells that fall within the current PTF 500 foot buffer zone.

Also, ADEQ has added language to Section 2.2.3 of the permit to include that all boreholes or wells located within 150 feet of the Process Water Impoundment and Runoff Pond shall be plugged and abandoned per ADWR rules.

"4. What proof does Curis have that the cement well casings will hold? Hydrologists inform me that the acid solution, when being injected **or acid and other contaminants when being extracted** could migrate through the ground to our water. There is well documented evidence that, for a variety of reasons, cement casings that have been used for natural gas have had an astronomical failure rate of up to 60%."

ADEQ Response –
Injection and extraction wells will be constructed with non-corrosive piping (tubing). Cement will be used as an outer structural component with no direct contact with process solutions. As a pre-operational and operational condition of the permit, all Class III injection wells shall be drilled, cased and cemented according to the requirements of the UIC permit. Prior to commencement of operation, all new Class III injection wells shall meet the mechanical integrity testing (MIT) requirements of the UIC permit. The design, construction, testing (mechanical integrity), and operation of injection and recovery wells shall follow EPA Class III rules (40 Code of Federal Regulations (CFR) Part 146).

#46, Pat Cosentino –
The commenter submitted an email in opposition to the Curis project with the following comment:

"there is no evidence of any in-situ mining operation returning the aquifer to baseline conditions in the United States."

ADEQ Response –
Points of Compliance are established for facilities that discharge pursuant to an Aquifer Protection Permit. The statutory requirement under A.R.S. §49-243(B)(2), states "That pollutants discharged will in no event cause or contribute to a violation of aquifer water quality standards at the applicable point of compliance for the facility."

ADEQ has determined that the project, as proposed, satisfies the requirements of BADCT (A.R.S. §49-243(B)), and the protection of AWQS at the points of compliance (A.R.S. §49-243(B)(2-3)). It is not required that the groundwater be restored to pre-mining conditions, as long as the AWQS are met at the points of compliance (POCs) and/or there is no further degradation of the aquifer relative to that pollutant at the POCs. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant). The permit contains required contingency actions that will be implemented if alert levels are exceeded at the points of compliance. Violation of an AQL at a point of compliance is a permit violation.

#47, Sue Hetherington –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –

See response to commenter #3.

#48, Judy Aliberto –

The commenter submitted an email expressing opposition to the Curis project for the following reasons:

"There are 107 INSITTU MINES around the WORLD AND IN THE USA. ALL 107 INSITTU MINES HAVE DAMAGED THE DRINKING WATER AQUAFIERS. THIS SHOULD BE SUFFICIENT PROOF THAT THIS TYPE OF MINING IS NOT SAFE FOR ALL OF FLORENCE, AZ AND THE PEOPLE WHO LIVE HERE, AND IN THE SURROUNDING AREAS. WE CANNOT RISK POLLUTION OF OUR MOST VALUABLE ASSET IN THE DESERT. OUR WATER AQUAFIER (AQUIFIER)."

ADEQ Response –
ADEQ has determined that the project, as proposed, satisfies the requirements of BADCT (A.R.S. §49-243(B)), and the protection of AWQS at the points of compliance (A.R.S. §49-243(B)(2-3)). It is not required that the groundwater be restored to pre-mining conditions, as long as the AWQS are met at the points of compliance (POCs) and/or there is no further degradation of the aquifer relative to that pollutant at the POCs. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant. The permit contains required contingency actions that will be implemented if alert levels are violated at the points of compliance. Violation of the AWQS or an AQL at a point of compliance is a permit violation.

Another problem is they will be transporting MILLIONS OF GALLONS OF SULPHURIC ACID BY RAILROAD TANKER CARS AND THRU THE LOCAL STREETS IN TANKER TRUCKS. Any accidental spills CURIS WILL SHIFT THE BLAME to THE INDEPENDENT CONTRACTOR transporting it, and CURIS will claim no liability for the spill. The clean up will fall to the INDEPENDENT CONTRACTORS, WHO TRANSPORT IT, to do the clean up. The Independent Contractors WILL NOT HAVE THE MILLIONS OF DOLLARS necessary to perform the CLEAN UP !!!!!!!!!!!!!!!! THAT MEANS THE FED. GOV AND THE STATE OF AZ AND IT'S TAX PAYERS WILL PAY FOR THE CLEAN UP! THAT MEANS CURIS WILL GET ALL THE "PROFIT" AND NON OF THE "LIABILITY".

ADEQ Response –
See response to commenter #39.

CURIS IS A CANADIAN COMPANY AND MAY NOT COME UNDER THE USA LAWS IN THE EVENT THERE ARE MAJOR PROBLEMS. US COURTS MAY HAVE LITTLE OR NO JURISDICTION IN THE EVENT OF CIVIL OR CRIMINAL VIOLATIONS AGAINST CURIS.

ADEQ Response –
See response to commenter #24(12).

ALSO, THERE IS NO MAJOR RESPONSE TEAM IN THE IMMEDIATE AREA THAT CAN RESPOND TO ANY MAJOR SPILL OF A TANKER TRUCK OR RAILROAD CAR. ANY SPILL WILL BE A "MAJOR SPILL". WHO WILL BE RESPONSIBLE FOR THE TRAINING AND RECRUITMENT OF THE MAJOR SPILL RESPONSE TEAM? AND WHO WILL PAY FOR THEIR TRAINING? THIS WILL ENDANGER ALL OF THE PEOPLE IN THE FLORENCE, AZ AREA AND ALL THE SURROUNDING AREAS IN THE EVENT OF A MAJOR SPILL."

ADEQ Response –
See response to commenter #39.

#49, James Holeman –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#50, Rick Barsness –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#51, Brenda Brooks –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.
ADEQ Response –
See response to commenter #3.

#52, Vicki D'Elia –
The commenter submitted an email attachment stating objection to the Curis project for the following reasons:

"The PTF Curis has proposed is not a pilot program. Curis proposes its PTF will require 2 years of leaching and rinsing, a 5-year post-closure monitoring period with potential for an additional 5-year monitoring period. Simple math runs this PTF to 12 years, which is outside of the one-year definition of a "temporary permit". Curis cannot complete PTF operations before the expiration of this permit. Therefore, one can only assume ADEQ is allowing a commercial APP to be issued without further public comment, hearings or further review. Therefore, I submit this permit is slanted (in more than one way) to provide Curis protection of their operations not the public which ADEQ has an obligation to protect."

ADEQ Response –
See response to commenter #45(2).

"Curis has designed its PTF field without perimeter wells for demonstration of hydraulic control. This does not reflect Curis proposed commercial operations which space perimeter wells hundreds of feet from interior injection/recovery wells. This spacing provides numerous possibilities for acid mining solutions to intersect preferential pathways to escape Curis control. The PTF is hardly a replication of commercial operations to generate "proof-of-concept" to maintain hydraulic control as required by the permit."

ADEQ Response –
The PTF will contain a total of 24 wells and consist of 4 Underground Injection Control (UIC) Class III injection wells, 9 recovery wells, 7 observation wells and 4 multilevel sampling wells. The observation wells will be used for groundwater elevation measurements, in conjunction with extracting more solution than goes in as a component of demonstrating hydraulic control at the PTF. Demonstrating hydraulic control for an in-situ leaching operation is a component of BADCT, and the APP facilities at Florence Copper Project have been evaluated and determined to meet the design requirements of A.R.S. §49-243, R-18-9-A202, and the Arizona Mining BADCT Guidance Manual.

"I fully support the pending challenge to ADEQ's issuance of the Temporary APP which has been filed in Maricopa County Superior Court. ADEQ's rush to issue this permit without a period for public comment first is underhanded and in my opinion a political move on the part of the Governor who is not fulfilling her oath to discharge her duties impartially."

ADEQ's processing of temporary APP P-106360 was conducted in accordance with the rules specified in Arizona Administrative Code R18-9-A210. This rule was approved in a final rulemaking effective November 12, 2005. Part D of this rule specifically relates to the public participation component of the Temporary APP process.

"The permit requirement for POC wells is vague and incomplete. It allows Curis to place POC wells in currently unspecified locations. This is not evidence of their ability to prove they shall not contaminate the drinking water aquifer and recover all of their hazardous solutions. I have no doubt the locations they do choose will not provide real results. Furthermore, the construction requirement for these wells is not clear. All of locations of these wells must be spelled out. ADEQ should have an independent, outside consultant review the location and construction of these POC wells and revise the permit to require the POC wells be adequately positioned and constructed to detect groundwater pollution from Curis in-situ mining operation. The current application is Curis attempt at a shell game that will only fool you and us into believing our water is safe. It is another slant the sets Curis PTF operations for nothing but success. Another way ADEQ is failing to protect the public."

ADEQ Response –

The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in A.R.S. §49-244, such that all POCs are within 750 feet of the Pollutant Management Area (PMA) and in the downgradient groundwater direction. POC well locations are specifically identified by latitude and longitude designations. ADEQ has reviewed and approved the construction details for the POCs. Groundwater monitoring at the POCs in the UBFU, LBFU, and Oxide water bearing units downgradient from the PTF and within the property boundary is protective of any potential downgradient groundwater users. Real time results will be obtained through components of BADCT and groundwater sampling at MW-01, a monitoring well adjacent to the PTF well field.

Demonstrating hydraulic control for an in-situ leaching operation is a component of BADCT, and the APP facilities at Florence Copper Project have been evaluated and determined to meet the design requirements of A.R.S. §49-243, R-18-9-A202. Therefore, it is anticipated that recovery of injection solutions shall be maintained such that AWQS are meet at the POC, or that no further degradation relative to a particular occurs as a result of the discharge at the facility.

"I would like to add that from day one Curis has ignored concerns of my water company (Johnson Utilities) that current and future drinking wells are located in an area just west (down-gradient) of their property and not protected by a clay aquitard. Curis must not be allowed to ignore this deep water basin does just because it sits west of their property. They must not be allowed to use me and thousands of other people as a guinea pig for their experiment."

ADEQ Response –
The foreseeable use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. ADEQ has not evaluated or considered the concept of a protective clay aquitard relative to required pollution control measures for BADCT.

"Curis proposes to plug and abandon ALL boreholes & wells located within 500 feet of the PTF well boundary. BHP previously drilled thousands of boreholes throughout the property. If we do not know where all these wells will be placed how can we be assured which holes/wells shall be plugged. Your permit does nothing to confirm the list of coreholes Curis claims all encompassing. It does not even require abandonment for the entire State land parcel. Nor does it consider historic coreholes beneath prominent PTF features such as the pipeline, underground mine workings and surface impoundments. The permit has no contingency plans if Curis cannot find the 40-year old coreholes they know exists. Since there is documentation that coreholes are a leading causes of excursions allowing for groundwater contamination, ADEQ should immediately stop all work on the PTF facility."

ADEQ Response –

See response to commenter #45(3).

"ADEQ is failing the public by refusing to require additional standards to protect drinking water resources. You do not require Curis to sample groundwater and prove compliance for levels of arsenic. ADEQ should have set ALs and AQLs before this permit was issued. As arsenic, in excess, can contribute to skin damage, circulatory system problems and increase the risk of cancers; this operation has the potential to injure thousands of people. The company (Curis) responsible for the contamination or even possible contamination should have the responsibility to protect the aquifer & cleaning up contamination of downgradient drinking water providers."

ADEQ Response –
Table 4.1-7 lists the parameters to be monitored semi-annually. In the case of arsenic, ADEQ adopted a Use Protection Level (UPL) to protect downgradient users which may be revised based on the ambient groundwater monitoring data. The current Alert Level for arsenic in the permit is 0.026 milligram per liter (mg/L), which is approximately 50% of the aquifer water quality standard.

"The proposed frequency (bi-annually over 2-years) for monitoring groundwater contaminants is not sufficient. ADEQ only requires Curis to sample quarterly for Level 1 pollutants and semiannually for Level 2 pollutants. This monitoring proposal is a slap in the face and only demonstrates how little Curis is concerned for my safety. Although ADEQ requires more frequent sampling than Curis proposes, you can do better. If Curis claims to develop data to support full commercial operation their monitoring standard should be equal to if not exceeding that of my water company."

ADEQ Response –
ADEQ has determined that the number and location of monitoring points is protective of those aquifers likely to be impacted, and are similar to the number and locations of monitoring points required in other mining APP permits. Collection of water samples at the residential drinking water sources is too distant from the site to provide useful information regarding the protection of AWQS at the POCs. These sources are already regulated and monitored under federal drinking water regulations.

The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in ARS §49-244, such that all POCs are within 750 feet of the Pollutant Management Area (PMA) and are in the downgradient groundwater direction. Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS.

The foreseeable use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. Groundwater monitoring in the UBFU, LBFU, and Oxide water bearing units at the POCs between the PTF and the Curis property boundary is protective of any potential downgradient groundwater users.

"The permit only requires Curis to sample the PLS tank, Raffinate Tank, Process Water Impoundment and Runoff Pound once within 90-120 days of the PTF startup. What? Curis own claims that PTF operations of 14 months are necessary to develop "mature" mining solutions to accurately reflect commercial mining. This is just another way to stack the deck for test results that are not truly reflective of full commercial operations. In all likelihood, Curis shall be analyzing mining solutions continuously during this PTF, ADEQ should require that data be reported on a monthly basis."

ADEQ Response –
The permit requires that discharge characterization for the Pregnant Leach Solution (PLS) Tank, Raffinate Tank, Process Water Impoundment, and Run-off Pond be completed within 90-120 days of initial PTF start-up and submitted to ADEQ within 30-days of the receipt of the laboratory analytical results. This time period will be adequate for determining representative process solutions for these facilities.

"Curis wants to claim that they will be the first in-situ operation that will not pollute the groundwater. They even claim they can clean it up after contamination. What planet do they live on? They are fully aware of FACT that not one ISL operation around the country & even the previous BHP pilot demonstrated THAT GROUNDWATER CANNOT BE RESTORED to pre-mining conditions. The Temporary APP does not sufficiently address groundwater pollution cleanup process by Curis or their ability to show adequate financial assurance to protect against contamination and provide for said cleanup. Please come buy a house here in Anthem at Merrill Ranch, so you can help pay for cleanup with me. It's not a matter of if, but when it will happen. Yet ADEQ will not be concerned if Curis uses an insurance policy they can default on, or a Bond that will not sufficiently cover cleanup costs. ADEQ has an obligation to make this information available to the public. Where is it?"

ADEQ Response –
ADEQ has determined that the project, as proposed, satisfies the requirements of BADCT (A.R.S. §49-243(B)), and the protection of AWQS at the points of compliance (A.R.S. §49-243(B)(2-3)). It is not required that the groundwater be restored to pre-mining conditions, as long as the AWQS are met at the points of compliance (POCs) and/or there is no further degradation of the aquifer relative to that pollutant at the POCs. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant). The permit contains required contingency actions that will be implemented if alert levels are violated at the points of compliance. Violation of the AWQS or an AQL at a point of compliance is a permit violation.

See response to commenter #24(12).

#53, Karen Shoppell –
The commenter submitted an email with an attachment expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#54, Ferdinand and Audrey Sobota –
The commenter submitted an email attachment stating objection to the Curis project for the following reasons:

1. "Our understanding is that over 800 core/bore holes have been drilled on this property since the 1960s by Asarco, Magma Copper Company and BHP Copper. Are these core/bore holes going to be filled prior to Curis' Pilot? If not, how are we going to be protected from those holes carrying the acid solution to our water? If they are not filled, how will you ever determine true "test" results?

ADEQ Response –
See response to commenter #24(16).

2. "On January 23, 2012, Curis reported to the EPA, groundwater exceedances on one of their monitoring wells of contaminants such as sulfate, total dissolved solids, and magnesium ranging from three times to twelve times the allowable levels. What does that tell us?"

ADEQ Response –
See response to commenter # 24(26).

3. "Is the issue really whether recent exceedances of sulfate and other minerals are caused by the small amount of acid pumped underground 14 years ago or natural fluctuations in groundwater dissolving minerals in the bedrock. Curis intends to disturb this bedrock, so what then?"

See response to commenter # 24(27).

4. "Are you, ADEQ, going to monitor Radionuclides in the drinking water? If not, who will and how often?"

ADEQ Response –
Under the Temporary APP, Curis must monitor for certain radionuclides in groundwater at POCs on a semi-annual basis. Your drinking water provider may be able to provide monitoring results for radionuclides in the drinking water.

5. "What happens at the end of the first year or after the one year extension? Is a permit issued to operate a full blown mining process automatically or are the results available to the public and ADEQ will hold another public hearing? What statutes apply to this?"

ADEQ Response –
See response to commenter # 45(2) regarding potential future permitting of commercial operations.

"Why wasn't Curis required to post a surety bond, certificate of deposit, trust fund or letters of credit to ensure the tax payers of Arizona will not be stuck with the cleanup costs?"

ADEQ Response –
See response to commenter #24(12).

6. "What is the process for taking samples during the "test pilot"? Who is going to collect the samples? How many samples/where/how often? We believe an independent, Arizona based, company should take the samples weekly and the information should be available to the public."

ADEQ Response –
Sampling frequencies and constituents are detailed in the permit in Section 2.5 and the permit tables, Section 4.0. All APP permittees self-monitor and report. ADEQ also conducts compliance inspections to ensure that monitoring results are valid.

The location and construction of POC wells will be overseen by Arizona registered geologists and engineers, and will be installed by Arizona licensed well drillers. The samples will be analyzed by Arizona licensed laboratories.

All records pertaining to this project are available for public review by contacting ADEQ Records Center at (602) 771-4380.

#55, Jerry Ravert –
The commenter submitted an email in support of the Curis project, with the following concern:

"As long as there is no "fracking" permitted and all safety measurers are followed, I believe Curis Resources should be allowed to test their in-situ mining process."

ADEQ Response –
The term fracking is generally applied to the method used for extraction of petroleum/natural gas, and is not allowed under the temporary permit. Table 4.1-8 includes Alert Levels for maximum injection pressures and Section 2.6.2.6 contains contingency measures to be initiated in the event of exceeding maximum injection pressures.

#56, Terry and Nancy Thornton –
The commenter submitted an email with an attachment expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#57, Curtis Haynes –
The commenter submitted an email with an attachment expressing opposition to the Curis project due to concerns about groundwater contamination.

"I fail to understand how letting a foreign country operate a copper mine within the town of Florence is going to protect our water source for the future of our children. Even if the profits were kept in Arizona, it would not cover the damages created by this In-situ Mining operation."

ADEQ Response –
See response to commenter #3 and 24(25).

There are no restrictions on foreign companies under ARS §49-241 through §49-244, and Arizona Administrative Code A.A.C. R18-9-A201 through A209, from obtaining an Aquifer Protection Permit. Curis has provided a performance surety bond which satisfies the financial requirements of A.A.C. R18-9-A203.

"At the very least ADEQ should not be ignoring the fact that Florence has not and will not grant a permit to Curis."

ADEQ Response –
ADEQ can only consider requirements under statute and rule when deciding whether to issue a permit. Curis met all regulatory requirements for a Temporary APP.

"Do your families drink this water? Will the pollutants contaminate water flowing underground to other communities?"

ADEQ Response –
Based upon the results of modeling performed as a part of the application, the discharge impact area (DIA) will remain within the site boundaries and approximately within 150 feet from the PTF well field. ADEQ has found that no drinking water wells are located within the DIA. See response to Commenter #3.

#58, Ruth F. Wloczewski –
The commenter submitted an email stating opposition to the Curis project for the following reasons:

"We believe the threat of water contaminates from sulfuric acid injected into the ground and mobilizing other contaminates is very real. Every in-situ mine located on an aquifer has created irreparable damage to that aquifer."

ADEQ Response –
See response to commenter #3 and #46.

"We do not think Curis has been totally honest and that they have no experience with in-situ copper mining and this mine will be an experiment with our precious water at risk."

ADEQ Response –
The APP application submitted by Curis resources has satisfied the technical capability requirements of A.R.S. §49-243(N) and A.A.C. R18-9-A202(B).

Also, see response to Commenter #3.

"This so called Pilot Project is a sham. The self monitoring is like the fox watching the hen house. The monitoring wells are too far from the mining site and even by their own schematic the contaminates would not reach the monitoring wells in more than five years."

ADEQ Response –
A.R.S. §49-244 requires that POCs be established no more than 750 feet from the edge of the pollutant management area. The currently designated POCs comply with this requirement.

Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS.

All APP permittees self-monitor and report. ADEQ also conducts compliance inspections to ensure that monitoring results are valid. The location and construction of POC wells will be overseen by Arizona registered geologists and engineers, and will be installed by Arizona licensed well drillers. The samples will be analyzed by Arizona licensed laboratories.

"Curis is a foreign company and when costly problems and mishaps occur they will pull up stakes and leave our country."

ADEQ Response –
There are no restrictions on foreign companies under ARS §49-241 through §49-244, and Arizona Administrative Code A.A.C. R18-9-A201 through A209, from obtaining an Aquifer Protection Permit. Curis has provided a performance surety bond which satisfies the financial requirements of A.A.C. R18-9-A203.

"It is the job of ADEQ to protect our water and we should not have to fight to convince our own government to do so."

ADEQ Response –
ADEQ must apply the requirements of the APP Program, as required by A.R.S. Title 49, Chapter 2, and A.A.C. Title 18, Chapter 9, Articles 1-4. In this manner, ADEQ is being protective of groundwater quality.

#59, Richard and Carol Biallas -
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#60, Harvey Sherlin –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#61, Shirley Cardwell –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#62, Wes Moraes –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#63, Michael George –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#64, Arne L. Hawkins –
The commenter submitted an email with an attachment expressing opposition to the Curis project for the following reasons:

1.."Curis says that the in-situ process of mining is a proven technique and is safe. According to the United States Geological Survey, NOT ONE in-situ mining operation in the United States has restored water quality to pre-mining conditions."

ADEQ Response –

The APP closure requirements under A.R.S. §49-201(5) state that "elimination, to the greatest degree practicable, of any reasonable probability of further discharge from the facility and of exceeding aquifer water quality standards at the applicable point of compliance." The requirement is not to achieve pre-mining conditions.

ADEQ has determined that the project, as proposed, satisfies the requirements of BADCT (A.R.S. §49-243(B)), and the protection of AWQS at the points of compliance (A.R.S. §49-243(B)(2-3)). It is not required that the groundwater be restored to pre-mining conditions, as long as the AWQS are met at the points of compliance (POCs) and/or there is no further degradation of the aquifer relative to that pollutant at the POCs. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant). The permit contains required contingency actions that will be implemented if alert levels are violated at the points of compliance. Violation of the AWQS or an AQL at a point of compliance is a permit violation.

2. "The pilot "test" proposed by Curis doesn't even resemble the actual proposed commercial mining operation proposal. How can we allow a "test" when the "test" does not compare apples with apples? The "test" results will provide no relative conclusions from which a permit for commercial operation can be made. Why then are we considering giving Curis approval for a "test" in the first place?"

ADEQ Response –
Pursuant to AAC R18-9-101(30) a "pilot project" means a short-term, limited-scale test designed to gain information regarding site conditions, project feasibility, or application of a new technology. The Temporary APP is to construct and operate a production test facility (PTF) which shall provide sufficient data to assess and to potentially develop a full-scale in-situ mining operation. ADEQ concurs that the information obtained from the pilot test will provide useful data regarding site conditions, project feasibility, to access the viability of in-situ leaching operations at the site and to potentially develop a full scale commercial operation based on results obtained from the pilot test.

3. "The proposed time period for monitoring by Curis doesn't fit with the actual time it takes for water quality testing to have any merit. Most of the groundwater contamination will take longer than one year plus one additional year to appear except directly next to the well sites. As we all know, the ground is fractured in this area and it may take years for any contamination to reach outside the test area. Curis also proposed testing every six months at their monitoring sites. This should be done on a much more timely and consistent basis to properly address any contamination that occurs. Why not every week or month at a minimum? Some of Curis' monitoring wells are too far from the injection sites. Once again, how can you properly monitor water quality when the time it takes for the contamination to occur at this distance is obviously longer than six months or maybe even six years?"

ADEQ Response –

The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in ARS §49-244, such that all POCs are within 750 feet of the Pollutant Management Area (PMA). Monitoring well MW-01 will be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS.

4. "Curis says that their proposed "test" will not be at the same level as our groundwater level so the quality of our water cannot be impacted. Johnson Utilities has water wells adjacent to the aquifer Curis has proposed to inject sulfuric acid into. Johnson Utilities is also planning to install additional wells to serve the increase in population in the area. These aquifers will certainly be affected by a pilot "test" or commercial operation."

ADEQ Response –
ADEQ acknowledges that Johnson Utilities, LLC ("Johnson") owns a registered well ADWR #55-212512 that is approximately 1.2 miles northwest from the Temporary APP Pollutant Management Area boundary. ADEQ is aware that the Johnson Utilities well is not connected to the drinking water system. The PTF will inject into the Oxide Unit between 500 to 1,200 feet below ground surface. Extraction wells, observation wells, monitoring wells and POCs in the UBFU, LBFU, and Oxide units, are located between the PTF injection wells and the Johnson Utilities well. ADEQ concurs that injection at the PTF site in the Oxide Zone is taking place at the same depth below ground surface as the Johnson Utilities well could conceptually extract groundwater from, however, the PTF injection is taking place in a separate and distinct geologic unit (Oxide) then the screened interval of the Johnson Utilities well (LBFU) and the comparable depths below ground surface for the PTF Oxide injection zone and potential groundwater withdrawal location in the LBFU are over 1.2 miles away from each other.

The foreseeable use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. Groundwater monitoring in the UBFU, LBFU, and Oxide water bearing units between the PTF and the Curis property boundary is protective of any potential downgradient groundwater users.

5. "The water quality standards proposed by Curis do NOT meet the current water quality standards required by our water providers. How can any "test" allow lower standards than what we allow our water providers to maintain? It is ludicrous to think that ADEQ would allow this in the first place, the department charged with protecting our water."

ADEQ Response –
In accordance with AAC R18-9-A202(A)(6)(a) the facility shall not cause or contribute to a violation of an Aquifer Water Quality Standard at the proposed point of compliance; or (b) if an Aquifer Water Quality Standard for a pollutant is exceeded in an aquifer at the time of permit issuance, no additional degradation of the aquifer relative to that pollutant

and determined at the proposed point of compliance shall occur as a result of the discharge from the proposed facility. In this case, the applicant shall submit an Ambient Groundwater Monitoring Report that includes data from eight or more rounds of ambient groundwater samples collected to represent groundwater quality at the new proposed points of compliance, and an AQL proposal for each pollutant that exceeds an Aquifer Water Quality Standard. Previously installed POCs have had ALs and AQLs set based on ambient water quality. Therefore, the ALs and AQL standards set previously in the in the permit were statistically derived values based on ambient groundwater quality at the time, and the new ALs and AQLs will be statistically derived values based on current groundwater quality concentrations present at the site. Current background groundwater quality may or may not meet drinking water quality standards. For the purposes of the Temporary APP, the drinking water standard (0.01 mg/L) for arsenic has been considered and will be applied through consideration of fate and transport of arsenic in groundwater to ensure that the UPL is not exceeded at the northwest corner of the State Mineral Lease Land.

6. "There have been hundreds of test wells drilled in this area. How can we be sure that the injection of sulfuric acid and resulting extraction of acid and copper won't become affected by these wells? We know there are maps showing some of the wells but not all. How can we protect our water without knowing where each well is located and until each well is sealed properly to avoid any chance of contamination? Once again, the land in this area is fractured and any contaminants will seek the path of least resistance which could involve these wells."

ADEQ Response –
See Response to Comment #24(6), #24(10), and #24(16).

7. "Curis has repeatedly used the prior BHP results as proof of a safe mining operation at this same area. However, the "test" from the 1990 pilot of 13 injection wells found the water quality exceeded established water quality standards in 26 separate cases. This is the opposite of proof."

ADEQ Response –
ADEQ issued this permit based on the information provided in the Temporary APP application submitted by Curis. ADEQ assumes that the commenter is referencing alert level exceedances to the existing and separate APP P-101704. Please see response to comment # 24(26) with regard to exceedances of alert levels.

8. "Curis has proposed assurance in the form of a bond to protect this "test". Does this bond protect just the "test" area or outside the "test" area where we live? Does it protect the residents outside the "test" area should there be any form of contamination or spill of acid and to what extent?"

ADEQ Response –
See response to commenter #24(12).

#65, Jan Roberts –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#66, David Porter –
The commenter submitted an email expressing opposition to the Curis project due to concerns about groundwater contamination.

ADEQ Response –
See response to commenter #3.

#67, Doug Heller –
The commenter submitted an email stating the following:

"I feel that the permit that has been issued should be withdrawn. After talking to a friend of a friend who is a mining engineer for EPA he noticed that there are no "Sentinel Wells" and the frequency monitoring is not as it should be. He told me that Sentinel Wells should be drilled between Curis test drill sights and the aquifer to monitor if there is ANY flow of the chemicals Curis uses towards the aquifer. Monitoring of the Sentinel Wells should be monitored a few times per week."

ADEQ Response –
ADEQ has required POCs in three separate water bearing zones, the UBFU, LBFU and Oxide Units, the Oxide Unit being targeted for in-situ leaching. The points of compliance established under the APP will be adequate for the protection of groundwater at the edge of the pollutant management area and are located between the PTF well field and down-gradient groundwater users. An exceedance of groundwater quality standards or an alert level at the Point of Compliance wells are required to be addressed by the permittee under the permit contingency plan requirements (Section 2.6).

The permit requires quarterly groundwater monitoring for all POCs for a shortened list of parameters and a semi-annual frequency for an expanded list of parameters including metals and radionuclides. If a permit limit such as an Alert Level for compliance groundwater monitoring is exceeded for the quarterly sampling event, the permit requires that the sample be analyzed for the expanded list of parameters (same sampling parameters for the semi-annual event) including metals and radionuclides, and other contingency actions as noted in the permit. Additionally, the permit requires a monitoring well (MW-01) at the downgradient edge of the PTF well filed. The placement of MW-01 will be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. Currently, monthly testing of MW-01 is required for pH, sulfate and TDS.

Monitoring well (MW-01), located adjacent to PTF well field, will be monitored monthly and the POCs located in each water bearing unit downgradient from the PTF monitored on a quarterly basis. In conjunction with specific contingency requirements, ADEQ believes this monitoring schedule is adequate to protect downgradient water quality for the duration of the PTF and into post-closure.

#68, Bill Brown –
The commenter submitted an email with an attachment expressing opposition to the Curis project for the following reasons:

"The Curis PTF will be conducted near a prime drinking water aquifer for our area and may contaminate our drinking water."

ADEQ Response –
See response to commenter #3.

"Under the APP terms this project will not be adequately monitored."

ADEQ Response –
See response to previous commenter #67 regarding the groundwater monitoring conditions.

ADEQ has determined that the number and location of monitoring points is protective of those aquifers likely to be impacted, and are similar to the number and locations of monitoring points required in other mining APP permits. Collection of water samples at the residential drinking water sources is too distant from the site to provide useful information regarding the protection of AWQS at the POCs. These sources are already regulated and monitored under federal drinking water regulations.

The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in ARS §49-244, such that all POCs are within 750 feet of the Pollutant Management Area (PMA) and are in the downgradient groundwater direction. Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure potential changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP.

The foreseeable use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. Groundwater monitoring in the UBFU, LBFU, and Oxide water bearing units at the POCs between the PTF and the Curis property boundary is protective of any potential downgradient groundwater users.

In addition to groundwater monitoring, numerous BADCT operational requirements are set forth in the permit, and shall provide adequate monitoring provisions to access the pilot test.

"Clearly the technology and processes for in-situ mining are too new and risky for experimenting within an area in such close proximity to potable water sources for existing, nearby residential development."

ADEQ Response –
See response to commenter #46.

"What happens if the project fails and the drinking water aquifer is polluted?"

ADEQ Response –
See response to commenter #46. The APP Program is designed to protect AWQS at the points of compliance, thereby minimizing any pollution to the surrounding aquifer. These requirements are in place regardless of the outcome of the pilot test.

#69, Ed Venetz –
The commenter submitted an email with an attachment expressing opposition to the Curis project for the following reasons:

"Every single heap leach mine in Montana has failed to prevent groundwater pollution. In addition the bonds required of these enterprises were insufficient to pay for the millions in dollars of clean up, leaving the taxpayers on the hook to foot the bill, while the companies declared bankruptcy and ran off with millions in profits."

ADEQ Response –
The PTF is not a heap leach facility. See response to commenter #46.

The Surety Bond submitted by Curis satisfies the financial assurance requirement in accordance with A.A.C. R18-9-A202(C)(2). The cost estimates have been evaluated by ADEQ and determined to be adequate for closure and post-closure of the APP facilities at the Florence Copper Project.

#70, Rich Rochel –
The commenter submitted an email with an attachment expressing opposition to the Curis project for the following reasons:

"If the in-situ mining process is so safe, why are there so many State and Federal safeguards?"

ADEQ Response –
A.R.S. §49-241, requires that all subject discharging facilities must obtain an APP.

"The injection wells proposed on State land require constant monitoring and testing. This monitoring will go on for years after the end of the one-year pilot test facility and beyond a one-year extension if granted."

ADEQ Response –

See response to commenter #45(2).

"We seriously doubt that Curis has the experience to accurately conduct this process. How many of their "experts" have demonstrated that they have successfully prevented exceedances?"

ADEQ Response –
The Department has reviewed the technical capabilities of Curis and their consultants. The technical capability demonstration requires that appropriate documents be sealed by an Arizona registered geologist or professional engineer. The technical capability requirement is a part of an on-going demonstration of technical capability. The permittee is required to maintain technical capability throughout the life of the facility.

"Who pays for the damage and loss of wildlife caused by the toxic deposits in the leach pond?"

ADEQ Response –
The provisions of Arizona Revised Statutes (ARS) §49-241 through §49-244, and Arizona Administrative Code (A.A.C.) R18-9-A201 through A209 are strictly related to protecting groundwater quality.

"Curis is a small company touting its relationship with HDI. Why, then, didn't HDI undertake this Project directly?"

ADEQ Response –
This question is not a matter that is addressed under the APP Program.

#71, Russell Clark –
The commenter submitted an email stating opposition to the Florence Copper Project for the following reasons:

"A foreign, Limited Liability company wants to mine copper in our state in our community and will take no responsibility for the probable consequences and long term damage done to our environment."

ADEQ Response –
The Arizona Revised Statutes (49-243(N) and Arizona Administrative Code (A.A.C. R18-9-A203) provide ADEQ authority to require closure and post-closure cost financial assurance for APP facilities. The performance surety bond submitted by Curis Resources satisfies the financial assurance requirement in accordance with A.A.C. R18-9-A202(C)(2) in the amount of $3,487,743. The cost estimates have been evaluated by ADEQ and determined to be adequate for closure and post-closure of the APP facilities at the Florence Copper Project PTF. The APP rules and statutes have no provision for excluding foreign companies from operations.

"They would mostly likely sell the copper to China. The Chinese will take no responsibility for the damage as they have proven to be untrustworthy trading partners in the past (remember the lead paint in children's toys?)."

ADEQ Response –
The APP Program is designed to protect groundwater quality. The ultimate buyers of the products are not a consideration.

"There will be little, if any benefit to Florence, Pinal County, Arizona or the United States."

ADEQ Response –
The APP Program is designed to protect groundwater quality. The economic benefits of the operation are not a consideration of the permitting process.

"The potential risk is staggering. Apply scientific analysis not political rhetoric! If you do, and I challenge you to do this and it would be irresponsible not to, a statistical probability evaluation of all the things that can go wrong in each step of this proposed project, the probability of catastrophic damage to our aquifer is so high that no rational person would take on the risk. We are not a casino!"

ADEQ Response –
The potential impact to nearby aquifers has been considered, and the project has been determined to comply with the requirements of the APP Program. The permit includes groundwater monitoring, and includes aquifer quality limits, alert levels, and a use protection level for arsenic.

#72, Angela Chicoine –
The commenter submitted an email opposing the Florence Copper Project for the following reasons:

"To date there is ***NO*** evidence that copper mining has a positive environmental effect. There is a large aquifer just under our communities here in Florence, and in the area of the proposed Copper Mining Project. ***I DO NOT WANT THIS PROJECT IN MY COMMUNITY CONTAMINATING MY WATER SUPPLY.*** If this is allowed to occur, I will sell my 3 properties here and would even abandon them as I could not in good conscience rent any of them to families that would be exposed to the water they would be bathing in and ingesting.

As a governmental official, you are the steward for our best interest. There is so much corruption in government today for the sake of special interests and money; we as a people are losing faith daily. We can only be as safe and protected as you make decisions that are truly humanitarian. Our health and lives are literally in your hands. I hope you will do the right thing and reject this copper mining proposal."

ADEQ Response –

The APP Program is designed to protect groundwater quality at the points of compliance, and requires contingency actions if alert levels or other action limits are exceeded.

#73, Janis Clark –
The commenter submitted an email stating opposition to the Florence Copper Project for the following reasons:

"A foreign, Limited Liability company wants to mine copper in our state in our community and will take no responsibility for the probable consequences and long term damage done to our environment.'

"They would mostly likely sell the copper to China. The Chinese will take no responsibility for the damage as they have proven to be untrustworthy trading partners in the past (remember the lead paint in children's toys?)."

"There will be little, if any benefit to Florence, Pinal County, Arizona or the United States.'

"The potential risk is staggering. Apply scientific analysis not political rhetoric! If you do, and I challenge you to do this and it would be irresponsible not to, a statistical probability evaluation of all the things that can go wrong in each step of this proposed project, the probability of catastrophic damage to our aquifer is so high that no rational person would take on the risk. We are not a casino!"

ADEQ Response –
See responses to commenter #71.

 # 74, Armand Young –
Submitted an email with the following comments relating to the Florence Copper Project:

The PTF is designed by Curis Resources not to demonstrate hydraulic control of the process but provide them with pre-determined results that favor their position. The 40 foot exclusion zone will not protect our aquifer or groundwater. The lower aquifer where a drinking water well exists at a depth of 600 feet is 1.5 miles from the PTF and will not be protected by this 40 foot exclusion. The pilot well field differs from the design for commercial production. The PTF well field does not include any perimeter wells. As a result, hydraulic control data generated by the PTF is irrelevant. The PTF should mimic commercial production. The Temporary APP was approved without public input. Even if ADEQ has this power, a public agency should seek public input from those people it represents before making a decision that will affect the environment of people living in that area. Remember you do not represent corporations or politicians but the people that live in that area. The proposed POC wells are not properly located or constructed to detect contaminates escaping from the PTF. They are so far away from the injection/extraction well field that they will not detect exceedances during the short life of the PTF. An independent consultant should determine location and construction of the

POC wells to detect ground water pollution. Curis should be required to conduct multi-level multi-port sampling near and just outside the PTF injection and extraction well field at several locations to account for all potential groundwater flow direction scenarios. More monitoring wells are needed in a ring around the well field. Standards to ensure proper placement and construction and complete sampling requirements. The first, second and third questions are: Why are the POC wells not properly located to detect contaminates escaping from the PTF? Why did you allow Curis to set up a PTF that differs significantly from a commercial production facility? How is the PTF designed to achieve hydraulic control?

ADEQ Response –

The 40 foot exclusion zone (injection and recovery wells shall be designed and installed to prevent injection into the top 40 feet of the oxide zone as described in Section 2.2.4) is one of many engineered considerations for injection/ recovery well construction details to prevent solution migration beyond the injection zone. Other BADCT operational conditions such as extracting more solution out than goes in, maintaining an inward hydraulic gradient, maintaining the fracture gradient are all components of maintaining hydraulic control.

The registered water well (i.e. Johnson well) at a depth of 600 feet, presumably screened in the LBFU, is approximately 1.2 miles northwest from the PTF and is protected by approximately 6,336 feet of lateral distance from the PTF test site. Additionally, extraction wells surrounding the injection wells are designed to capture the in-situ solution and prevent solutions from escaping the in-situ leaching zone. POCs located in the UBFU, LBFU, and the Oxide zone northwest of the PTF located between the injection zone and any potential downgradient groundwater users will further protect off-site drinking water sources.

The pilot test well field design differs from the commercial scale design, due to the much smaller nature of the pilot test. The design of the pilot test well field was accepted by ADEQ due in part to the small size of the pilot-scale Solvent Extraction and Electrowinning (SX/EW) plant, which is consistent with the small number of injection and recovery wells within this very limited size PTF well field and the relatively short operating period of the Temporary Permit.

While the Temporary APP has been issued, for purposes of A.A.C. R18-9-A210(E), this permit becomes effective on the later of the following: 1) If no timely appeal is filed, upon completion of the public participation requirements under A.A.C. R-18-9-109; 2) If a timely appeal is filed, upon final decision of the water quality appeals board; or 3) upon the date specified by the permittee in a written notification to ADEQ that the permittee can use the authorization to operate the PTF granted by this permit.

The public participation requirements were met in accordance with A.A.C. R18-9-A210.

The proposed POC wells are properly located and constructed to detect contaminates escaping from the PTF. The POC for the groundwater monitoring is required to be

established in the uppermost aquifer (i.e. – the shallowest groundwater). However in the case of Florence Copper project, ADEQ has required POCs in three separate water bearing zones, the UBFU, LBFU and Oxide Units, the Oxide Unit being targeted for in-situ leaching. The points of compliance established under the APP will be adequate for the protection of groundwater at the edge of the pollutant management area and are located between the PTF well field and any downgradient groundwater users. POC locations are required by A.R.S. § 49-244 to be placed on the downgradient edge of the pollutant management area. The seven (7) POCs are located correctly, as required by the cited statute. Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. Alert levels, aquifer quality limits, and a use protection level (UPL) for the protection of the AWQS at the points of compliance are all in effect during the pilot test operations, closure operations, and post-closure monitoring period.

The location and construction of POC wells will be overseen by Arizona registered geologists and engineers, and will be installed by Arizona licensed well drillers.

Curis and its predecessors should be required to provide all information they have on possible coreholes to ADEQ. ADEQ should require Curis to close all coreholes on the State land holdings before work begins. Curis proposed standards set arsenic and sulfate above Safe Drinking Water primary and secondary levels. Additional ALs that should be set for parameters without AWQS include PH, sulfate radio chemicals, TDS, magnesium, sodium and aluminum. ADEQ should require Curis to meet all State Drinking Water Standards throughout the PTF. The PTF should be shut down if any exceedance occurs above these standards. Curis should be required to monitor for Level 1 pollutants bi-weekly and level 2 pollutants monthly by an independent agency paid for by Curis and reporting directly to ADEQ. Curis should have nothing to do with this agency except pay for the services. Curis's proposal for bi-annual testing is a clear indication of their lack of concern for our environment and the residents of Florence. It's very important that POC wells need to be moved to appropriate locations to get relevant data. ADEQs approval for a single sampling event for mining solutions will not reveal the extent of ground water contamination and the requirements for ground water restoration. Since Curis will be analyzing mining solutions continuously, ADEQ should require sampling data on a monthly basis. The BHP tests show Sulfate levels are 7 times the AL and 12.5 tines the original levels back in 1998. These levels are increasing over time and a clear and present danger to children and older adults. Information from ISL mines around the world demonstrate that ground water cannot be restored regardless of the technique used and the time frame. In short ADEQ knows and all evidence from existing and past ISL mines demonstrate that it is not a closed system, hydraulic control is impossible and the rinsing technique has never worked in real practice. The fourth and fifth questions are: What factors made you decide in favor of this PTF? Why are the PTF water quality standards lower than the base line standards of the aquifer and State Water Quality Standards?

ADEQ Response –
Because the APP facilities comply with BADCT requirements, ADEQ believes that there will not be AWQS exceedances at the POCs, or further degradation of the aquifer at the POCs, for those constituents that already exceed the POCs at the time of permit issuance.

See response to commenter #24(6) and #24(10).

For the purposes of the Temporary APP, the drinking water standard (0.01 mg/L) for arsenic has been considered and will be applied through consideration of fate and transport of arsenic in groundwater to ensure that the UPL is not exceeded at the northwest corner of the State Mineral Lease Land. Sulfate has a secondary MCL set at 250 mg/L. For POCs that have alert levels currently set for sulfate, three of the four wells have alert levels set below the secondary MCL for sulfate at 144 mg/l, 126 mg/l, and 86 mg/L. Alert levels for sulfate, TDS, aluminum, and magnesium have been set for groundwater monitoring at the currently installed POCs. ADEQ does not believe that pH would serve as an appropriate indicator parameter at the POCs due to the buffering capacity of the surrounding groundwater. Therefore it would not be useful in evaluating hydraulic control of the PTF. ADEQ did not include sodium alert levels since other parameters such as sulfate and TDS better serve as indicator parameters. AQLs are set to the AWQS, unless background water quality indicates otherwise in accordance with AAC R18-9-A202(6). ADEQ believes that quarterly and semi-annual groundwater monitoring at the POCs, in conjunction with monthly monitoring at MW-01, is adequate to assess groundwater conditions, and in fact, is a more frequent sampling frequency compared to other APP mining permits. Numeric standards set in the form of ALs and AQLs at previously installed POCs have been determined through statistical methods and are based on data collected over a fifteen year period from the UBFU, LBFU, and Oxide aquifers.

In your Public Notice No. 12-48 dated 6/7/12 you listed four equally important demonstrations the mine must make to receive an APP. In reviewing Curis Resources plan for the PTF, the company history and their financial history it is oblivious that Curis resources TIP and PTF should have been denied. Here's my reasons why this should have been denied.

1. Technical ability. Curis is a small speculative company. The company has never mined anything let alone a technically complicated ISL mine. The company has no history or memory of mining. The personnel of the company are newly hired, have never mined an ISL operation as a team. HDI provides management and technical services only. None of its associates have ISL mining experience. Only one of the associates has mining experience and that's an open pit mine. Collectively all of the Curis team and consultants have no ISL mining experience as a company or team. We the public are not responsible for letting Curis get information at the expense of our water and environment. This lack of experience causes serious mistakes, witness the acid spill from a mine near Clifton, AZ. It is said this spill was caused be an employee working for a experienced multi-billion dollar corporation and not a bunch of amateurs Curis Resources inability to answer the 88 deficiencies in their 12/20/2011 application and to

top it off they had 69 deficiencies on their PTF application. This demonstrates their lack of technical ability. You are setting up the community of Florence for a disaster. The sixth question is: What made you decide that this conglomeration of people, that call themselves a mining company, have the technical ability to manage and operate an ISL mine?

ADEQ Response –
See response to commenter #70.

2. Financial capability. As a company Curis would be classified as a penny stock. Curis is currently operating on a 40 million dollar senior loan. It is using borrowed funds to finance current operations and expenses. As a reminder a senior loan takes precedence over all of the other claims against Curis. Forty million is hardly enough to set up and monitor a test facility that mirrors a real production facility and provides for adequate testing and financial protection for the water providers and citizens of Florence. Curis has already borrowed 16 million against this facility in May 2012. As of 9/30/12 Curis has about 8 million in cash left and will have to borrow additional funds in the near future. It has a accumulated deficit of 40 million with total assets of 38 million. Current ISL operations in other states require a 40 to 80 million bond before operations begin. Clearly Curis does not have the financial resources to fund this bond. Curis has proposed that it would obtain a letter of credit from a US bank but it did not provide any evidence that it had secured one, the amount or any detailed plan to do so. ADEQ has not released any information regarding this performance bond. HDI has no financial responsibility for Curis. Curis has no other operations of any kind that you could attach in case of environmental damage. Surely the water providers and water users in Florence are not protected. The seventh and eight questions are: What criteria did you use to determine the financial capability of Curis? What are the terms and amount of the performance bond if any?

ADEQ Response –
See response to commenter #24(12).

3. Compliance with Arizona aquifer water quality standards at a point of compliance. There is no new technology that would ensure point of compliance with Arizona aquifer water quality standards. They are using the same old technology that has contaminated aquifers all over the world. Testing is inadequate throughout the PTF. Base line standards of the aquifer have not been measured and Curis is not required to return the aquifer to these standards. ADEQ has permitted Curis to violate the State Safe Drinking Water Standards with this PTF. See the first and second paragraphs for additional information. The ninth question is: How is the PTF designed to ensure compliance with the Arizona aquifer water quality standards at the point of compliance?

ADEQ Response –
Ambient mine block groundwater concentrations are required to be established in accordance with Section 2.2.3, Section 2.7.4.3 and Section 3.0. The PMA allows the permittee to place pollutants within the test mine block for the purposes of in-situ

leaching, so elevated concentrations of sulfate and metals at this location during operations and into the initial rinsing phase are expected. The objective of the APP is to not exceed AWQS at the POCs, or cause further degradation relative to that pollutant if the AWQS is already exceeded at the time of permit issuance. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure that BADCT is met and AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant.

Compliance with AWQS at the POCs was determined through many factors, including but not limited to the following: BADCT considerations including facility design, type of pollutants, discharge quality, characteristics of the aquifer(s), ambient water quality, discharge impact area, and groundwater fate/transport modeling.

The facility must be designed and operated to achieve the greatest degree of discharge reduction achievable through the application of BADCT: The technology being used has been used for decades and has shown in all cases to be flawed. Setting up the PTF that does not mirror an actual production facility is a flawed design and will not accurately reflect the actual degree of discharge in the aquifer. The design is flawed and the results will be flawed. The tenth question is: What requirements in this PTF will satisfy this demonstration?

ADEQ Response –
The five-spot pattern has been reviewed by ADEQ and determined adequate. BADCT requires that injection and recovery wells be properly designed per BADCT Section 3.4.5. However, specific well field design layout is not covered under BADCT due to such site variables as field size and SX/EW plant location. There are a number of scientific field studies that have been completed over the years which include the use of the five-spot pattern. One in particular is included in the five-volume document titled Generic In-Situ Copper Mine Design Manual, prepared by the United States (US) Bureau of Mines, and dated April 1988. As an example, Volume III of the manual discusses a field experiment (Cyprus Casa Grande Mine) which integrated the use of the five-spot pattern, similar to Curis's proposed layout design. The evaluation of the well field location and design was submitted and accepted by ADEQ in Curis's APP application.

The BADCT Manual (Section 3.4.1) states that "There are numerous variations of in-situ leaching that may be applied to a given site based on the depth and hydrogeologic characteristics of the ore body and other factors. The discharge control system which constitutes BADCT for an in-situ leaching operation may depend upon the type of in-situ leaching operation and will always be a composite of: site characteristics; design construction and operations; and closure/post-closure measures." Curis has provided and ADEQ has approved an adequate site characterization and design for construction for the PTF operations.

The cause and effect of the PTF on the Florence community and land owners will be significant. If this PTF was in the middle of Phoenix or Scottsdale it would never have been considered. We elected a Mayor and Council in 2012 that are against this ISL

operation. As such the majority of people in this community are against the mine. This was the main issue of the election. In 1998 when BHP received approval for a production test facility there was no one living in this area. Currently there are over 2,000 houses, with thousands more to come and thousands of people and children living in this area. You should drive through Anthem @ Merrill Ranch, tour both Union Centers, the hospital and the Safeway shopping center. You will find a modern community that business and home owners have invested hundreds of millions of dollars to add to the beauty and value of the Florence community. This is what you are putting at risk. An ISL mine will never come close to adding this type of value to Florence. Instead it will reduce the value of this community and eventually cause all residential and business development in this area to come to a stand still. If you proceed with this PTF Southwest Value Partners will probably write off their land holdings and move on. They cannot wait another 5 to 12 years for this experiment to be concluded or turn bad. Pulte the builder at Anthem will have to cease building if sales fall due to this ISL mine. People that are in the market for a residence or retirement home will look elsewhere for a home as soon as they discover that an ISL mine is a few miles away. People currently living here do not want to live next to an ISL mine and will slowly leave. Florence competes with all other builders of residences and retirement homes in Arizona and in the US. We will not be competitive with an ISL mine in the center of our town. When a builder leaves he leaves homes and businesses with people in them, jobs that are permanent and an environment that is not contaminated. When a miner leaves he leaves empty buildings with no people in them, no jobs and water, land and an environment that is generally contaminated. Look at the history of mining and mining towns. If you approve this PTF you can sit back and boastfully say that you contributed to the destruction of Florence, AZ. The final two questions: Do you have the names and locations of any ISL mines that did not alter the ground water or aquifer after they completed production? Why did you amend the TIP to allow a discharge for more than six months?

ADEQ Response –
With regard to the first question, please see response to commenter #24, # 46 and #48.

The terms, conditions, and restrictions of this Temporary APP, in conjunction with monitoring and enforcement activities, if needed, by ADEQ constitute adequate measures to prevent contamination of the drinking water aquifer.

ADEQ agrees that activities described by the commenter cannot be completed in two years. The Department does not agree that all of these activities must be covered under the Temporary APP. For example, facilities can be constructed without prior authorization under an APP. Operation of the PTF, and any testing that requires discharge, must be conducted under the Temporary APP. Data developed during the pilot study will be used for the amendment to the existing APP for a full scale project, in compliance with A.A.C. R18-9-A210.A. Finally, that longer term groundwater monitoring is required through amendment of the existing APP after the Temporary APP expires does not violate the requirements of A.A.C. R18-9-A210.A.

#75, Ruth and Tom Morrow –
The commenter submitted an email stating their opposition to the Florence Copper Project do to the potential for groundwater contamination.

ADEQ Response –
See response to commenter #3.

#76, Tony Srnicek –
The commenter submitted a letter stating opposition to the Florence Copper Project due to threats to groundwater quality.

ADEQ Response –
See response to commenter #3.

#77, N. Allan Borggard –
The commenter submitted a letter in opposition to the Florence Copper Project for the following reasons:

"I have been a resident of Florence, AZ for 4.5 years. I live in the Pulte Corporation district of Merrill Ranch. I purchased my house in this new community so that I could live near the town of Florence, Arizona. It is beyond my comprehension that the State of Arizona would even consider this type of copper project on State Owned Land. The in-situ copper extraction method that Curis is proposing on state owned land is considered dangerous for areas where there are no residents!!"

"I am a practicing Canadian Mining Geologist and I can assure you that this method of extraction would never be approved near residents anywhere in Canada. Curis is not in my opinion a financially sound entity that will have the ability to provide funds to the state should the water table become contaminated. The State of Arizona needs to consider if Curis will have the financial ability to remedy any situation that might arise with this method of extraction."

ADEQ Response –
See response to commenters #3 and #23. See Section 2.1 of the permit for how the applicant has satisfied the financial assurance requirements of R18-9-A203.

#78, Mike O'Hara –
The commenter submitted a letter stating opposition to the Florence Copper Project and posed the following questions:

1. As part of its groundwater and surface water protection programs, ADEQ requires mining companies to submit Aquifer Protection Permit Applications (APPA) that include facility-specific radiological characterizations. Has this been done and where can the results be reviewed?

ADEQ Response –

Discharge characterization is required and described in Section 2.5.1. Discharge characterization includes radionuclides. In addition, the collection of ambient groundwater data, and periodic monitoring of POC wells is required under the APP (See tables 4.1-5 through 4.1-7). The groundwater monitoring data includes selected radionuclide constituents. The results of data collection during the application process can be referenced in the facility file for APP P-106360.

2. ADEQ has issued a temporary two-year APP to Curis when the Curis PTF requires two years of leaching and rinsing, a five-year post closure monitoring period, and a potential post-closure monitoring extension for another 5 years. What is ADEQ's rational for this decision? How is ADEQ proposing to properly analyze the safety and viability of the Curis operation before the TAPP expires?

ADEQ Response –
See response to commenter #45(2).

3. The Curis pilot well field design is significantly different from the design it would use for commercial production. Why isn't ADEQ requiring Curis to use the same design for its pilot well field that it would use in its commercial operation?

ADEQ Response –
The five-spot pattern has been reviewed by ADEQ and determined adequate. BADCT requires that injection and recovery wells be properly designed per BADCT Section 3.4.5. However, specific well field design layout is not covered under BADCT due to such site variables as field size and SX/EW plant location. There are a number of scientific field studies that have been completed over the years which include the use of the five-spot pattern. One in particular is included in the five-volume document titled Generic In-Situ Copper Mine Design Manual, prepared by the US Bureau of Mines, and dated April 1988. As an example, Volume III of the manual discusses a field experiment (Cyprus Casa Grande Mine) which integrated the use of the five-spot pattern, similar to Curis's proposed layout design. The evaluation of the well field location and design was submitted in Curis's APP application and accepted by ADEQ.

4. Why isn't ADEQ requiring that perimeter wells be within 75 to 100 feet of each other during the pilot test?

ADEQ Response –
That level of coverage is not necessary for evaluating pilot test results, or for providing proper monitoring at the POC locations. The level of coverage is consistent with that required in APPs for other mining operations.

5. Will ADEQ revise the TAPP to require Curis to adequately position and construct the POC wells to better detect groundwater pollution? If not, why not?

ADEQ Response –

See previous response. ADEQ considers the POC locations to be adequate to evaluate the protection of AWQS at the points of compliance. The commenter does not specify specific issues relating to POC well construction. The POCs will be constructed by Arizona licensed well drillers, overseen by Arizona registered engineers or geologists.

6. Will ADEQ have an independent outside consultant review the location and construction of the POC wells? If not, why not?

ADEQ Response –
The location and construction of POC wells will be overseen by Arizona registered geologists and engineers, and will be installed by Arizona licensed well drillers. The samples will be analyzed by Arizona licensed laboratories.

7. Since coreholes are documented to be one of the leading causes of excursions allowing groundwater contamination, will ADEQ require Curis to properly document the location and abandonment of all coreholes and wells on the state land parcel? If not, why not?

ADEQ Response –
Yes, coreholes and wells within 500 feet of the PTF well field shall be properly abandoned. Most of the coreholes and wells required to be abandoned fall on State Land, however some within that 500 foot radius fall on Curis privately owned property. ADEQ will require documentation that the coreholes and wells have been abandoned in accordance with the Section 2.2.3 and Section 3.0.

8. Has ADEQ required Curis to sample groundwater to set AL and AQL? If not, why not?

ADEQ Response –
Yes. See Section 2.5.3.2 and the APP permit Tables 4.1-5 through 4.1-7, and the Compliance Schedule, Section 3.0.

9. Will ADEQ reconsider its monitoring schedule and POC well field to require a monitoring network and schedule that provides more protection for our drinking water supply? If not, why not?

ADEQ Response –
Commenter does not propose specific changes. ADEQ considers the POC locations and sampling frequencies to be adequate to evaluate the protection of AWQS at the points of compliance.

The terms, conditions, and restrictions of the Temporary APP, in conjunction with monitoring and enforcement activities, if needed, by ADEQ constitute adequate measures to prevent contamination of the drinking water aquifer.

ADEQ Response –

ADEQ has determined that the number and location of monitoring points is protective of those aquifers likely to be impacted, and are similar to the number and locations of monitoring points required in other mining APP permits. Collection of water samples at the residential drinking water sources is too distant from the site to provide useful information regarding the protection of AWQS at the POCs. These sources are already regulated and monitored under federal drinking water regulations.

The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in ARS §49-244, such that all POCs are within 750 feet of the Pollutant Management Area (PMA) and are in the downgradient groundwater direction. POCs are monitoring the UBFU, LBFU and Oxide aquifers. Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS.

The foreseeable use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. Groundwater monitoring in the UBFU, LBFU, and Oxide water bearing units at the POCs between the PTF and the Curis property boundary is protective of any potential downgradient groundwater users.

10. Will ADEQ require Curis to monitor for Level 1 pollutants on a quarterly basis and Level 2 pollutants on a semi-annual basis during the pilot program? If not, why not?

ADEQ Response –
Yes, groundwater monitoring requirements include quarterly (Level 1) as described in Table 4.1-6 and semi-annual (Level 2) routines as described in Table 4.1-7.

11. Because of the importance of the groundwater supply to our immediate area it would seem that sampling of the process solutions should be continuously analyzed and reported during the project. Will ADEQ require Curis to conduct such analysis and the data on a monthly basis throughout the PTF operations? If not, why not?

ADEQ Response –
ADEQ does not consider monthly sampling of the lixiviant to be necessary, as the composition will not change significantly during operations.

12. Evidence from ISL mining around the world and from the BHP pilot demonstrates that groundwater cannot be restored to pre-mining conditions within the 9 month period specified in the PTF and that rebound of contaminants can occur months or years after mining has ended. In light of the abundance of documented evidence to this effect, will ADEQ revisit the Curis proposal and require an extended period for determining contamination and restoration to pre-mining conditions? If not, why not?

ADEQ Response –
The nine month period referenced by the commenter is the post-mining rinsing period. After the rinsing period, the permit includes an initial five year post-closure groundwater monitoring period, with an evaluation at the end of that time to determine if additional post-closure groundwater monitoring will be necessary. The groundwater quality at the points of compliance will be protected during this post-closure period.

The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure that BADCT is met and AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant.

13. Has Curis actually obtained a performance bond? If they have, what are the scope and terms of the bond? What is the reliability of assurance of the bond?

ADEQ Response –
See Section 2.1 in the permit.

14. Will ADEQ require Curis to obtain a bond or put enough money into escrow to cover the actual expenses related to groundwater cleanup obligations, which will have to be performed after the permit expires? If not, why not?

ADEQ Response –
See response to commenter #24(12).

15. What restrictions or safeguards has ADEQ required of Curis to assure that the sulfuric acid solution used in the process will not migrate into the lower aquifer zone?

ADEQ Response –
The groundwater quality provisions of the permit are satisfied as long as the AWQS are met at the points of compliance established in the lower aquifer at POC wells M14-GL, M15-GU, and M54-LBF. A cone of depression will be maintained by extracting more process solutions than are injected thus preventing migration of solutions beyond the PTF well field in the Oxide zone.

16. Please explain the rationale for not requiring Curis to conduct multi-level, multi-port sampling at several locations near and just outside the PTF injection and extraction well field so that all potential groundwater directional flow scenarios can be accounted for.

ADEQ Response –
ADEQ is satisfied that the modeling performed in support of the application adequately predicts the direction of groundwater flow for the purposes of the limited duration pilot test. The lateral flow directions at the site are not significantly variable.

17. How does ADEQ justify the amount of water this operation will contaminate when water is such a crucial and limited resource in this area?

ADEQ Response –
The lixiviant is a weak sulfuric acid solution. Based upon the nine month rinsing operation and the buffering capacity of the aquifer, the long-term damage to water quality will be minimal. The pilot test operations are required to maintain AQWS at the points of compliance throughout the operational, closure, and post-closure periods. Groundwater modeling, using sulfate as an indicator parameter, predicted that a sulfate concentration of 2 mg/L above background will extend no further than 150 feet from the PTF well field in the lower oxide zone during the five year post-closure period.

#79, Colleen Borggard –
The commenter submitted a letter in opposition to the Florence Copper Project and asked the following question:

"Does Curis have the financial ability to remedy any problems that might occur with this type of mining??"

ADEQ Response –
See response to commenter #24(12).

#80, Diana Regazzi –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#81, Victoria Sportelli –
The commenter submitted an email in opposition to the Florence Copper Project for the following reason:

"In general, in situ mining, also called "fracking," has proven to be dangerous to water quality and water systems in the eastern states."

ADEQ Response –
In-Situ mining is defined as the exclusive extraction through leach solution injection of a mineral ore body based upon the contact between a leaching solution and in-place minerals. Fracturing will not be part of the PTF In-Situ operation. It is not the intent of this pilot test to create fracturing which could cause a loss of injected solutions. See Table 4.1-8 for permit limits on maximum injection pressures.

Allowing in situ mining in a water-starved state as ours would be disastrous. Plus, Curis Resources track record has been abysmal regarding both in its mining operations and in its lack of cleaning up at sites it has already used.

ADEQ Response –

The meaning of this statement is unclear. Curis has not operated any other mines.

"Jobs now are worth nothing if later we have contaminated water. The outmigration in the water-damaged areas would be tremendous. Trucking good water would be too prohibitive for a population to remain. Property values would plummet--again. We would end up with a desolate, empty, terrain of unusable, un-taxable property. Is your department, is our state prepared to pay the billions of dollars it would take to mitigate in situ mining gone bad? We think not."

ADEQ Response –
The APP is designed to protect the aquifer water quality standards at the points of compliance, and includes aquifer quality limits, alert levels, and a use protection levels for arsenic. See response to Commenter #3.

#82, William Brayden –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#83, Bob Mielke –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#84, Rod Morrice –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#85, Nancy Freeman –
The commenter submitted an email stating the following concerns about the Florence Copper Project:

"The permit does mention drawdown of groundwater in the area. The permit states that the water levels in the region are already declining at a greater than historical rate. When you refer to groundwater elevation levels fluctuating as much as 20 feet, do you mean that the water table has lowered 20 feet? What will be the additional drawdown due to Curis' water use in the wells? Where is the water balance data?"

ADEQ Response –

The APP Program does not regulate groundwater withdrawal. Curis has provided ADEQ with an acceptable water balance for the PTF operations. The water balance concerns mine operations, not groundwater depth.

Concern One: Drying, or holding, ponds of the spent process solution. The temporary permit states that "barren solution" from the SX-EW plant will be reused, or "re-injected." In the first place, the solution will not be barren. The sulfuric acid solution will dissolve all heavy metals out of the bedrock, including uranium, arsenic, selenium and other harmful constituents. All these metals are common in Arizona, so their content should be tested for and analyzed. I believe you have some of the records of the present contaminants from the previous attempt to mine at by BHP. If the water is to be reused, what is the purpose of the Process Water Impoundment? How will this toxic water that comes out of the SX-EW plant be dealt with? In their reports, Curis management was referring to drying ponds. I questioned a Curis manager at a P and Z hearing in Florence last year, and was told that the water would not be toxic; yet because of the mineral load, the water would not be fit for reuse. What will be the content the "mineral load" of the "impoundments" or "drying" ponds? How will their toxicity be dealt with? What will keep residential and migratory birds out of these pond facilities?

ADEQ Response –
The Process Water Impoundment is double –lined with a leak collection and removal system. The applicant has demonstrated that stored solutions will be compatible with the liners. The APP Program is designed to protect groundwater quality at the points of compliance, and there are no provisions in the Program that are specifically designed to protect wildlife.

Concern Two: Hazardous Materials Sulfuric Acid Spills: Hazardous materials incidents associated with mining operations are common in Arizona. Numerous spills of sulfuric occur on public highways and railways in Arizona. Fortunately, these are often away from populated areas, but in the case of Florence, they could occur within the town limits, which will cause harm and distress to the health and safety of the residents. In all cases, roads are blocked for hours, while cleanup crews in green suits and face masks sop up the spills and even have to excavate any polluted soil. Further, numerous releases of sulfuric acid and other hazardous materials occur on the mining sites due to broken pipes, equipment malfunctions and human error. Again, most mines are in isolated pockets away from the daily life of residents and businesses, so the Florence situation is unique in that the acid and other chemicals will be within the town limits.

I do not see any analysis of the probability of the spills impacting the groundwater, which is important since there are public wells near the site. We know from data analysis that it took sulfuric acid spills at Sierrita in Green Valley approximately three years to travel two miles (www.savethesantacruzaquifer.info/Sulfuric%20Acid%20Spills.htm) to reach public wells, but there is not such a leeway in the Florence case. Further, we need an analysis of the probability of any spills impacting the nearby Gila River. I will contact the Army Corp of Engineers to see about their role in this jurisdiction.

ADEQ Response –
See response to commenter #39.

#86, Dave Stagg –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#87, Doris Whipps –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.
ADEQ Response –
See response to commenter #3.

#88, Melanie Solliday –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#89, Joyce Evans –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#90, Stewart and Janice Green –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#91, Wayne & Brenda Stubstad –
The commenter submitted an email expressing concern about potential groundwater contamination and the effect on home values in the area.

"We bought a winter residence at Johnson Ranch and we are very concerned about the blatant disregard for the most valuable resource: our water. We convinced others from ND to buy property in the area as we were excited about what the up and coming area had to offer; now we regret it. Is it time to sell out and find a more stable area before property prices fall?"

ADEQ Response –
See response to Commenter #3. ADEQ can not comment on the timing of real estate transactions.

#92, Valerie Blaser –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#93, Renee Aquino –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#94, James Pruter –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#95, Anne Jones –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#96, Karen Bennett –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#97, Robert Johnson –
The commenter submitted an email stating objection to the Florence Copper Project, as well as made vaguely threatening comments to ADEQ staff.

ADEQ Response –

See response to commenter #3.

#98, Frank & Jill Fishella –
"We are writing this email to STOP the copper mine in Florence from going through."

ADEQ Response –
See response to commenter #3.

#99, Carl & Judith Anderson –
The commenter submitted an email in opposition to the Florence Copper Project stating the following:

ADEQ has to give intellectual consideration to the following:
1) CURIS; *as (The) "start-up" company can and will sell the program to another company that will follow their own program of In-Situ mining causing further risk and drain on the community.*

ADEQ Response –
The subject of the temporary APP is the Production Test Facility.

The Production Test Facility does not include full scale commercial mining operations. The Production Test Facility well field will be limited to conducting tests, on approximately 2.2 acres of land, within the State Trust Land parcel, to provide data which might be used in an application for a permanent individual aquifer protection permit. Following the completion of the Production Test project, Curis will have the option to submit an application to ADEQ for a significant amendment to the existing permanent individual APP to allow mining, and that the amendment would be subject to all of the requirements for public participation and appeal. Review of this application will include an evaluation of pilot test results. The design to be employed for commercial operation has not yet been approved by ADEQ. If another company replaces Curis, that company would also be required to obtain an Aquifer Protection Permit and be subject to the same requirements.

2) CURIS; cannot guarantee acid or other chemicals/chemical reactions will not leak/seep into our Aquifer!

ADEQ Response –
The APP Program is designed to be protective of the AWQS at the points of compliance. See response to Commenter #3.

3) restored groundwater; has NEVER been achieved in any "In-situ" project ever!

ADEQ Response –
See response to Commenter #64(1).

4) SPILLS; will be inevitable and in close proximity to residential homes and schools, causing risk to heath/life not to mention the cost of cleanup.

ADEQ Response –
Spills located at the site will be investigated and remediated in accordance with Section 2.6 of the APP. Also, please see response to commenter # 39.

5) DROUGHT; in Arizona is constant, how can we afford to lose ANY water in the process

ADEQ Response –
See response to Commenter #3.

6) EVACUATION; will be impossible, especially for the retired and elderly in Anthem.

ADEQ Response –
Evacuation of Anthem or other residential areas are not subject to requirements of the APP Program. The APP Program is designed for the protection of groundwater quality.

7) MAINTENANCE; of roads that will carry the mining traffic (with frequented with large-load semi-trucks, hauling tons of Sulfuric Acid and other Chemical supplies in and around residential areas) will be constant.

ADEQ Response –
Maintenance of roads is not a consideration in the APP Program. The APP Program is designed for the protection of groundwater quality.

8) JOBS; are minimal for the community, most jobs will be high-tech Canadian jobs *any* monies will flow back into the Canadian economy. Normal copper mining manpower multipliers will not apply!

ADEQ Response –
The economic aspects of the project are not a consideration in the APP Program. The APP Program is designed for the protection of groundwater quality.

9) "Master" planned "residential" Community; will be lost with a threat to; life, to retirement enjoyment, or to the value of our property by rezoning this area to industrial and/or instating in-situ mining.

ADEQ Response –
Quality of life or values to property due to rezoning are not considerations in the APP Program. The APP Program is designed for the protection of groundwater quality.

10) LAW SUITS; will be unaffordable to the state of Arizona if any or all of these conditions ensue.

ADEQ Response –
ADEQ has no control over lawsuits.

In closing; we would also draw your attention to the observed indifference ADEQ exhibited at the last public meeting. Looks of boredom, coupled with side discussions and maneuvering wires and moving computers while concerned residents were speaking, was rude and only served to convey an attitude prejudice from ADEQ who are paid a salary to protect/consider the residents of Arizona!

ADEQ Response –
The supporting ADEQ Public Hearing staff not assigned positions such Hearing Officer, Hearing Facilitator, Time Keeper or hired Court Reporter were assigned other duties. Those other duties include: signing in interested parties, signing in speakers, directing public participants, answering generalized questions, providing technical assistance, manning an ADEQ information table, distributing site maps/documents to participants, assisting the Public Information Officer, and attending to the Public Hearing staff. For the interest of time and the availability of the rented facility, ADEQ staff were required to complete these duties while the Public Hearing was in process.

#100, Dr. Fred Armeni –
The commenter submitted two emails in opposition to the Florence Copper Project for the following reasons:

Curis Resources has been issued a "Temporary Aquifer Protection" permit to operate a pilot test facility on State land that is an island within the Town limits of Florence. The property is surrounded by land that is zoned residential/commercial and is a short distance from a multi-million dollar Anthem development housing several thousand people (which I am one of them), not to mention the nearby K-8 school and 80,000 residents further downstream in San Tan Valley. This is an entirely inappropriate location to run an experimental, unproven in-situ mining operation that is almost guaranteed to contaminate the water where we live.

ADEQ Response –
See response to commenter #3.

Curis will be injecting a toxic chemical (sulfuric acid) into the ground that adjoins the drinking water aquifer. The fractures, faults and unabandoned holes on the property are natural conduits for the injected acid and no amount of supposed hydraulic control can insure that some of that fluid will not escape. It's like trying to suck all the milk from the bottom of a glass with a straw. It can never be completely drawn up.

ADEQ Response –
See response to Commenter #64(1).

ADEQ believes that fractures, faults and unabandoned holes have been adequately addressed in the Application or by permit conditions.

Any minor amounts of sulfuric acid remaining in remote fractures after rinsing operations are complete will be buffered by the surrounding groundwater.

The in-situ process will release heavy metals, radiochemicals and other contaminants such as arsenic, cadmium, lead and mercury. The above-ground evaporation pond will leave toxic materials open to the air above and accessible to animals and birds. There are risks of leaks, pipe failures, spills, tanker truck accidents and human error that are too great to contemplate.

ADEQ Response –
The in-situ process and the evaporation pond are subject to the requirements of the Temporary permit. Please see response to commenter #39 with regard to toxic spills.

In-situ leaching problems are not as visible as in open-pit mining and problems can go undetected for years. A short, one- or two-year pilot test facility cannot possibly detect the long-term effects of the in-situ process.

ADEQ Response –
Upon completion of the pilot test, the permittee is required to monitor groundwater for an extended period of time. The time period for post-closure monitoring will be determined under the Closure Plan Section 2.9.2.

First, in-situ mining as depicted by Curis is not a closed system, hydraulic control of the sulfuric acid mixture is impossible and the rinsing technique to cleanse contaminated aquifers and groundwater is insufficient. There has never been an instance where contaminated groundwater was restored to pre-mining conditions. There are just too many fractures, faults and holes through which the water escapes. BHP's tests in Florence and in Casa Grande along with in-situ mining all over the world demonstrate these conclusions. Water contamination is a routine byproduct of in-situ mining. Our water is at risk. There are thousands of people who live a few miles downstream from the proposed mine who should not be placed in harm's way.

ADEQ Response –
See response to the commenter's second paragraph above.

Human error, a tanker truck accident, equipment failure and leaks are but a few of the reasons this process is so risky, not to mention the fact that the proposed mine is right in the geographic center of an incorporated Town. Would ADEQ even consider this project if it were proposed in the middle of Phoenix or Scottsdale? Curis can say they will take every possible precaution, but the fact is that bad stuff happens. We see it every day and I don't want to be the lab rat for this experiment!

ADEQ Response –

An application for an APP in the areas indicated would be required to follow the same statutes and rules used in the review of the Curis temporary APP.

#101, Jorganne and Robert Cochran -

The commenter submitted an email stating opposition to the Florence Copper Project for the following reason:

There is no way that a one-year pilot test with another one-year extension can adequately demonstrate the long-term effect on the adjacent drinking water aquifer.

ADEQ Response –

Upon completion of the pilot test, the permittee is required to monitor groundwater for an extended period of time. The time period for post-closure monitoring will be determined under the Closure Plan Section 2.9.2.

The well installation proposed by Curis is not what was proposed in Curis's full production permit application. If the pilot test facility were a true test, the same configuration should be used in the test as that intended for full production. It appears that Curis proposed, and ADEQ accepted, a set-up that is not realistic and is the least likely to reveal potential problems in the short term of the temporary permit.

ADEQ Response –

The subject of the temporary APP is the Production Test Facility. The Production Test Facility does not include full scale commercial mining operations. Therefore, the well configuration for the PTF may differ from the well configuration proposed for the full production. The five-spot pattern for the pilot test has been reviewed by ADEQ and determined adequate. BADCT requires that injection and recovery wells be properly designed per BADCT Section 3.4.5. However, specific well field design layout is not covered under BADCT due to such site variables as field size and SX/EW plant location. The Production Test Facility does not include full scale commercial mining operations. The Production Test Facility well field will be limited to conducting tests, on approximately 2.2 acres of land, within the State Trust Land parcel, to provide data which might be used in an application for a permanent individual aquifer protection permit. Following the completion of the Production Test project, Curis will have the option to submit an application to ADEQ for a significant amendment to the existing permanent individual APP to allow mining, and that the amendment would be subject to all of the requirements for public participation and appeal. Review of this application will include an evaluation of pilot test results. The design to be employed for commercial operation has not yet been approved by ADEQ.

The point of compliance wells are too far away from the production wells and not located to reflect the northwesterly flow of the aquifer. Additionally, testing at the point of compliance wells will be left to the Curis Company thus making them infrequent and questionable as to the authenticity of results. Finally, the permit doesn't impose acceptable standards for water quality and only speaks to water quality ***after*** the project ends and water clean-up occurs. Curis makes no mention of maintaining safe drinking water standards ***during*** the life of the test or the project.

ADEQ Response –
The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in ARS §49-244, such that all POCs are placed on the downgradient edge of the pollutant management area and within 750 feet of the Pollutant Management Area (PMA).

Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP.

Alert levels, aquifer quality limits, and a use protection level for the protection of the AWQS at the points of compliance are all in effect during the pilot test operations, closure operations, and post-closure monitoring period. Ambient water quality collected at the mine block wells, MW-01 and the POCs will be collected prior to the start-up of the pilot test as described in the permit.

The location and construction of POC wells will be overseen by Arizona registered geologists and engineers, and will be installed by Arizona licensed well drillers. The samples will be analyzed by Arizona licensed laboratories.

Permit limits such as Alert Levels and Aquifer Quality Limits for groundwater monitoring must be met during the life of the project and into closure and post-closure. AWQS will have to met at the POCs throughout the life of the facility, unless background water quality (i.e. ambient), determined through statistical methods, indicated that an AQL should be set above an AWQS.

There are a large number of unabandoned coreholes and bore holes all over the site. These holes create a natural conduit for injected fluid and Curis should have to properly locate and close them throughout the State land site.

ADEQ Response –
Curis has to properly locate and close unabandoned coreholes and wells within 500 feet of the PTF in accordance with Section 2.2.3 and Section 3.0.

See response to commenter #24(6) and #24(10).

#102, James Grab –
The commenter submitted an email stating objection to the Florence Copper Project for the following reasons:

I am writing to ask that you do not issue the Temporary Aquifer Protection Permit requested by Curis Resources. Curis's PTF is not a "pilot" project as it is currently designed and permitted and it does not meet the requirements of the temporary permit regulations. The PTF will not prove that commercial operations are safe and it will not answer ADEQ's questions posed in its deficiency letters. The PTF will not prove that

Curis can maintain hydraulic control during commercial operations. Curis's PTF well field does not replicate the proposed commercial operations well field. Curis should be required to meet federal drinking water standards for both arsenic and sulfate. They should not be allowed to operate until all AQLs and ALs are established and subjected to public review and comment.

ADEQ Response –
ADEQ has determined that the project is a pilot project under A.A.C. R18-9-A210(A)(1), and therefore does meet the requirements of the temporary permit rules. The results of the pilot test are not complete. Once the pilot test is complete, the results will be used to evaluate any application for commercial operations at the project site. Any technical deficiencies noted as part of the Application review for P-106360 have been satisfied by the Applicant. The required groundwater monitoring and water level monitoring will establish whether hydraulic control is maintained. If alert levels are exceeded at the monitoring points, contingency actions are triggered under the permit provisions. Compliance under the APP Program is established using the aquifer water quality standards, not the federal drinking water standards, although in most cases, the standard is the same. A Use Protection Level (UPL) has been established for arsenic of 0.01 mg/L. There is no federal drinking water standard for sulfate. The AQLs and ALs in the three new POC wells will be established statistically, based upon ambient data. The statistical methods proposed to be used to calculate AQLS and ALs at the new POCs are described in Section 2.5.3.2 and Section 2.5.3.2.2 and were available for review during the public comment period. The currently installed POC wells have AQLs and ALs statistically established based on background water quality collected over the past fifteen years. The AQLs and ALs previously established were available for review during the public comment period. All AQLs and ALs should be established prior to operations.

Curis's proposed monitor wells will not provide new data to prove the safety of commercial operations. Properly designed and placed monitor wells must be required and there must be more frequent sampling. If you accept Curis's predicted sulfate plume map as accurate, the PTF monitor wells will not detect any excursions from the injection/extraction well field and will only produce meaningless data.

ADEQ Response –
A.R.S. §49-244 requires that POCs be established no more than 750 feet from the edge of the pollutant management area. The currently designated POCs comply with this requirement.

Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS.

Most disturbing are the abandoned coreholes which have been documented as one of the leading causes of excursions causing groundwater contamination. ADEQ should require Curis to locate and properly fill all abandoned coreholes on the State land parcel prior to operating the PTF.

ADEQ Response –
Curis is required to locate and abandon coreholes and wells in accordance with Section 2.2.3 and Section 3.0. of the APP.

See response to commenter #24(6) and #24(10). The maintenance of hydraulic control at the PTF well field is the main component used to prevent excursions from the mine block wells. Coreholes and or wells located outside of the 500 foot radius, whether on State Land or privately property, are outside the Area of Review (AOR) and do not pose a significant risk as a source of potential excursions from the PTF.

Curis's proposed PTF and the Temporary Permit include unrealistic groundwater cleanup assumptions that are inconsistent with the experience of ISL uranium mines across the country. They continue to misrepresent the impact their operations will have on the Lower Basin Fill Unit upon which our community relies and will increasingly rely for drinking water purposes.

ADEQ Response –
See response to commenter #64(1).

Drinking water resources were considered when establishing POCs for the permit in the UBFU, LBFU and Oxide aquifers. POCs were placed between the PTF well field, the property boundary and between any potential downgradient groundwater users.

The injection zone is located in the oxide unit and in-situ leaching solutions shall be contained within the oxide unit as required by the permit as described in Section 2.3.1.

Finally, Curis's project will severely hamper the residential development of the area around it. Thousands of us have already committed to make this area one of the best places to live in Arizona. The presence of this project will deter future prospective residents and developers from coming to our community because of the uncertain groundwater contamination that this project will create. In 20 years, after they have raped the land for their financial gain, any residents who are left will be stuck with an underdeveloped contaminated mess and they will be the ones who will have to pay to try and clean it up. Surely in a state that is rich with copper deposits, Curis can find somewhere far away from a residential area to operate its project. Please reject the temporary permit and stop this project once and for all.

ADEQ Response –

The economic aspects of the project are not a consideration in the APP Program. The APP Program is designed for the protection of groundwater quality at the points of compliance.

#103, Ray Merkel –

The commenter submitted a letter stating opposition to the Florence Copper Project for the following reason:

"Why would you even consider allowing a small company from Canada that has never operated an in-situ copper mine to use a parcel of State Land to conduct an experiment that is highly likely to contaminate our water supply? The underground copper deposit is in the same level of the aquifer (as) most of the local wells. Would you want to drink water from one of those wells?"

ADEQ Response –

Curis Resources has demonstrated the technical competence necessary to carry out the terms and conditions of the permit in accordance with A.R.S. § 49-243(N) and A.A.C. R18-9-A202(B). The permittee is expected to maintain technical capability throughout the life of the facility.

See response to Commenter #64(1).

Any minor amounts of sulfuric acid remaining in remote fractures after rinsing operations are complete will be buffered by the surrounding groundwater.

The main drinking water aquifer is in the Lower Basin Fill unit (LBFU). The injection zone is located in the oxide unit and in-situ leaching solutions shall be contained within the oxide unit as required by the permit, Section 2.3.1. The oxide unit is a separate and distinct geologic unit from the LBFU.

"You can't possibly believe the flushing process is guaranteed to clean the aquifer. Nor is there any guarantee that the acid injection solution will not flow outside the monitored zone or even bypass the monitors."

ADEQ Response –

See response to immediately previous comment.

"What guarantees do we have that Florence's residents will ever see or hear the truth about the negative impact this risky venture brings?"

ADEQ Response –

The comment is not clear. Groundwater monitoring is required under the permit. The results of monitoring are reported to the Water Quality Division, Compliance Section, Data Unit, and are available for public review.

#104, Robert Wloczewski –

The commenter submitted an email in opposition to the Florence Copper Project.

"by issuing this permit you are in effect issuing a permit to contaminate our water supply and change the life style of thousands of our neighbors for years to come. Devastating effects on property values and property taxes for a massive cleanup that you have caused. The sad fact is that you can't be held responsible for your decision. Unless you are looking at a different presentation that I am, this injection of sulfuric acid is going to take place right in our water supply. The rock is already fractured with thousands of existing boar holes from a previous mining operation. I think a first grader can look at this picture and predict its outcome. Do the right thing for the future of our community and rescind this permit."

ADEQ Response –
See response to Commenter #64(1) regarding mine block closure requirements.

See response to Commenter #64(4) regarding the injection depths and locations.

See response to Commenter #24(6), #24(10) and #24(16) regarding boreholes.

Any minor amounts of sulfuric acid remaining in remote fractures after rinsing operations are complete will be buffered by the surrounding groundwater.

The main drinking water aquifer is in the Lower Basin Fill unit (LBFU). The injection zone is located in the oxide unit and in-situ leaching solutions shall be contained within the oxide unit as required by the permit, Section 2.3.1. The oxide unit is a separate and distinct geologic unit from the LBFU.

#105, Sharon Reid –
The commenter submitted an email stating opposition to the Florence Copper Project for the following reasons:

I respectfully request that you reverse your issuance of the reference permit. Your obligation per your mission is to the public and not to a foreign company who is less than forthcoming and overly zealous about it's mining practices.

The PTF Curis has proposed is not a pilot program. Curis proposes it's PTF will require 2 years of leaching and rinsing, a 5-year post-closure monitoring period with potential for an additional 5-year monitoring period. Simple math runs this PTF to 12 years, which is outside of the one-year definition of a "temporary permit". Curis cannot complete PTF operations before the expiration of this permit. Therefore, one can only assume ADEQ is allowing a commercial APP to be issued without further public comment, hearings or further review. Therefore, I submit this permit is slanted (in more than one way) to provide Curis protection of their operations not the public which ADEQ has an obligation to protect.

ADEQ Response –

ADEQ agrees that all of the activities described by the commenter cannot be completed in two years. The department does not agree that all of these activities must be covered under the Temporary APP. For example, facilities can be constructed without prior authorization under an APP. Operation of the PTF, and any testing that requires discharge, must be conducted under the Temporary APP. Data developed during the pilot study will be used for the amendment to the existing APP for a full scale project, in compliance with A.A.C. R18-9-A210.A. Finally, that longer term groundwater monitoring is required through an amendment of the existing APP after the Temporary APP expires, does not violate the requirements of A.A.C. R18-9-A210.A.

The Production Test Facility does not include full scale commercial mining operations. The Production Test Facility well field will be limited to conducting tests, on approximately 2.2 acres of land, within the State Trust Land parcel, to provide data which might be used in an application for a permanent individual aquifer protection permit. Following the completion of the Production Test project, Curis will have the option to submit an application to ADEQ for a significant amendment to the existing permanent individual APP to allow mining, and that the amendment would be subject to all of the requirements for public participation and appeal. Review of this application will include an evaluation of pilot test results. The design to be employed for commercial operation has not yet been approved by ADEQ.

Curis has designed it's PTF field without perimeter wells for demonstration of hydraulic control. This does not reflect Curis's proposed commercial operations which space perimeter wells hundreds of feet from interior injection/recovery wells. This spacing provides numerous possibilities for acid mining solutions to intersect preferential pathways to escape Curis's control. The PTF is hardly a replication of commercial operations to generate "proof-of- concept" to maintain hydraulic control as required by the permit.

ADEQ Response –
The subject of the temporary APP is the Production Test Facility. The Production Test Facility does not include full scale commercial mining operations. Therefore, the well configuration for the PTF may differ from the well configuration proposed for the full production. The five-spot pattern for the pilot test has been reviewed by ADEQ and determined adequate. BADCT requires that injection and recovery wells be properly designed per BADCT Section 3.4.5. However, specific well field design layout is not covered under BADCT due to such site variables as field size and SX/EW plant location.

Also, see response to the previous comment above.

I fully support the pending challenge to ADEQ's issuance of the Temporary APP which has been filed in Maricopa County Superior Court. ADEQ's rush to issue this permit without a period for public comment first is underhanded and in my opinion a political move on the part of the Governor who is not fulfilling her oath to discharge her duties impartially.

ADEQ Response –
ADEQ has followed all public participation requirements of A.A.C. R18-9-A210.

The permit requirement for POC wells is vague and incomplete. It allows Curis to place POC wells in currently unspecified locations! This is not evidence of their ability to prove they will not contaminate the drinking water aquifer and recover all of their hazardous solutions! I have no doubt the locations they do choose will not provide real results.

Furthermore, the construction requirement for these wells is not clear. All of locations of these wells must be spelled out. ADEQ should have an independent, outside consultant review the location and construction of these POC wells and revise the permit to require the POC wells be adequately positioned and constructed to detect groundwater pollution from Curis's in-situ mining operation. The current application is Curis's attempt at a shell game that will only fool you and us into believing our water is safe. It is another slant the sets Curis's PTF operations for nothing but success. Another way ADEQ is failing to protect the public.

ADEQ Response –
The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in ARS §49-244, such that all POCs are within 750 feet of the Pollutant Management Area (PMA) and in the downgradient groundwater direction. POC well locations are specifically identified by latitude and longitude designations. POC construction details are available for review in the Application and subsequent documents by contacting ADEQ Records Center. ADEQ has reviewed and approved the construction and location details for the POCs. Groundwater monitoring at the POCs in the UBFU, LBFU, and Oxide water bearing units' downgradient from the PTF is protective of any potential downgradient drinking water users.

I would like to add that from day one Curis has ignored concerns of my water company (Johnson Utilities) that current and future drinking wells are located in an area just west (down gradient) of their property and not protected by a clay aquitard. Curis must not be allowed to ignore this deep water basin does just because it sits west of their property! They must not be allowed to use me and thousands of other people as a guinea pig for their experiment.

ADEQ Response –
Curis has identified all registered wells within 1.5 miles of the PMA. Wells registered to Johnson Utilities (within 1.2 miles of the PMA) have been identified by Curis in the Application. ADEQ has not evaluated or considered the concept of a protective clay aquitard relative to required pollution control measures for BADCT.

Curis proposes to plug and abandon ALL boreholes & wells located within 500 feet of the PTF well boundary. BHP previously drilled thousands of boreholes throughout the property. If we do not know where all these wells will be placed how can we be assured which holes/wells will be plugged. Your permit does nothing to confirm the list of

coreholes Curis claims all- encompassing. It does not even require abandonment for the entire State land parcel. Nor does it consider historic coreholes beneath prominent PTF features such as the pipeline, underground mine workings and surface impoundments. The permit has no contingency plans if Curis cannot find the 40-year old coreholes they know exists. Since there is documentation that coreholes are a leading causes of excursions allowing for groundwater contamination, ADEQ should immediately stop all work on the PTF facility.

ADEQ Response –
See response to commenter #24(10) and #24(16). The maintenance of hydraulic control at the PTF well field is the main component used to prevent excursions from the mine block wells. Coreholes and or wells located outside of the 500 foot radius, whether on State Land or privately property, are outside the Area of Review (AOR) and do not pose a significant risk as a source of potential excursions from the PTF.

ADEQ has added language to Section 2.2.3 of the permit to include that all boreholes or wells located within 150 feet of the Process Water Impoundment and Runoff Pond shall be plugged and abandoned per ADWR rules.

ADEQ is failing the public by refusing to require additional standards to protect drinking water resources. You do not require Curis to sample groundwater and prove compliance for levels of arsenic. ADEQ should have set ALs and AQLs before this permit was issued. As arsenic, in excess, can contribute to skin damage, circulatory system problems and increase the risk of cancers; this operation has the potential to injure thousands of people. The company (Curis) responsible for the contamination or even possible contamination should have the responsibility to protect the aquifer & cleaning up contamination of downgradient drinking water providers.

ADEQ Response –
See response to Commenter #74 for discussion of an arsenic Use Protection Level (UPL).

The proposed frequency (bi-annually over 2-years) for monitoring groundwater contaminants is not sufficient. ADEQ only requires Curis to sample quarterly for Level 1 pollutants and semi- annually for Level 2 pollutants. This monitoring proposal is a slap in the face and only demonstrates how little Curis is concerned for my safety. Although ADEQ requires more frequent sampling than Curis proposes, you can do better. If Curis claims to develop data to support full commercial operation their monitoring standard should be equal to if not exceeding that of my water company.

ADEQ Response –
ADEQ believes the frequency for groundwater monitoring is appropriate. In fact, the groundwater sampling frequency for the Temporary APP is accelerated compared to other mining permits. Additionally, a monitoring well adjacent to the PTF well field will be sampled monthly, which is a unique groundwater monitoring condition as compared to other mining APPs.

The permit only requires Curis to sample the PLS tank, Raffinate Tank, Process Water Impoundment and Runoff Pound once within 90-120 days of the PTF startup. What? Curis's own claims that PTF operations of 14 months are necessary to develop "mature" mining solutions to accurately reflect commercial mining. This is just another way to stack the deck for test results that are not truly reflective of full commercial operations. In all likelihood, Curis will be analyzing mining solutions continuously during this PTF, ADEQ should require that data be reported on a monthly basis.

ADEQ Response –
The permit requires that discharge characterization for the PLS Tank, Raffinate Tank, Process Water Impoundment, and Run-off Pond be completed within 90-120 days of initial PTF start-up and submitted to ADEQ within 30-days of the receipt of the laboratory analytical results. This time period should be more than adequate for determining representative process solutions for these facilities. A one-time sampling event is sufficient since the chemistry of the solution isn't expected to change significantly over time.

Curis wants to claim that they will be the first in-situ operation that will not pollute the groundwater. They even claim they can clean it up after contamination. What planet do they live on? They are fully aware of FACT that not one ISL operation around the country & even the previous BHP pilot demonstrated THAT GROUNDWATER CANNOT BE RESTORED to pre-mining conditions.! The Temporary APP does not sufficiently address groundwater pollution cleanup process by Curis or their ability to show adequate financial assurance to protect against contamination and provide for said cleanup. Please come buy a house here in Anthem at Merrill Ranch, so you can help pay for cleanup with me. It's not a matter of if, but when it will happen. Yet ADEQ will not be concerned if Curis uses an insurance policy they can default on, or a Bond that will not sufficiently cover cleanup costs. ADEQ has an obligation to make this information available to the public. Where is it?

ADEQ Response –
ADEQ has determined that the project, as proposed, satisfies the requirements of BADCT (A.R.S. §49-243(B)), and the protection of AWQS at the points of compliance (A.R.S.§49-244). The permit contains required contingency actions that will be implemented if alert levels are violated at the points of compliance. Violation of the AWQS or an AQL at a point of compliance is a permit violation.

Please see response to commenter #24(3) and #24(12).

All records pertaining to this project are available for public review by contacting ADEQ Records Center at (602) 771-4380.

If your core responsibilities include:

• Ensuring that Arizona's public water systems deliver safe drinking water
ADEQ must not undermine their ability to deliver that water.

• Identify water pollution problems & establish standards to address them'
ADEQ is fully aware of the problems Curis ISL operations present and must establish the real standards to protect the public.
• Investigate complaints & violations of Arizona's water quality laws, rules & permits
ADEQ must respond to each and every comment and should have followed the proper procedure for issuance of this Temporary APP.
• Manage the quality of water resources through partnerships within natural boundaries of state's watersheds
ADEQ's management must be in a manner that is responsible to the public safety
• Monitor & assess quality of surface & ground water throughout the state
ADEQ must monitor and insure the safety of the groundwater throughout the state including
ALL citizens of Florence Arizona.
• Regulate the discharge & treatment of wastewater.
ADEQ must be sure their regulations or lack thereof, do not result in contamination of public water sources.

ADEQ Response –
The APP regulated facilities at Florence Copper Project have been evaluated for conformance with ARS §49-241 through §49-244, and A.A.C. R18-9-A201 through A209. The facilities have been designed to meet BADCT performance requirements and AWQS will be maintained at the Point of Compliance wells or will not contribute to further degradation of the aquifer(s). The terms, conditions, and restrictions of the Temporary APP, in conjunction with monitoring and enforcement activities, if needed, by ADEQ constitute adequate measures to protect drinking water.

#106, Mary Jean Cirrito –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#107, A.J. Smith –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

I trust you will ensure that conditions do not exist so that water and dissolved contaminants can flow from the lower to upper aquifer. Such conditions could include a natural one such as an artesian system or an artificial one resulting from too much pumping of fluid into the lower zone without a corresponding withdrawing at a greater rate. Note that pressure gradients caused by forced flow in the lower zone from permeability of the host matrix could also result in advection of undesirable species to the upper aquifer through any aquitard holes or other faults.
If you can provide assurance that any such advection cannot occur, then I will continue my support of the project. Such assurance could be forthcoming from in-situ and

ongoing pressure measurements combined with limitations on pumping rates (injection and withdrawal).

ADEQ Response –
The Applicant has demonstrated that pressure differentials and differences in hydraulic head maintained at the injection and recovery zone will be adequate to contain in-situ mining solutions within the Oxide Unit.

The Temporary APP requires Curis Resources to maintain hydraulic control by pumping more solution then is injected. Hydraulic control will be monitored by measuring the water levels in the outermost recovery wells with that of water levels in the closest observation wells. Water levels in the paired observation-recovery wells will be measured and recorded. Additionally, injection pressures will be continuously monitored. The Temporary APP covers the appropriate monitoring to maintain hydraulic control for the PTF well field and is outlined in Table 4.1-8, Section 2.2.4, and Permit Section 2.6.2.6. The loss of hydraulic control would be recognized during the daily monitoring, which if fracturing is the case (one of several possibilities), will show as a volume differential. The injection versus extraction volumes will be metered (see permit Table 4.1-8) at the wellheads, thus providing another mechanism for identifying the loss of hydraulic control.

ADEQ believe that potential pathways for solution migration have been adequately addressed in the Application or addressed by the permit conditions.

#108, Don Bisson –
The commenter submitted a letter stating opposition to the Florence Copper Project for the following reasons:

We feel that based on technical data provided to communities directly affected by injecting acid solution into areas close to drinking water wells will eventually pollute the aquifers. Our conclusion is a result of comparing Curis's assurances of safety with the in-situ process. These assurances of safety do not even come close to the oppositions' position and back-up research to show it is not safe and total extraction of the solution is not possible.

ADEQ Response –
See response to commenter #3.

The risk of the potential damage to the delicate aquifer water system that supplies thousands of residents with safe drinking water should not be compromised. The $3,000,000 bond posted by Curis Resources would be very insufficient to repair the damage to the ground water by the test wells if it failed.

ADEQ Response –
See response to commenter #3.

To date, it appears that there is no proof in-situ processes around the world have returned ground water to it's natural state.

ADEQ Response –
Please see response to commenter #24(3).

#109, Betty Pimentel –
The commenter submitted a letter stating opposition to the Florence Copper Project.

What's going to happen to this area where we live. Will it become a Ghost town? Will people start to move? I know I would if I could afford to. But we have put everything in our home here. Now instead of being happy and worry free we all have to worry about the safety of our water.

Let me ask you a question. Why was the water at Curis mine contaminated? How did that happen? If they can't keep their own water safe I'm to trust them with ours?

ADEQ Response –
ADEQ can not answer the comment as stated as not enough information is provided. The drinking water provider would be required to monitor constituents in the drinking water they provide to their consumers.

#110, Emmett Maguire –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#111, Frank Annin –
The commenter submitted an email stating opposition to the Florence Copper Project for the following reasons:

Our concerns:

- jobs for the community. It was admitted most jobs would be from outside.. maybe 20 for locals.
- project is owned by foreign companies. Where is their loyalty to our rights, environment, etc. They can just walk away at any point short or long term.
- how are they going to be taxed on their profits... or is the state giving them loopholes to evade these
- how will the road access be maintained, by whom
- is there a plan to address the entry to the project, such as turn lanes so that the thru traffic is not affected
- the toxins being poured into the earth can harm the groundwater that supplys water for residents north and west of the project

- how much good ground water will be claimed for the project? will this affect the amount for the general public
- the detection of the contamination is located so far away from the drill holes...it would take months/years to detect
- how many drill sites are open now and how will all these be filled ?
- how many train/truck loads of dangerous chemicals will be passing through the area..
- how safely can they be stored on site and protected from vandalism
- how many more minerals will be leached from the ground to add to the pollution of the land.
- who will pay for the environmental cleanup? Who paid for the Green Valley cleanup? taxpayers
- we, the recent residents, along with the Native Tribes have objected

ADEQ Response –
Most of the comments such as economic benefits, company ownership, taxes, road access, right-of-ways, transportation, and vandalism are outside the scope of the APP Program. The APP Program is designed for the protection of groundwater quality.

The ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and conformance with the Arizona Mining BADCT Guidance Manual, in order to obtain the necessary permit required to discharge.

ADEQ established monitoring requirements and pollution control limits that were specific to the Production Test Facility. ADEQ believes the conditions set forth in the permit will evaluate the components of BADCT and demonstrate that AWQS will be met at the POCs or no further degradation will occur.

Curis has legal rights to three separate sources of water for use at the PTF site and surrounding vicinity as described in the Application-Section 14C.5. Aquifer tests conducted at site have demonstrated that sufficient groundwater resources are available to support PTF operations.

See response to commenter #24(12) regarding environmental cleanup liability. Green Valley-Sierrita Mine is owned and operated by Freeport McMoran. The company is conducting remedial actions for this site under a consent agreement with ADEQ.

#112, Gary Rose –
The commenter submitted an email stating opposition to the Florence Copper Project for the following reasons:

The geology of the mining site is highly fractured, and contains hundreds of old unsealed bore holes from previous unsuccessful attempt at in-situ mining. It would be impossible to contain solutions (which are highly toxic) from the process within the mining site. It would also be impossible to adequately clean up the strata (which includes aquifers) after the mining attempt concludes. This poses a great risk to nearby residents and to deep water wells adjoining the mining site.

I am not seeing a surety bond of sufficient amount to pay for any and all remediation of the environment caused by escaped toxic solutions, including the cost of increased treatment of water drawn from adjacent deep wells.

ADEQ does not have sufficient staff to adequately monitor the mining operation.

ADEQ Response –

See Response to Commenter #3 and #24(12).

Any reduction of ADEQ staff will have no effect upon the legal requirements imposed on Curis by the provisions of the Temporary APP. All permit requirements will remain in place.

#113, Larry Olson –
The commenter submitted an email expressing concern about the possibility of groundwater contamination.

ADEQ Response –
See response to commenter #3.

#114, Kerry Quimby –
The commenter submitted a letter stating opposition to the Florence Copper Project for the following reasons:

We feel that based on technical data provided to communities directly affected by injecting acid solution into areas close to drinking water wells will eventually pollute the aquifers. Our conclusion is a result of comparing Curis's assurances of safety with the in-situ process. These assurances of safety do not even come close to the oppositions' position and back-up research to show it is not safe and total extraction of the solution is not possible.

ADEQ Response –
See response to commenter #3.

The risk of the potential damage to the delicate aquifer water system that supplies thousands of residents with safe drinking water should not be compromised. The $3,000,000 bond posted by Curis Resources would be very insufficient to repair the damage to the ground water by the test wells if it failed.

ADEQ Response –
See response to commenter #3.

To date, it appears that there is no proof in-situ processes around the world have returned ground water to it's natural state.

ADEQ Response –
Please see response to commenter #24(3).

#115, Christina Dumal –
The commenter submitted a letter stating opposition to the Florence Copper Project for the following reasons:

- The FCP will result in contaminating our aquifer, the Lower Basin Fill Unit (LBFU); there is no history of an in-situ mine not contaminating water in the US. Further, it will place an undue burden on the taxpayers as historically these cleanup costs have been borne by the taxpayers and not the companies who have caused the contamination.

ADEQ Response –
See response to commenter #24(12).

- A copper mine in the geographical center of town is a death sentence to the historical Town of Florence (ToF) and to current residents' property values.

ADEQ Response –
See Response to Commenter #3.

- The terminology in the temporary permit is inadequate and does not support ADEQ's mission.

ADEQ Response –
The commenter does not provide specific information on permit language they find inadequate. The terminology in the Temporary APP is consistent with other APPs and is considered adequate by ADEQ.

- The company, Curis, itself has proven time and again that it lacks integrity and cannot be trusted.

ADEQ Response –
Curis Resources has complied with the requirements of the APP Program, A.A.C. R18-9-A(200) et seq., and A.R.S. Title 49, Chapter 2, Article 3. All applicable legal and technical requirements have been satisfied.

In addition I have reviewed the temporary Aquifer Protection permit and have numerous concerns and comments. As such ADEQ must revoke the temporary aquifer permit for the following reasons:

First, throughout this permit there are many instances in which the word 'shall' is used. The term 'must' needs to be used instead. Those of us who are familiar with government-speak realize that the term 'must' is much more definitive and provides little 'wiggle room' for the permittee. As a government agency, ADEQ's mission is to protect and enhance public health, welfare, and the environment in Arizona, thus the existing terminology is unacceptable and shows that your agency is not serious in its duty to protect Arizona.

ADEQ Response –
The language in the Temporary APP is consistent with other mining APPs and or other APPs. ADEQ consistently uses the term "shall" when identifying regulatory requirements.

- **Point. 2.1** –Curis' Financial capability. In the permit Curis' financial culpability only covers the life of the project, and this is unacceptable. According to the March 2012 report, *Nuclear Fuel's Dirty Beginnings*, 'It is becoming increasingly apparent that contaminants remain in the aquifer for many years even after restoration.' In fact there are reports that the initial target levels set have had to be increased because it has been impossible to get the levels back to where they were before mining began. Therefore the terminology in this section is unacceptable; Curis must be held responsible for any and all cleanup regardless of the time in which contaminates are discovered. As noted in an October 19, 2011 Arizona Republic article, *Groundwater cleanup likely will take decades*, trichloroethene, a contaminant, was discovered in 1981 and is still not cleaned up in 2011. In addition ADEQ must be transparent in providing all the details surrounding the surety bond.

ADEQ Response –
See response to commenter #24(12).

- **Point 2.2**-Best Available Demonstrated Control Technology. It states that the pilot test is to demonstrate hydraulic control. I most certainly agree with this point. Thus monitoring wells must be placed close enough to the well field to ensure quick detection of contamination, and in the current permit these wells are placed well over 700 feet away from the well field.

ADEQ Response –
Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP.

- **Point 2.2.3** – Pre Operational Requirements. All boreholes and wells within 500 ft of the Production Test Facility (PTF) shall be plugged and abandoned. What about the area between the PTF and our aquifer? Will these areas be plugged and abandoned? Will ADEQ make the final determination that all of these are plugged and abandoned or will ADEQ let Curis be responsible for this determination? If your agency permits Curis to be responsible for this determination, then I foresee several issues arising. First, Curis has been less than forthright with the residents of the area during its three year tenure in our area. Please refer to pages 5 through 18 of this document for further details concerning this point. Additionally, there would most assuredly be a conflict of interest should Curis be permitted to make this determination as their bottom line could be affected if additional boreholes and wells were located and had to be plugged and abandoned. Therefore ADEQ should not abdicate its responsibilities to Curis for this determination.

ADEQ Response –
See response to commenter #24(10) and #24(16).

- **Point 2.3**- Discharge limitations. Here it states that hydraulic control must be maintained at all times. We are aware that the former mine operators, BHP, lost hydraulic control for 2 – 3 days. This is totally unacceptable. In fact this section is devoid of any mention that if hydraulic control is lost that Curis must cease operations immediately. ADEQ must demand that operations cease immediately otherwise the environment and aquifer are at risk of being contaminated.

ADEQ Response –
See Section 2.6.3.4. of the Temporary APP.

- **Point 2.4** – Points of Compliance. As stated in point 2.2 monitoring wells must be placed close enough to the well field to ensure quick detection of contamination. Additionally, ADEQ must have their own monitoring well, used to monitor and verify Curis' findings.

ADEQ Response –
See ADEQ Response to Point 2.2. The sampling activities are overseen by Arizona registered geologists or engineers, and the lab analysis and lab reporting is performed by Arizona licensed laboratories.

- **Point 2.5**- Monitoring requirements. In 2.53, Groundwater monitoring and sampling protocols, quarterly and semiannual compliance monitoring are only required; this is entirely inadequate. In ISL uranium mines bi weekly monitoring is required and yet contamination of the aquifers still occurs. As such, if anything ADEQ should increase monitoring to daily or hourly if indeed they wish to fulfill their mission to protect. Furthermore, ADEQ must increase the frequency of monitoring of all of the parameters listed in their semi-annual monitoring

protocol. In addition ADEQ must also conduct its own monitoring, not just rely on Curis' results; keeping in mind President Regan's wise words, 'Trust but verify.' Curis has a 'dog in this hunt' so to speak, and therefore cannot be permitted whatsoever to be the sole supplier of data. As I have listed on pages 5 through 18 of this document, Curis has not established itself as a 'trusted' entity to those of us who live in this area. As such, Curis cannot be solely entrusted to protect our environment. Remember it is your, ADEQ's, mission to protect.

ADEQ Response –
ADEQ believe the parameters and frequency of groundwater monitoring at MW-01 and at the seven POCs are appropriate. Additionally, see ADEQ Response to Comment 2.4.

- **Point 2.6** - Contingency Plan Requirements. According to the temporary permit if Curis exceeds Alert levels (AL) then they have 5 days **after becoming aware of the violation** to notify ADEQ. This is entirely too long a time between exceeding alert levels and ADEQ notification. Furthermore, what's to say that Curis can't extend this period of time especially if they aren't themselves made aware of the violation, i.e. an employee 'forgets' to tell them. Additionally Curis can continue to exceed ALs during this time as ADEQ has not stated that operations must cease immediately. There are several statements within section 2.6 which permit Curis to continue operations even though they have contaminated the environment and these are unacceptable; Curis must be required to cease operations and notify ADEQ immediately. Operations must not be permitted to resume until the problem is resolved. We do know that all ISL mines to date contaminate aquifers and I suspect that it is due in large part by the lackadaisical approach whereby an alert level is exceeded followed by days elapsing before notification and all the while the environment is continually bombarded with contamination.

ADEQ Response –
The language quoted in the comment is typical permit language framework used in all recently issued APPs. ADEQ does not concur that the framework should be changed for an AL exceedance in the Temporary APP.

- **Point 2.7** – Reporting and Recordkeeping Requirements. Throughout this entire section there is one very glaring omission, and that is the fact that ADEQ does not verify any of Curis' information. Where are ADEQ's inspections? Where does it state that ADEQ will perform unannounced inspections and verification of records? How does ADEQ plan to protect the water and environment based on data and reports submitted solely by Curis?

ADEQ Response –
Inspections and records requests are covered under Section 6.8 of the permit. In addition all permitted facilities are subject to A.A.C. R18-9-110 regarding inspections, violations, and enforcement.

#116, Roger Featherstone –

The commenter submitted a letter stating opposition to the Florence Copper Project for the following reasons:

First and foremost, this permit is not legal under Arizona law. Curis Industries has withdrawn its application for a normal APP, and in an effort to get around the town of Florence's decision to protect the best interests of its residents by maintaining a residential zoning for private lands purchased by Curis, has contrived this temporary permit for lands under lease from the Arizona state land trust. ADEQ must not and cannot legally facilitate this bait and switch by Curis. ADEQ exceeds its authority as there are no provisions in Arizona state law that allow ADEQ to grant a permit such as this. This is not a minor or temporary operation. This PTF would have serious consequences for our environment that would go far beyond the one year span of this permit. Therefore, regardless of the merits of this proposal, ADEQ has no choice but to revoke this permit. If Curis wants to run an in-situ copper mine on state trust land, either as a test project or for commercial purposes, they must submit an application for a full APP and go through the steps of getting it approved or rejected.

Even if it were legal for ADEQ to grant this type of permit, which is clearly not the case, there are a myriad of other reasons (some of which are outlined below) why this permit is improper and must be revoked.

ADEQ Response –

Temporary Individual Permit provisions are defined in AAC R18-9-A210. Curis has submitted a complete application to obtain this permit and therefore ADEQ has granted the permit in accordance with law and rule.

Curis did not withdraw its application for a normal APP. Curis Resources suspended the request for the Significant Amendment Application for P-101704 in a letter dated December 20, 2011.

Curis Resources has complied with the requirements of the APP Program, A.A.C. R18-9-A210, and A.R.S. Title 49, Chapter 2, Article 3. There is no provision to deny a permit if all applicable legal and technical requirements are satisfied.

Curis Industries Plan of Operations for the PTF clearly is for two years and an ambitious two years at that. To complete the conditions that must be met before operations begin, then 14 months of injecting toxic chemicals into the ground, and then completing a bare minimum of 9 months of "rinsing" of the groundwater followed by 30 days of rest and then testing within a one year permit is impossible. While the conditions of this permit call for a possible one year extension to this permit, it would be almost impossible to finish operations within a two year period. According to ADEQ, no more than one extension can be granted to the permit. The permit does not lay out the conditions that must be met for the permit to be extended.

Will there be conditions that Curis must meet?

Is extension of the permit conditioned on the meeting of certain performance criteria?

Would there be public notice, comment and appeal of the extension?

ADEQ Response –
ADEQ agrees that the schedule of the Permit is premised on using more that one year to complete the pilot study. However, ADEQ has not determined that it will renew the Permit for a second year. As required under the Section 3.0 of the permit, the permittee must submit a renewal application 60 days prior the expiration of the first year. At that time ADEQ will determine whether to renew the permit for an additional year. That decision will be made based on the available information regarding the progress of the pilot study. The extension of the Temporary APP is an appealable action pursuant to ARS41-1092(3). There is no public notice or public participation requirement for the renewal of the permit, as long as are no changes to the permit. The public participation requirements of A.A.C. R18-9-109 are required when making a significant amendment to a temporary individual permit (A.A.C. R18-9-A210 (D)(5).

How could the permit possibly be refused if Curis is does not need to notify ADEQ until 60 days before the permit runs out that they want to renew? By that time, there would be no chance of "rinsing" the groundwater to return it to pre-test conditions.

Everything that is written into the permit and factsheet makes it clear that this PTF is, at the very minimum, a two year operation. How then can ADEQ maintain with a straight face that it is granting a one year permit?

What happens if Curis cannot "rinse" the groundwater before the end of the permit?

ADEQ Response –
ADEQ agrees that all of the activities described by the commenter cannot be completed in two years. The department does not agree that all of these activities must be covered under the Temporary APP. For example, facilities can be constructed without prior authorization under an APP. Operation of the PTF, and any testing that requires discharge, must be conducted under the Temporary APP. Data developed during the pilot study will be used for the amendment to the existing APP for a full scale project, in compliance with A.A.C. R18-9-A210.A. Finally, that additional rinsing or longer term groundwater monitoring is required through amendment of the existing APP (P-101704) after the Temporary APP expires, does not violate the requirements of A.A.C. R18-9-A210.A.

ADEQ agrees that the schedule of the Permit is premised on using more that one year to complete the pilot study. However, ADEQ has not determined that it will renew the Permit for a second year. As required under the Section 3.0 of the permit, the permittee must submit a renewal application 60 days prior the expiration of the first year. At that time ADEQ will determine whether to renew the permit for an additional year. That

decision will be made based on the available information regarding the progress of the pilot study.

Would Curis be allowed to continue without a permit?

ADEQ Response –
No.

How would ADEQ or the public be able to enforce the letter and the mandate of ADEQ's mission without a permit?

ADEQ Response –
If a entity was operating an APP discharging facility without the appropriate permit, that is a violation of A.R.S. 49-241 and would be subject to ADEQ enforcement action.

The permit makes it clear that Curis's financial assurance for the PTF is only valid for the life of the permit. Once the permit runs out, how could Curis be compelled to clean up after themselves?

What would prevent Curis from walking away from their obligations once the permit expires?

Unless all of these questions can be satisfactorily answered, the permit must be revoked.

ADEQ Response –
In accordance with Section 3.0 of the Temporary APP, the permittee shall submit an amendment application to incorporate all discharging facilities, and all closure/post-closure activities in accordance with an ADEQ approved Closure Plan per Section 2.9.1 from APP P-106360 into APP P-101704. The application shall also include updated closure/post-closure cost estimates for APP P-101704 and a corresponding updated financial assurance mechanism for APP P-101704.

The land that Curis wishes to use for this PTF is 160 acres of Arizona State Land. Curis currently owns Mineral Lease 11-26500 that is due to expire next year. How can ADEQ grant a permit for an operation in which the company may not have legal use of the land by the completion of the operation?

ADEQ Response –
The Temporary APP is a permit for discharges to groundwater. It is not tied to the lease on Arizona State Land.

The permit does not mention that there are many archaeological features on the state trust lands that Curis wishes to use. There is no discussion in the permit or factsheet about how this project would impact those features. Similarly, there are ongoing cultural ties from Native American cultures to the state trust land that Curis wishes to use. There is no discussion of this in the factsheet or permit either. In granting the permit, ADEQ has

violated state and federal laws, treaties, and executive orders mandating that cultural and archaeological features pertaining to Native Americans must be protected. This permit must be revoked unless and until provisions of state and federal laws, treaties and executive orders are satisfied.

ADEQ Response –
There are no provisions in the rules and statutes that govern the APP Program for cultural or archaeological considerations. The cultural/historical preservation evaluation is being conducted as part of the UIC permitting process.

The hydrological model used by Curis to estimate the flow of toxic chemicals from the injection wells is not only out of date, the developer of the software model has cautioned that the model was not designed for the purpose that it was used for by Curis. ADEQ has improperly relied on this data and found it acceptable. This permit must be revoked until and unless ADEQ can demonstrate that the modeling by Curis was done using the correct modeling software and that the result can be independently verified by ADEQ.

ADEQ Response –
The computer code used to simulate both groundwater flow and solute transport was MODFLOW-SURFACT™. MODFLOW-SURFACT™ is widely accepted groundwater modeling program. The Applicant completed calibrations of the data in accordance with industry standards. ADEQ reviewed and accepted the modeling assumptions and results.

What happens if a pump on one or more recovery wells fails completely and a replacement is not available for more than 24 hours?

ADEQ Response –
Permit Section 2.6.3.4 requires replacement of non-functioning equipment within 24-hours. Curis must have spare equipment (pumps, valves, sensors, etc.) on hand for replacement.

What happens if there is an extended power failure at the mine for more than 24 hours?

ADEQ Response –
Permit Section 2.6.3.4 requires replacement of non-functioning equipment within 24-hours. Curis must have spare equipment (pumps, valves, sensors, etc.) on hand for replacement.

With the increasing severity of storms and other weather events due to climate change, it is increasingly likely that a storm event could render the power grid inoperable for periods much longer than 24 hours.

What follows is a discussion of additional issues (listed in no particular order or ranking of significance) that arise from the factsheet and the permit that, unless and until they can be satisfactorily answered or remedied, the permit must be revoked:

1. There are no provisions in the permit that spell out what would happen if the permit were revoked due to non-compliance or other factors. How would hydrological control of the PTF be maintained if the permit were revoked?

ADEQ Response –
Under the APP, Curis Resources is subject to the enforcement provisions of A.A.C. R18-9-110.

2. Please explain how a fracture gradient of 0.65 pounds per square inch per foot of depth was established as being adequate to prevent hydraulic fracturing of the bedrock. Did ADEQ look at not only the pressure but also how the movement of minerals, contaminants and toxic chemicals could affect the hydraulic fracturing of the bedrock? If not, why not? If so, what were the conclusions?

ADEQ Response –
Formation testing to establish a minimum fracture gradient in the oxide zone (0.71 pounds per square inch per foot (psi/ft)) was completed in 1995. A safety measure of 0.65 psi/ft was selected in order to assure that induced fracturing in the oxide zone would not occur. Typically groundwater will exert a pressure equivalent to 0.34 psi/ft of depth. The addition of other dissolved minerals, process solution, and any contaminants present should increase the density by approximately 5-percent (0.45 psi/ft). Using this approach the maximum injection pressure can be determined by multiplying the fracture gradient limit (0.65 psi/ft) by the depth from the top of the wellhead to the top of the injection interval. Even with the additional density the fracture gradient would still be well below the established minimum.

3. Since the groundwater flow direction in the Lower Basin Fill Unit (LBFU) changes significantly in direction due to agricultural pumping and since drinking water is drawn from the LBFU, the location and number of the POC wells is not sufficient.

ADEQ Response –
The PTF consists of injecting in-situ leaching solutions into the Oxide Unit. The Oxide Unit is a separate and distinct geologic unit from the LBFU. The point of compliance for the groundwater monitoring is required to be established in the uppermost aquifer. (i.e. – the shallowest groundwater). However in the case of Florence Copper project, ADEQ has required POCs in three separate water bearing zones, the UBFU, LBFU and Oxide Units. POC locations are required by A.R.S. § 49-244 to be placed on the downgradient edge of the pollutant management area. The seven (7) POCs are located correctly, as required by the cited statute. The points of compliance established under the APP will be adequate for the protection of groundwater at the edge of the pollutant management area and are located between the PTF well field and any potential downgradient drinking water sources.

Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently

located to measure changes in chemical groundwater concentrations emanating from the injection zones in the Oxide Unit within the effective time frames of the Temporary APP.

ADEQ believes the POCs for the PTF are adequately located based on fifteen years (15) of site specific and regional groundwater data. While groundwater flow direction fluctuations are evident in the data, on-site pumping wells such as BIA-9, BIA-10 and WW-3 will be taken off line during the PTF, or abandoned. ADEQ does not anticipate large seasonal groundwater flow fluctuations from on-site groundwater pumping. Groundwater modeling indicated that off-site groundwater pumping will not materially affect PTF operations in the Oxide zone. Therefore, additional POCs were not warranted.

4. The location of all of the POC and monitoring wells should have been determined before the permit was granted.

ADEQ Response–
All POC well locations have been established in accordance with the rules and statutes that govern the APP Program.

5. Curis Industries has not demonstrated that they are technically capable of carrying out the terms and conditions of this permit.

ADEQ Response–
The permit application provided the resumes and technical experience of the people associated with the project. Per rule ADEQ found those people technically capable.

6. Curis Industries has not demonstrated financial capability throughout the life of this permit. The financial assurance amount is not sufficient to compensate for closure and damages when and if Curis declare bankruptcy or otherwise renege on their commitments. The financial assurance amount did not take into account the loss of private property or property values to neighbors.

ADEQ Response–
Please see response to commenter #24(12).

7. The permit did not take into account the loss of revenue to the state of Arizona though the devaluing of the state trust land under mineral lease in this permit or the neighboring state trust lands that could be affected by this project.

ADEQ Response –
Land valuation is not a part of the APP Program.

8. The possible damage to cultural or archaeological sites due to failure of the above ground containment features has not been addressed.

ADEQ Response –

There are no provisions in the rules and statutes that govern the APP Program for cultural or archaeological considerations. The cultural/historical preservation evaluation is being conducted as part of the UIC permitting process.

9. While the permit allows Curis to temporarily shut down the operation for a period of 60 days or greater, it does not address the need for Curis to maintain hydrological control of the site during cessation.

ADEQ Response –
The permit requirements for hydraulic control (Permit Section 2.2.4) remain in effect until the Plan for maintenance/monitoring of discharge control systems (Permit Section 2.8) has been approved by ADEQ.

10. The mine closure plan should have been available for review by ADEQ and the public before the permit was granted.

ADEQ Response –
All permit application documents are available for public review by contacting ADEQ Records Center including the Closure and Post-Closure Plan in Attachment 16 of the Application. The Temporary APP requires, as part of the Compliance Schedule Section 3.0, that the permittee submit a closure plan for all discharging facilities permitted under this Temporary Individual Permit in accordance with Section 2.9.1.

11. The permit does not disclose what neutralizing agents could be added to formation water during the mine block "rinsing" phase. What are these chemicals and have there been adequate study of what additional changes they could make underground? Has ADEQ done any analysis that shows that these neutralizing agents would not change the geochemical balance during or after "rinsing?"

ADEQ Response –
The permit is not required to provide this level of detail. However, Curis's permit application states there will be no addition of agents such as neutralizers to facilitate mine block rinsing. Only groundwater from the formation will be used as rinse water.

12. Why does ADEQ allow Curis to end "rinsing" when the sulfate levels are at least twice the current background level and/or the level 1 compliance limits?

ADEQ Response –
The APP Program does through the use of a PMA allow the permittee to place pollutants within the test mine block for the purposes of in-situ leaching, allow for the release of chemicals into an aquifer at levels above the AWQS, as long as AWQS are met at the points of compliance or no further degradation of water quality relative to that pollutant occurs. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure that BADCT is met and AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant. The 750 mg/l sulfate rinsing standard was a trigger concentration level to cease mine block rinsing and a concentration determined

to be an acceptable sulfate standard when AWQSs would most likely be met in the mine block.

13. Why does the permit not require additional confirmation groundwater samples beyond one year after groundwater "rinsing" has ceased? Has ADEQ demonstrated conclusively that there would be no rebound to toxic pollution after one year?

ADEQ Response –
Frequency of rebound sampling will be re-evaluated under the submittal of the Closure Plan required by Section 2.9.1. Any additional rebound sampling will be amended into permit P-101704 as described in Section 2.9.1 and Section 2.9.2.

14. The compliance schedule in the permit (3.0) requires the operator to complete 8 rounds of ambient water quality monitoring at intervals of one sample every 2 weeks in order to set pollution limits. However, the permit allows the first round of sampling to begin prior to discharge (presumably of acid). Eight rounds of sampling would take 112 days.

On top of that, the operator is allowed 30 days for lab analysis of the samples and then and other 30 days is allowed for calculation of AWQS and AQL levels. It would take additional time for ADEQ to verify and put in place the limits suggested by Curis and that time frame is not established in the permit. This would mean that at a minimum, pollution levels would not be set until one quarter of the PTF was complete. This is unacceptable. Pollution levels must be set before the PTF begins operation.

ADEQ Response –
Eight rounds of ambient water quality are required at the three new POCs. AQLs and ALs are already set for four of the currently installed POCs. While ambient groundwater sampling spread over months or years is preferred, or to have ambient sampling completed before operations begin would be an ideal situation, it should not affect the reliability of the data, even if the PTF began operations. Over fifteen years of groundwater monitoring data has been collected at the site that could be used as a comparison, and the travel times in the aquifer indicate it would take longer than 6 months for a discharge at the PTF to reach the POCs so the water quality at those POCs locations would be consistent with ambient groundwater concentrations.

15. The schedule for required inspections and operational monitoring for the groundwater monitoring wells, the pumps, and the in-situ area injection and recovery well block is far too lax for a permit with this short a duration.

ADEQ Response –
Table 4.1-3 of the permit requires weekly pump inspections/monitoring and daily for In-Situ area injection and recovery well block. A shorter time period would be of little if any benefit.

16. This PTF is not a pilot project as advertised and will not prove that commercial operations would be safe. Therefore the entire rational for the PTF is not valid.

ADEQ Response –
The pilot test project was fully explained in the Curis permit application.

17. The distinction between the Upper Basin Fill Unit and the Lower Basin Fill Unit is not supported by current hydrological conditions and does not adequately characterize the site for the PTF or the geological or hydrological conditions.

ADEQ Response –
This comment is too vague in nature to respond.

18. The permit does not establish that Curis can maintain hydrological control at all times.

ADEQ Response –
Permit Section 2.2.4 requires that hydraulic control be maintained and observed at all times.

19. The well field set up is inadequate.

ADEQ Response –
This comment is too vague in nature to respond.

20. The water quality parameters are inadequate.

ADEQ Response –
This comment is too vague in nature to respond. The water quality parameters are similar to other copper mining APPs.

21. There is inadequate groundwater monitoring both before "testing" begins and during the course of the project.

ADEQ Response –
ADEQ believes there is adequate groundwater monitoring before and during the course of the project. The newly installed POCs will require eight rounds of ambient groundwater sampling in accordance with Section 2.5.3.2. Compliance groundwater monitoring at the POC wells is required on a quarterly and semi-annual basis as defined in Table 4.1-6 and Table 4.1-7. Monthly groundwater monitoring at MW-01 is described in 2.5.8. and includes Level 2 parameters before and after the pilot test. Mine block wells are required to be sampled prior to testing in accordance with Section 2.2.3.e and during mine block closure (Section 2.9.2), closure (Section 2.9.1.), and into post-closure (Section 2.10.) Additionally, ADEQ believes there is adequate groundwater monitoring in the form of approximately 15 years of groundwater data for this site collected from the

UBFU, LBFU, and Oxide aquifers prior to the operations allowed under the Temporary APP.

22. There are many more old coreholes that need to be filled than anticipated and the 500 foot boundary for closure is inadequate.

ADEQ Response –
See Response to Commenter #24(16). The commenter does not provide a rationale for claiming the 500 foot boundary is inadequate or an explanation of why they believe more coreholes exist within the boundary.

23. The permit makes unrealistic groundwater clean up assumptions.

ADEQ Response –
The commenter does not explain what specifically is unrealistic about the groundwater clean up assumptions.

24. The PTF will not provide any new data needed to prove the safety of commercial operations.

ADEQ Response –
The PTF will necessarily provide new data. ADEQ believes the PTF will provide useful data to assess the feasibility of proposed commercial operations.

25. Assumptions that the PTF will be economically viable are unrealistic.

ADEQ Response –
ADEQ does not review economical viability of APP Projects.

26. Curis has not demonstrated that ADEQ's concerns stated in its deficiency letters have been corrected.

ADEQ Response –
The technical deficiencies associated with the pilot project have been satisfied.

27. The permit allows for toxic acid mining solutions to be injected into the aquifer at the same depth as where groundwater is pumped for drinking water.

ADEQ Response –
ADEQ believes the commenter is referencing the Johnson Utilities registered well located approximately 1.2 miles northwest of the PTF and screened in the LBFU. ADEQ is aware that the Johnson Utilities well is not connected to the drinking water system. The PTF will inject into the Oxide Unit between 500 to 1,200 feet below ground surface. Extraction wells, observation wells, monitoring wells and POCs are located between the PTF injection wells and the Johnson Utilities well. ADEQ concurs that injection at the PTF site in the Oxide Zone is taking place at the same depth below ground surface as the

Johnson Utilities well could conceptually extract groundwater from, however, the PTF injection is taking place in a separate and distinct geologic unit (Oxide) then the screened interval of the Johnson Utilities well (LBFU) and the comparable depths below ground surface for the PTF Oxide injection zone and potential groundwater withdrawal location in the LBFU are over 1.2 miles away from each other.

28. Curis and ADEQ are incorrect that the principal source of groundwater withdrawals are from the UBFU.

ADEQ Response –
ADEQ is aware that ADWR registered wells within the surrounding area withdraw groundwater from the UBFU and primarily, the LBFU aquifers. Some ADWR registered wells in the surrounding area are screened in the Oxide Zone.

29. The LBFU is the primary source of groundwater withdrawals. Johnson Utilities pulls water from the LBFU at 597 feet. Merrill Ranch and the town of Florence are planning to install wells within the LBFU.

ADEQ Response –
See response to Comment #27.

30. ADEQ fails to take into consideration that BHP lost hydraulic control of their pilot project for a 2 to 3 day period.

ADEQ Response –
This comment is too vague in nature to respond.

31. The PTF design differs significantly from the design proposed for commercial production therefore the purpose of the PTF to demonstrate that commercial operations would be safe is invalid.

ADEQ Response –
The purpose of the pilot test is to demonstrate that hydraulic control can be maintained.

32. The PTF does not include any perimeter wells to maintain hydraulic control.

ADEQ Response
The Temporary APP contains a number of monitoring requirements to assure maintenance of hydraulic control. ADEQ believes that these requirements are adequate.

33. The proposed commercial operations design included perimeter wells hundreds of feet from recovery wells. This spacing provides opportunity for toxic chemicals to escape Curis's control.

ADEQ Response –

The proposed commercial operation is not the subject of this Temporary APP.

34. The PTF fails to replicate the conditions of the proposed commercial operations.

ADEQ Response –
See response to commenter #74.

35. The Financial assurances do not address off-site impacts.

ADEQ Response –
The financial assurance requirements for closure and post-closure costs do not account for any possible unforeseen impacts off-site. Any such off-site impacts would be addressed as corrective actions under the APP permit.

36. ADEQ has not independently verified Curis's financial assurance calculations.

ADEQ Response –
ADEQ has evaluated and approved the closure and post-closure costs that were submitted as required by the Aquifer Protection Program rules. See the permit and factsheet for information regarding how the financial assurance requirements have been satisfied.

37. Curis is only required to maintain financial assurances for the life of the permit. What happens when additional cleanup is required after the permit expires?

ADEQ Response –
In accordance with Section 3.0 of the Temporary APP, the permittee shall submit an amendment application to incorporate all discharging facilities, and all closure/post-closure activities in accordance with an ADEQ approved Closure Plan per Section 2.9.1 from APP P-106360 into APP P-101704. The application shall also include updated closure/post-closure cost estimates for APP P-101704 and a corresponding updated financial assurance mechanism for APP P-101704.

38. The geochemistry of the PTF is different from the commercial operations design. Curis plans to stack solution in the commercial permit while the PTF does not allow stacking.

ADEQ Response –
An Individual Permit for commercial operation has not been requested by Curis. Stacking is not something that has been discussed by Curis for the PTF and is not allowed by this permit.

39. The toxic acid solution Curis wants to inject into the ground will release radiochemicals, magnesium, aluminum, and many more contaminants that would not only create a toxic underground plume that would escape containment, but would also be settled out in the settling ponds on the surface. The permit does not adequately address

the disposal of those contaminants or the real possibility that they would migrate offsite through accidents during transportation to disposal sites or becoming airborne and blowing off-site.

ADEQ Response –
Transportation to disposal sites or airborne particles is outside the scope of the APP Program. Other County, State and Federal Programs have oversight for these concerns. Closure Costs in the Application and subsequent documents contained cost estimates for soil, sediment and sludge characterization at the impoundments and also contained disposition costs for that media.

40. The Temporary permit's arsenic standards are confusing and based on an unsubstantiated modeling level.

ADEQ Response –
The comment is too vague to respond to and the commenter does not explain the term "unsubstantiated modeling level."

41. The permit proposes sulfate standards that exceed secondary drinking water standards.

ADEQ Response –
Curis requirements under the Temporary APP are that they shall not exceed Aquifer Water Quality Standards or cause further degradation at the points of compliance. Three of the four ALs set for sulfate at the currently installed POCs are below the secondary standard for sulfate. The other sulfate AL above the secondary Maximum Contaminant Level (MCL) for sulfate was calculated based on background water quality at the site.

42. For numerous points of compliance, the permit allows Curis and ADEQ to set standards during PTF operations with no baseline and no public input of comments.

ADEQ Response –
ADEQ believes there is adequate baseline data in the form of over fifteen years of groundwater monitoring at the Curis site. Currently, AQLs and ALs for four POCs are established in the Temporary APP. The AQLs and ALs for those four POCs were available for review during the public comment period. The methodology for the calculation of new AQLs and ALs for three new POCs is described in the Temporary APP and was also available for review during the public comment period.

43. More frequent sampling of contaminants if needed. Some uranium ISL mines are required to test bi-weekly for level 1 pollutants, while this permit only requires quarterly sampling during the life of the mine.

ADEQ Response –

ADEQ believes the quarterly monitoring (Level 1) at the POCs is adequate for the pilot test. MW-01 adjacent to the PTF well field is required to be sampled on a monthly basis.

44. The life of the permit is so short that the testing requirements need to be correspondingly shortened from the boilerplate requirements of an ordinary APP.

ADEQ Response –
Where appropriate, time frames in typical framework language were adjusted to accommodate the shortened time frames of the proposed pilot test.

45. The Compliance wells are located too far away and will not detect pollutants until after the PTF has been completed.

ADEQ Response –
The POC locations have been established in accordance with statutory provisions. MW-01, located adjacent to the PTF well field will detect any potential contamination emanating from the PTF well field within the time frames of the Temporary APP.

46. Several multi-port sampling wells need to be installed within the PTF well boundary.

ADEQ Response –
Multiple-port sampling wells are located internal to the PTF well field and are referred to as Westbay wells in the Application.

47. The multi-port sampling wells should be sampled at the same depth as the proposed injections to evaluate whether contaminants are being released.

ADEQ Response –
The current network of POC monitoring wells includes wells that are screened in the same unit as the injection zone as well as other units to ensure that there is no migration of pollutants. Additionally MW-01 located adjacent to the PTF well field will detect any potential contamination emanating from the PTF well field within the time frames of the Temporary APP. MW-01 will be a nested well screened equivalent to the injection zones.

48. The location of well number MW-01 needs to be determined, it's design specified, and the well installed before the PTF begins operations.

ADEQ Response –
MW-01 will be required to be installed in accordance with the Compliance Schedule, Section 3.0. The construction details and exact location of MW-01 are subject to ADEQ review and approval.

49. In 1999, BHP concluded that exceedances in 2 wells (one of which is a POC well in this permit) were due to communications between aquifers through two open coreholes.

ADEQ Response –
The APP Section has not reviewed this information as part of the Temporary APP Application. ADEQ can not conclusively state whether or not exceedances in 1999 were due to communications between aquifers through two open coreholes.

50. The permit only requires abandonment of wells and plugging of coreholes 500 feet around the injection well field. This distance needs to be increased.

ADEQ Response –
See ADEQ Response to Comment #22.

51. Proper abandonment of wells and other site features is needed.

ADEQ Response –
The wells or coreholes that are within 500 feet of the PTF will be abandoned in accordance with UIC and ADWR requirements which are specified in a Plugging and Abandonment Plan in the Application-Exhibit 16A. ADEQ has added language to Section 2.2.3 of the permit to include that all boreholes or wells located within 150 feet of the Process Water Impoundment and Runoff Pond shall be plugged and abandoned per ADWR rules.

52. The permit makes unrealistic groundwater cleanup assumptions. The 9 month rinse and 30 day resting period are far too short. Groundwater conditions cannot be restored to pre-mining conditions within 9 months.

ADEQ Response –
The commenter does not provide a justification regarding the statement that groundwater conditions cannot be restored within 9 months. The statutory requirement is that the permittee shall not exceed Aquifer Water Quality Standards at the applicable POC or cause no further degradation. There is no regulatory APP requirement to meet "pre-mining" conditions within the PMA. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant.

53. Contaminant rebound can occur months or years after mining has ended, yet ADEQ only requires one year of post mining testing.

ADEQ Response –
There are no timeframes established in the permit when the post-closure monitoring would cease. The initial post-closure period is for five years as described in Section 2.9.1. Post-closure monitoring associated with the PTF will be amended in to P-101704 as described in Section 2.9.1, Section 2.9.2, and Section 3.0.

54. The EPA UIC permits must be granted before this permit can go into effect.

ADEQ Response –
The permittee can not operate the Class III injection wells without an EPA UIC permit.

55. While self-reporting is problematic at best for a full APP, to rely on self-reporting for a one year permit is completely inadequate.

ADEQ Response –
All APP permittees self-monitor and report. ADEQ also conducts compliance inspections to ensure that monitoring results are valid.

#117, Annette Kankelfritz -
Commenter is opposed to project due to generalized concerns for groundwater quality, and requests protection of our precious groundwater resource.

ADEQ Response –
See response to Commenter #3.

#118, Larry Olson -
Commenter includes an article related to faster migration of contaminants in soil than previously predicted, due to colloid encapsulation. Commenter requests that the permit be denied until the mining process does not require introducing chemicals into the soil in any means or duration.

ADEQ Response –
Although the movement of contaminants through soil and groundwater is a continually changing science, the use of engineering best available demonstrated control technologies (BADCT), along with the protection of aquifer water quality standards at the points of compliance are the legal foundation of the APP Program. In-situ mining is allowed under that Program, as long as the Program requirements are satisfied. It is not possible for the permit to forbid placement of chemicals into the soil, as long as BADCT is satisfied, as determined on an industry-wide basis, and the aquifer water quality standards are protected at the points of compliance. Water quality will be monitored under the permit, so that any contaminants potentially escaping the site are detected, and the contingency actions under the permit will be appropriately triggered.

#119, Mary and Charles Hughes -
Commenters are concerned with long-term damage to the aquifer and water supply from acids and heavy metal leachates from the in-situ mining process proposed under the permit.

ADEQ Response –
See response to commenter #3.

#120, Cheryl and Jack Hoisington -
Commenters are concerned about the high risk of groundwater contamination in an aquifer that is vital to the economy of Pinal County.

ADEQ Response –
Although the use of in-situ leaching involves direct injection into the ore body, POC wells are used to protect AWQS at the point of compliance. In addition, groundwater modeling studies concluded that the aerial extent of sulfate contamination, defined at 2 mg/L above background concentration, would extend only 150 feet from the PTF well field during the five year post closure period. Also, the permit requires rinsing and sampling procedures during PTF Mine Block closure, and an initial five year post-closure monitoring period, with an evaluation of whether an additional post-closure monitoring period is necessary.

#121, Deborah and John Stanton -
Commenters are concerned about the effects of copper mining on the precious water resources in the area, and the possibility of accidents in spite of careful practices.

ADEQ Response –
See response to Commenter #3. In addition, the permit contains groundwater monitoring to be protective of AWQS at the points of compliance, and required contingency actions in the event of alert level exceedances at the POCs. Mine block rinsing and post-closure monitoring is also required.

#122, Robert L. Johnson -
Commenter is concerned about impacts to groundwater quality posed by the in-situ mining process under the temporary permit.

ADEQ Response –
See response to Commenter #3.

#123, George L. Staby -
Commenter is opposed to the copper project, mainly due to problematic science being offered by the promoters, and requests that the opposition be noted.

ADEQ Response –
Commenter's opposition is noted. See response to Commenter #3.

#124, Deborah and Craig Walters -
Commenters express concern regarding the protection of ground water.

ADEQ Response –
See response to Commenter #3.

#125, Janet Senn -
Commenters express concern regarding the protection of ground water.

ADEQ Response –
See response to Commenter #3.

#126, Renae Specht -
Commenter requests protection of water, and concern that a post-mining return to baseline conditions is not possible.

ADEQ Response –
See response to Commenter #3, and response to Commenter #64(1).

#127, Robert E. Allen and Dorothy C. Mize-Allen
(1) Commenters express a concern with the impact on groundwater

ADEQ Response –
See response to Commenter #3.

(2) Commenters do not believe that all of the old boreholes and coreholes will be found and properly sealed

ADEQ Response –
The location of the wells and coreholes within the 500-foot zone were identified using records from ADWR and historical records of drilling conducted by previous owners of the property. Certain locations of known coreholes shall be field verified to identify changes in soil texture, surface elevations and changes in vegetation that may be indicative of previous drilling activities and to detect collars of coreholes that may no longer be visible from the surface. Additionally, excavation and geophysical techniques shall be implemented to locate coreholes. ADEQ considers this approach to locate previous coreholes to be acceptable, and is typical protocol when trying to locate subsurface features at a site.

(3) Commenters express concern that acid will penetrate into deep fissures and into porous rock, will pose a long-term threat to groundwater quality.

ADEQ Response –
The rinsing process required as a part of the mine block closure requirements will mitigate the acidity of the water resulting from the injection of the weak acid solution during pilot test operations. Any minor amounts of remaining weak acid solution remaining in remote fractures will be buffered by natural groundwater.

#128, Linda and Billy Cromwell -
(1) ADEQ's temporary APP does not require sufficient monitoring of groundwater contaminants and does not require the collection of data from drinking water sources.

ADEQ Response –
ADEQ has determined that the number and location of monitoring points is protective of those aquifers likely to be impacted, and are similar to the number and locations of monitoring points required in other mining APP permits. Collection of water samples at the residential drinking water sources is too distant from the site to provide useful

information regarding the protection of AWQS at the POCs. These sources are already regulated and monitored under drinking water regulations and should be regularly sampled by your drinking water provider.

(2) No in-situ mining operation has ever returned the groundwater to pre-mining conditions.

ADEQ Response –
See response to Commenter #64(1).

#129, Cheryl and Michael O'Donnell -

(1) If the temporary aquifer protection permit that ADEQ issued to Curis Resources is not rescinded, the threat to our drinking water is just as great as any permanent APP would be and it should have the same level of scrutiny. Curis is using the TAP process to bypass the level of review for a full-blown operational permit and the pilot test facility has been set up so that it is not likely to demonstrate the full effect of the actually production process.

ADEQ Response –
Curis has qualified for the issuance of a temporary permit allowed under A.A.C. R18-9-A210. The results of the pilot study performed under the temporary APP will be used to evaluate an amendment to the existing permit allowing full scale operations.

(2) The permit would allow a number of chemicals to be released into the aquifer at levels that exceed drinking water standards. Curis acknowledges that its operations will mobilize arsenic. The drinking water standard for arsenic is 10 parts per billion. But Curis proposes to ensure only that arsenic will not exceed 50 ppb – five times the drinking water standard – as it leaves the site. In fact, Curis anticipates arsenic concentrations in its wastewater levels ranging from 50 to 6,600 parts per billion. Using these measurements, Curis will not be obligated to protect drinking water quality.

ADEQ Response –
The APP Program does allow for the release of chemicals into an aquifer at levels above the AWQS, as long as AWQS are met at the points of compliance or no further degradation of water quality occurs at the POCs, if AWQS are violated at the time of permit issuance. Wastewater levels removed using recovery wells may contain levels of contaminants above the AWQS, without causing the AWQS to be exceeded at the POCs. Production leach solution for the pilot test will be injected into the Oxide Unit, not directly into an aquifer typically used by the residential developments.

The enforceable Arizona AWQS for arsenic in groundwater is 0.05 mg/L. The permit includes a use protection level of 0.01 mg/L, which will be used to evaluate, and possibly lower, the alert levels for arsenic in the POC wells.

#130, Douglas J. Casad -

Surety bonds, monetary responsibilities for failures to this type of operation are meaningless after the fact. BP in the Gulf, Chernobyl, Japan's nuclear, Alaska Exxon demonstrate well intentioned engineers (safety) to create safe enviro operations. Money cannot correct the damage created to our environment by these catastrophes. Why would you even consider approving such a potentially hazardous project? Should profits/jobs be so important to risk such a catastrophe? Just say NO! It's your responsibility to us.

ADEQ Response –
Curis Resources has complied with the requirements of the APP Program, A.A.C. R18-9-A(200) et seq., and A.R.S. Title 49, Chapter 2, Article 3. There is no provision for denying a permit if all applicable legal and technical requirements are satisfied.

#131, Carolyn Gerber -
Commenter expresses concern that there are too many possibilities for contamination of the water supply, truck/machine damage to roadways, harsh machinery noise, and damage to the land where animals graze and crops are grown. Commenter also comments that there will be no benefits to area residents from mine operations.

ADEQ Response –
The APP Program is focused on the protection of groundwater resources, and cannot regulate the commenters other concerns. For groundwater protection response, see response to Commenter #3.

#132, Joseph Hildesheim-
Commenter is opposed to the project due to generalized concerns for groundwater quality, and requests protection of our precious groundwater resource.

ADEQ Response –
See response to Commenter #3.

#133, Sharon Reid and Roy Faulhaber -
In-situ mining as depicted by Curis is not a closed system, hydraulic control of the sulfuric acid mixture is impossible and the rinsing technique to cleanse contaminated aquifers and groundwater is insufficient. There has never been an instance where contaminated groundwater was restored to pre-mining conditions. There are just too many fractures, faults, and holes through which the water escapes. BHP's tests in Florence and Casa Grande along with in-situ mining all over the world demonstrate these conclusions. Human error, a tanker truck accident, equipment failure and leaks are but a few of the reasons this process is so risky, not to mention that fact that the proposed mine is in the geographic center of an incorporated Town.

ADEQ Response –
See response to Commenter #64(1).

#134, Janice and John Burdette -

(1) The permit granted by ADEQ for a two-year Pilot Test Facility will in reality go on for many more years, and unbelievably Curis could be issued a commercial permit before data from this PTF "test" is even collected and analyzed. Plus, only one sample is required to be analyzed for arsenic and other pollutants during the initial two-year period. Outrageous! Based on Curis's PTF application monitoring proposal, they have demonstrated a true lack of concern for the residents of Florence, and much more monitoring must be required.

ADEQ Response –
The project will consist of a 14 month leaching phase and a 9 month rinsing phase. The time period extending past the two-year period is for post-closure monitoring of groundwater quality to evaluate the effectiveness of closure activities.

The compliance schedule (Section 3.0) requires the submission of ambient mine block groundwater concentrations within 30 days of start-up, and ambient sampling every two weeks for eight sampling rounds from the three new POC wells to be installed within 30-60 days of permit issuance, and prior to discharge (including arsenic – See Table 4.1-5). Table 4.1-2 of the permit lists discharge sampling points for both one-time and multiple-event requirements, for numerous analytes, including arsenic. Table 4.1-6 of the permit describes the quarterly sampling required for numerous constituents in all POC wells. Table 4.1-7 describes the semi-annual extended list of analytes required to be sampled in all POC wells, including arsenic. In addition, an arsenic use protection level of 0.01 mg/L is established for use in development of a narrative aquifer water quality standard at the POCs, which is more restrictive than the numeric AWQS of 0.05 mg/L. MW-01 a monitoring well adjacent to the PTF well field is required to be sampled in accordance with Section 2.5.8 and includes arsenic analysis, prior to and after the pilot test. One sample at each PTF well is required to be sampled prior to operations as stated in Section 2.2.3 to determine ambient concentrations at the mine block wells, including arsenic. Additional sampling of the mine block wells is required as described in Section 2.9.1 and Section 2.9.2. and includes arsenic.

(2) Commenter expresses concern over hydraulic control of injected acid solutions and the minerals and toxic compounds released by the solutions. They also state that: "Surprisingly, in Curis's PTF application they said that demonstrating hydraulic control is unnecessary! Isn't demonstrating hydraulic control a major part of what this test is all about, and the most telling in terms of future water quality? Why do they not have to demonstrate hydraulic control?"

ADEQ Response –
The applicant has demonstrated hydraulic control of leach solutions through the use of groundwater modeling overseen by Arizona registered professional engineers and geologists. Hydraulic control over the injected solutions shall be maintained during the operating life of the facility as described in Section 2.3.1. Any minor amounts of leach solution that may remain in remote fractures after rinsing operations are complete will be buffered by natural groundwater during the rinsing process.

(3) How can ADEQ in good conscience allow sulphuric acid injections and all the dangers this process will unleash happen in the middle of our growing town, and upstream of our water wells. This solution will dissolve copper and many other dangerous compounds and the resulting chemical "toxic soup" will flow where it wants; and it will flow into our drinking water aquifer, polluting it beyond Curis's financial commitments.

ADEQ Response –
See response to Commenter #3.

#135, Hal Neuenswander -

(1) Why would you even consider allowing a small company from Canada that has never operated an in-situ copper mine to use a parcel of State land to conduct an experiment that is highly likely to contaminate our water supply?

ADEQ Response –
ADEQ does not exclude foreign companies if they demonstrate, as Curis Resources Ltd has, compliance with the Financial Capability and Technical Capability requirements of the APP Program.

(2) Applicant expresses concern that the flushing process will not clean the aquifer.

ADEQ Response –
The applicant has demonstrated hydraulic control of leach solutions through the use of groundwater modeling overseen by Arizona registered professional engineers and geologists. Minor amounts of leach solution that may remain in remote fractures after rinsing operations are complete will be buffered by natural groundwater.

(3) Both ADEQ and the EPA are shorthanded and so Curis is being allowed to do self-reporting. Does the analogy of the fox guarding the henhouse ring a bell? What guarantees do we have that Florence's residents will ever see or hear the truth about the negative impact this risky venture brings?

ADEQ Response –
All APP permittees self-monitor and report. ADEQ also conducts compliance inspections to ensure that monitoring results are valid. The sampling activities are performed by Arizona registered geologists or engineers, and the lab analysis and lab reporting is performed by Arizona licensed laboratories.

#136, Dale and Sharon Gastaldin -

(1) The comments express concern that the injection of acid solution will pollute the drinking water aquifer, and that total extraction of the solution is not possible.

ADEQ Response –

Under the APP Program requirements, it is not necessary to extract 100% of the leach solution, as long as the AWQS are protected at the points of compliance or no further degradation occurs at the POCs if the AWQS is violated at the time of permit issuance. See also the response to Commenter #3.

(2) The $ 3,000,000 bond posted by Curis Resources would be very insufficient to repair damage to the groundwater by the test wells if it failed.

ADEQ Response –
See response to commenter # 24(12).

(3) To date, it appears there is no proof in-situ processes around the world have returned groundwater to it's natural state.

ADEQ Response –
See response to Commenter #64(1).

#137, Donna and Jeffrey Johnstone -

(1) There is no way that a one-year pilot test with another one-year extension can adequately demonstrate the long-term effect on the adjacent drinking water aquifer.

The well installation proposed by Curis is not what was proposed in Curis's full production permit application. If the pilot test facility were a true test, the same configuration should be used in the test as that intended for full production. It appears that Curis proposed, and ADEQ accepted, a set-up that is not realistic and is the least likely to reveal potential problems in the short term of the temporary permit.

ADEQ Response –
Long term monitoring of the aquifers is described in the Temporary APP in Section 2.9.1 and will be amended into APP P-101704.

The subject of the temporary APP is the pilot test. The pilot test results will be used to evaluate potential operations at the project site to be conducted under a permanent APP. The results will be evaluated as a part of that process.

(2) The point of compliance wells are too far away from the production wells. Additionally, testing at the point of compliance wells is infrequent and the permit doesn't impose acceptable standards for water quality.

ADEQ Response –
A.R.S. §49-244 requires that POCs be established no more than 750 feet from the edge of the pollutant management area. The currently designated POCs comply with this requirement.

Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently

located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS.

The groundwater sampling proposed for the POC wells is consistent with other mining APPs and in fact, is more stringent that what is generally required at other mine sites. The AWQS used for compliance purposes to determine permit violations are the legal standards by which water quality is evaluated. A use protection level for arsenic that is more stringent than the corresponding AWQS will be used to establish a narrative AWQS under the permit.

(3) There are a large number of unabandoned coreholes and bore holes all over the site. These holes create a natural conduit for injected fluid and Curis should have to properly locate and close them throughout the state land.

ADEQ Response –
Curis is required to properly locate and abandon all wells and coreholes within the 500-foot zone of the PTF. The wells and coreholes were identified using records from ADWR and historical records of drilling conducted by previous owners of the property. Certain location of known coreholes will be field verified to identify changes in soil texture, surface elevation and changes in vegetation that may be indicative of previous drilling activities and to detect collars of coreholes that may no longer be visible from the surface. Additionally excavation and geophysical techniques will be implemented to locate coreholes. ADEQ considers this approach to locate previous coreholes to be acceptable, and is typical protocol when trying to locate subsurface features at a site.

See response to commenter #24(10) and #24(16).

#138, Jane Nadeau -

(1) Since this copper project is controversial, I'm concerned about the value of my home decreasing. Can you guarantee me that it will not lose its value?

ADEQ Response –
ADEQ cannot guarantee your home value.

(2) There appears to be a great concern over water contamination, can you guarantee me that the water I drink will not be contaminated?

ADEQ Response –
See response to Commenter #3.

(3) I learned that there is no independent 3rd party overseeing the location and construction of POC wells, monitoring, and sampling on this project. Why is this? How will the public know if they are in compliance?

ADEQ Response –
All APP permittees self-monitor and report. ADEQ also conducts compliance inspections to ensure that monitoring results are valid. The location and construction of POC wells will be overseen by Arizona registered geologists and engineers, and will be installed by Arizona licensed well drillers. The sampling will be analyzed by Arizona licensed laboratories.

(4) I learned of coreholes that have not been filled. I understand that the coreholes can lead to groundwater contamination. Does ADEQ plan to be on-site to locate and assure all holes are filled?

ADEQ Response –

ADEQ does not plan to be on-site to locate and assure all holes are filled. Arizona registered geologists and engineers and licensed well drillers will be on-site to perform corehole/well abandonment. Also see response to commenter #24(10) and #24(16).

(5) How come ADEQ issued a temporary permit for a project that does not fit the required 2 year window but instead allowed a temporary permit that will allow for a potential 12 year operation?

ADEQ Response –
The project will consist of a 14 month leaching phase and a 9 month rinsing phase. The time period extending past the two-year period is for post-closure monitoring of groundwater quality to evaluate the effectiveness of closure activities and will be amended into APP P-101704 as described in the Temporary APP.

(6) Why did ADEQ issue a temporary permit before taking public comments? It appears to me that you are just going through the motions and have already made a decision.

ADEQ Response –
The public participation requirements, including the sequencing of the public notice and comment process, for a temporary APP are established at A.A.C. R18-9-A210(D).

(7) Why does ADEQ not require Curis to have the same well field setup for hydraulic control during the pilot project as would be planned for commercial production?

ADEQ Response –
The subject of the temporary APP is the pilot test. The pilot test results will be used to evaluate potential operations at for commercial production under an Individual

(8) Does Florence have a HAZ MAT team to take care of any chemical spills? If not, where is the closest one and how long will it take for them to get to the spill area and how long will it take to clean it up? How much of the chemical will have leached into the ground by the time the cleanup is complete? Who is paying for the cleanup?

ADEQ Response –
The question regarding hazardous materials (HAZ MAT) resources available to the Town of Florence should be addressed to the Town.

(9) I heard a lot about not enough money set aside by Curis for groundwater cleanup after the permit and bond expires. Why should the taxpayer pick up the tab if there are not adequate funds set aside?

ADEQ Response –
See response to commenter #24(12).

(10) I have yet to find anywhere that in-situ mining is safe when it comes to possible water contamination. ADEQ is supposed to protect the citizens of this state. Why would ADEQ allow this project to move forward?

ADEQ Response –
See response to Commenter #3.

#139, Carole Waite -
Commenter objects to the permit issuance for the flowing reasons:

(1) Safety, in terms of well casings leaking.

ADEQ Response –
All Class III injection wells shall be drilled, cased and cemented according to the requirements of the UIC permit. Prior to commencement of operation, all new Class III injection wells shall meet the mechanical integrity testing (MIT) requirements of the UIC permit as described in Section 2.2.3.b.

Potential well casing leaks are addressed in the Temporary APP, Section 2.6.2, 2.6.2.5., 2.6.2.6, and 2.6.3.4.

(2) A number of POC wells are too far from the drilling project.

ADEQ Response –
A.R.S. §49-244 requires that POCs be established no more than 750 feet from the edge of the pollutant management area. The currently designated POCs comply with this requirement.

Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP

(3) As currently designed and permitted, this is not a "pilot" project, as required by the temporary permit.

ADEQ Response –
ADEQ has determined that this pilot project does meet the standard for a pilot project under A.A.C. R18-9-A210(1). Pursuant to AAC R18-9-101(30) a "pilot project" means a short-term, limited-scale test designed to gain information regarding site conditions, project feasibility, or application of a new technology. The Temporary APP is to construct and operate a production test facility (PTF) which shall provide data to assess and to potentially develop a full-scale in-situ mining operation. ADEQ concurs that the information obtained from the pilot test will provide useful data regarding site conditions, project feasibility, to access the viability of in-situ leaching operations at the site and to potentially develop a full scale commercial operation based on results obtained from the pilot test.

See response to commenter #45(2).

(4) Abandoned bore holes, which have been documented as one of the leading causes of groundwater contamination, cannot all be found and abandoned.

ADEQ Response –
The location of the wells and coreholes within the 500-foot zone were identified using records from ADWR and historical records of drilling conducted by previous owners of the property. Certain location of known coreholes will be field verified to identify changes in soil texture, surface elevation and changes in vegetation that may be indicative of previous drilling activities and to detect collars of coreholes that may no longer be visible from the surface. Additionally excavation and geophysical techniques will be implemented to locate coreholes. ADEQ considers this approach to locate previous coreholes to be acceptable, and is typical protocol when trying to locate subsurface features at the site.

Additionally, see response to commenter #24(10) and #24(16).

(5) There is no proven evidence of any in-situ mine being able to remediate drinking water once it is contaminated.

ADEQ Response –
See response to Commenter #64(1).

#140, Vicki E. and Michael A. O'Hara -

(1) As a part of its groundwater and surface water protection programs, ADEQ requires mining companies to submit Aquifer Protection Permit Applications (APPA) that include facility-specific radiological characterizations. Has this been done and where can the results be reviewed?

ADEQ Response –
The APP Program requires the submission of discharge characterization and available groundwater quality data. In addition, the collection of ambient groundwater data, and

periodic monitoring of POC wells is required under the APP (See tables 4.1-5 through 4.1-7). This data includes selected radionuclide constituents. The results of data collection during the application process can be referenced in the facility file for APP P-106360. Ambient monitoring for the new POCs will be required and will include radionuclides.

Radiological data for the site can also be referenced in the facility file for APP P-101704.

(2) ADEQ has issued a temporary two-year APP to Curis when the Curis PTF requires two years of leaching and rinsing, a five-year post closure monitoring period, and a potential post-closure monitoring extension for another five years. What is ADEQ's rational(*sic*) for this decision? How is ADEQ proposing to properly analyze the safety and viability of the Curis operation before the TAPP expires?

ADEQ Response –
See response to commenter #45(2).

(3) The Curis pilot well field design is significantly different from the design it would use for commercial production. Why isn't ADEQ requiring Curis to use the same design for its pilot well field that it would use in its commercial operation?

ADEQ Response –
The subject of the temporary APP is a pilot test. The pilot test results will be used to evaluate potential operations at the project site to be conducted under a permanent APP. The results will be evaluated as a part of that process. The design to be employed for commercial operation has not yet been approved by ADEQ.

(4) Why isn't ADEQ requiring that perimeter wells be within 75 to 100 feet of each other during the pilot test?

ADEQ Response –
That level of coverage is not necessary for evaluating pilot test results, or for providing proper monitoring at the POC locations. The level of coverage is consistent with that required in APPs for other mining operations.

(5) Will ADEQ revise the TAPP to require Curis to adequately position and construct the POC wells to better detect groundwater pollution? If not, why not?

ADEQ Response –
See previous response. ADEQ considers the POC locations to be adequate to evaluate the protection of AWQS at the points of compliance. The commenter does not specify specific issues relating to POC well construction. The POCs will be constructed by Arizona licensed well drillers, and designed by Arizona registered engineers or geologists.

In accordance with Section 2.9.2, the mine block wells, where actual injection will take place, are required to be sampled during closure and into post-closure. Sampling at the actual injection point(s) will determine chemical concentrations at the source and will better assist in determining potential groundwater contamination after rinsing.

(6) Will ADEQ have an independent outside consultant review the location and construction of the POC wells? If not, why not?

ADEQ Response –
The location and construction of POC wells will be overseen by Arizona registered geologists and engineers, and will be installed by Arizona licensed well drillers.

(7) Since corehole are documented to be one of the leading causes of excursions allowing groundwater contamination, will ADEQ require Curis to properly document the location and abandonment of all coreholes and wells on the state land parcel? If not, why not?

ADEQ Response –
ADEQ will require Curis to locate and abandon all coreholes and wells that lie within a 500-foot boundary from the PTF well field. See Response to Commenter to #138-4. The 500-foot boundary encompasses mostly State Land, however a portion of the 500 foot boundary does extend onto Curis property.

(8) Has ADEQ required Curis to sample groundwater to set AL and AQL? If not, why not?

ADEQ Response –
Yes. See the APP permit Tables 4.1-5 through 4.1-7, and the Compliance Schedule, Section 3.0.

(9) Will ADEQ reconsider its monitoring schedule and POC well field to require a monitoring network and schedule that provides more protection for our drinking water supply? If not, why not?

ADEQ Response –
Commenter does not propose specific changes. ADEQ considers the POC locations and sampling frequencies to be adequate to evaluate the protection of AWQS at the points of compliance.

ADEQ has determined that the number and location of monitoring points is protective of those aquifers likely to be impacted, and are similar to the number and locations of monitoring points required in other mining APP permits. Collection of water samples at the residential drinking water sources is too distant from the site to provide useful information regarding the protection of AWQS at the POCs. These sources are already regulated and monitored under drinking water regulations that are separate to APP requirements.

The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in ARS §49-244, such that all POCs are within 750 feet of the Pollutant Management Area (PMA) and are in the downgradient groundwater direction. Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS.

The foreseeable use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. Groundwater monitoring in the UBFU, LBFU, and Oxide water bearing units at the POCs between the PTF and the Curis property boundary is protective of any potential downgradient groundwater users.

(10) Will ADEQ require Curis to monitor for Level 1 pollutants on a quarterly basis and level 2 pollutants on a semi-annual basis during the pilot program? If not, why not?

ADEQ Response –
Yes, groundwater monitoring requirements at the POCs include quarterly (Level 1) as described in Table 4.1-6 and semi-annual (Level 2) routines as described in Table 4.1-7.

(11) Because of the importance of the groundwater supply to our immediate area it would seem that sampling of the process solutions should be continuously analyzed and reported during the project. Will ADEQ require Curis to conduct such analysis and the data on a monthly basis throughout the PTF operations? If not, why not?

ADEQ Response –
ADEQ does not consider monthly sampling of the lixiviant to be necessary, as the composition will not change significantly during operations. Water in the underground workings will be sampled periodically during operations, as described in the permit, Section 2.5.1 and into closure and post-closure.

(12) Evidence from ISL mining around the world and from the BHP pilot demonstrates that groundwater cannot be restored to pre-mining conditions within the nine month period specified in the PTF and that rebound of contaminants can occur months or years after mining has ended. In the light of the abundance of documented evidence to this effect, will ADEQ revisit the Curis proposal and require an extended period for determining contamination and restoration to pre-mining conditions? If not, why not?

ADEQ Response –
The nine month period referenced by the commenter is the post-mining rinsing period. After the rinsing period, the permit includes an initial five year post-closure groundwater monitoring period, with an evaluation at the end of that time to determine if additional post-closure groundwater monitoring will be necessary. The groundwater quality at the points of compliance will be protected during this post-closure period.

The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation at the POC if the AWQS are violated at the time of permit issuance.

(13) Has Curis actually obtained a performance bond? If they have, what are the scope and terms of the bond? What is the reliability of assurance of the bond?

ADEQ Response –
The surety bond submitted by Curis was reviewed for its conformity with the established ADEQ template for the surety bond financial assurance mechanism. The review also included steps to determine that the bonding company was listed as an acceptable surety on federal bonds in Circular 570 of the U.S. Department of Treasury.

(14) Will ADEQ require Curis to obtain a bond or put enough money into escrow to cover the actual expenses related to groundwater cleanup obligations, which will have to be performed after the permit expires? If not, why not?

ADEQ Response –
See response to commenter #24(12).

(15) What restrictions or safeguards has ADEQ required of Curis to assure that the sulfuric acid solution used in the process will not migrate into the lower aquifer zone?

ADEQ Response –
The Applicant is required to limit acid injection in the Oxide Unit as described in the Discharge Limitations in Section 2.3. Additionally BADCT requirements for in-situ leaching have been met, and constitute adequate measures to protect water quality.

(16) Please explain the rationale for not requiring Curis to conduct multi-level, multi-port sampling at several locations near and just outside the PTF injection and extraction well field so that all potential groundwater directional flow scenarios can accounted for.

ADEQ Response –
Multi-level, multi-port sampling will be conducted within the PTF mine block to access in-situ mining operation at the West Bay wells. Additionally, multi-level sampling will occur at monitoring well MW-01 located adjacent to the PTF.

ADEQ is satisfied that the modeling performed in support of the application adequately predicts the direction of groundwater flow for the purposes of the limited duration pilot test. The lateral flow directions in the Oxide Unit at the site are not significantly variable.

(17) How does ADEQ justify the amount of water this operation will contaminate when water is such a crucial and limited resource in this area?

ADEQ Response –
The lixiviant is a weak sulfuric acid solution. Based upon the nine month rinsing operation and the substantial buffering capacity of the aquifer, the long-term damage to water quality will be minimal and will not exceed statutorily allowed limits. The pilot test operations are required to maintain AQWS at the points of compliance or not cause further degradation throughout the operational, closure, and post-closure periods. Groundwater modeling, using sulfate as an indicator parameter, predicted that a sulfate concentration of 2 mg/L above background will extend no further than 150 feet from the PTF well field in the oxide zone during the five year post-closure period. Updated groundwater modeling will be required at the end of the five year post closure period using site specific data.

#141, David R. Rawls -
The commenter submitted a hand written script with attached newspaper articles in support of the project and also provided oral comments during the public hearing.

ADEQ Response –
The comments are noted.

#142, Joan and Roland Moyneur -
(1) First, we would like to express our complete disgust with your agency's support of this under funded Canadian company, over the resident's rights of expecting ADEQ to protect the domestic water supply of the community. Curis was floated on the Toronto Ontario Stock Exchange as a way to limit H.D.I.'s environmental lawsuit exposure as they have extensive assets.

ADEQ Response –
See response to commenter #24(12).

(2) Curis as a company, has no mining experience and yet they expect us to believe they will attain hydraulic control over their pregnant leachate when this has never been done by any company worldwide. Insitu operations for all minerals has had a 100% failure in protecting local groundwater.

ADEQ Response –
See response to Commenter #64(1).

(3) Curis PTF program as proposed is a joke. The monitoring wells are so far out of range related to the injection and recovery wells that they are totally useless. For true monitoring to occur, there needs to be a ring of no less than 16 wells (4:1 ratio) no further than 150 feet outside of the (4) recovery wells. Monitoring needs to be done weekly with a neutral third party doing the analysis, paid for by Curis. This monitoring should begin 60 days after the start of leachate injection.

ADEQ Response –

ADEQ has determined that the number and location of monitoring points is protective of those aquifers likely to be impacted, and are similar to the number and locations of monitoring points required in other mining APP permits. Collection of water samples at the residential drinking water sources is too distant from the site to provide useful information regarding the protection of AWQS at the POCs. These sources are already regulated and monitored under federal drinking water regulations.

The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in ARS §49-244, such that all POCs are within 750 feet of the Pollutant Management Area (PMA) and are in the downgradient groundwater direction. Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS.

The foreseeable use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. Groundwater monitoring in the UBFU, LBFU, and Oxide water bearing units at the POCs between the PTF and the Curis property boundary is protective of any potential downgradient groundwater users.

The location and construction of POC wells will be overseen by Arizona registered geologists and engineers, and will be installed by Arizona licensed well drillers. The samples will be analyzed by Arizona licensed laboratories.

(4) Additionally, Curis proposed bond and set-aside for cleanup of the spent leachate ponds is completely irrational. Closure of just the ponds will exceed their budget at the minimum of ten times their proposed amount; let alone what the cost will be for closing or abandonment of all well sites. The actual plan by Curis due to these woefully under funded works appears to be bankruptcy and complete abandonment of any related liability.

ADEQ Response –
See response to commenter #24(12).

#143, A.J. Smith -
The commenter submitted comments in support of the APP and the project.

ADEQ Response –
The comment is noted.

#144, John & Karen Wall -
The above-referenced temporary individual permit for Curis Resources' pilot test facility (PTF) should be revoked for the following reasons:

(1) According to Arizona Administrative Code R18-9-A210, a pilot project is authorized to develop date for a full-scale project. As such, it should replicate the same configuration as proposed for the commercial operation. ADEQ's own regulations would not allow a full-scale project using the same installation and reporting requirements as that proposed for Curis's PTF.

Next, the configuration of the PTF injection, recovery and monitoring wells is significantly different from that proposed in their commercial application. If this were a legitimate PTF, the well configuration would be identical to that for commercial operations.

ADEQ Response –
The subject of the temporary APP is the Production Test Facility. The Production Test Facility does not include full scale commercial mining operations. The Production Test Facility well field will be limited to conducting tests, on approximately 2.2 acres of land, within the State Trust Land parcel, to provide data which might be used in an application for a permanent individual aquifer protection permit. Following the completion of the Production Test project, Curis will have the option to submit an application to ADEQ for a significant amendment to the existing permanent individual APP to allow mining, and that the amendment would be subject to all of the requirements for public participation and appeal. Review of this application will include an evaluation of pilot test results. The design to be employed for commercial operation has not yet been approved by ADEQ.

(2) Additionally, the PTF does not meet the maximum two-year window of a temporary individual permit and, in fact, it appears that ADEQ intends to issue a commercial permit before adequate data from the PTF can be fully collected and analyzed. This sidesteps the public comment and hearing process required for a commercial mining operation and allows Curis to experiment and move on to commercial operation without actually proving the safety of the process

ADEQ Response –
See ADEQ Response to Comment 1 above.

(3) Additionally, point-of-compliance wells are located in such a way as to be inadequate to detect contaminants during the two-year PTF window.

ADEQ Response –
A.R.S. §49-244 requires that POCs be established no more than 750 feet from the edge of the pollutant management area. The currently designated POCs comply with this requirement.

Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP.

(4) Furthermore, ADEQ has accepted Curis's intent to locate and plug only those coreholes, bore holes and old wells existing within 500 feet of the well field boundary. Unabandoned holes are documented to be the leading causes of excursions causing groundwater contamination. There are no plans to include the State land parcel or other areas of the PTF site such as the pipeline, underground mine workings and surface impoundments. There is no contingency in the event Curis is unable to locate holes it knows to exist.

ADEQ Response –
ADEQ has accepted Curis's intent to locate and plug only those coreholes and wells within 500 feet of the PTF well field boundary. ADEQ concurred with the EPA assessment of a 500-foot Area of Review from the PTF requiring corrective action such as abandonment of coreholes and or wells. The location of the pipeline, underground working and impoundments falls outside of that 500 foot Area of Review from the PTF, and therefore, ADEQ does not see the need to require those coreholes or wells to be abandoned prior to PTF operations. While the permit does not require coreholes or wells to be abandoned near the pipeline, underground mine workings and at the surface impoundments, ADEQ assumes and it is standard industry practice to properly abandoned coreholes and wells under the footprint of proposed impoundments.

The mine shaft has not been abandoned and is not proposed to be abandoned for the pilot test. The underground workings will be monitored for water level elevations and will be required to be sampled in a depth specific manner throughout the duration of the pilot test and into closure and post-closure.

(5) ADEQ's temporary APP includes insufficient monitoring of groundwater contaminants and does not require the collection of data from drinking water sources, something I find unconscionable. How can Curis prove the safety of drinking water sources without being required to monitor and report test results on those sources?

ADEQ Response –
ADEQ has determined that the number and location of monitoring points is protective of those aquifers likely to be impacted, and are similar to the number and locations of monitoring points required in other mining APP permits. The POCs are located between the PTF and any potential downgradient groundwater user (i.e. drinking water). Collection of water samples at the residential drinking water sources is too distant from the site to provide useful information regarding the protection of AWQS at the POCs. These sources are already regulated and monitored under federal drinking water regulations and should be regularly sampled by your drinking water provider.

The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in ARS §49-244, such that all POCs are within 750 feet of the Pollutant Management Area (PMA) and are in the downgradient groundwater direction. Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the

effective time frames of the Temporary APP. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS.

The foreseeable use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. Groundwater monitoring in the UBFU, LBFU, and Oxide water bearing units at the POCs between the PTF and the Curis property boundary is protective of any potential downgradient groundwater users.

(6) ADEQ should also not assume protection based on Curis's promise of restoration using unproven technology, especially considering that NO in-situ mining operation has EVER returned the groundwater to pre-mining conditions. What makes ADEQ think Curis will be the first one?

ADEQ Response –
ADEQ has determined that the project, as proposed, satisfies the requirements of BADCT (A.R.S. §49-243(B)), and the protection of AWQS at the points of compliance (A.R.S.§49-243(B)(2-3)). The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant). The permit contains required contingency actions that will be implemented if alert levels are violated at the points of compliance. Violation of the AWQS or an AQL at a point of compliance is a permit violation.

#145, Mary Jen Cirrito -
Commenter has general concerns regarding groundwater quality and drinking and bathing water safety.

ADEQ Response –
See response to Commenter #3. The quality of drinking water supplied to your subdivision is regulated under the Safe Drinking Water laws, and the water quality of the water supplied is monitored and reported to ADEQ by your water provider.

#146, Cynthia Smith -
Commenter has general concerns regarding sub-division water quality.

ADEQ Response –
See response to Commenter #3. The quality of drinking water supplied to your subdivision is regulated under the Safe Drinking Water laws, and the water quality of the water supplied is monitored and reported to ADEQ by your water provider.

#147, Keith Flygare -
If you haven't already, this letter is requesting that you go out to the Posodon Butte (Florence Butte) where the sulfuric acid is planned to be injected and see how much higher this is than the aquifer in the valley. You can do this by driving south on Hunt Highway, turn left on Merrill Ranch Parkway and drive to the eastern end where it dead

ends into Felix Rd. This is approximately 100 feet higher than the valley where the aquifer is located. As well turn north on Sun City Blvd. and Spirit Way, drive to the end of both streets and observe the natural washes and slopes where the acid will flow down to the aquifer and the lower sections of Merrill Ranch behind Safeway/McDonalds shopping center. There is absolutely no question that gravity will cause the acid to flow like a river down to the aquifer, contaminate and destroy it.

ADEQ Response –
See response to commenter #3. The dilute sulfuric acid leach solution will be injected at depths of about 500 to 1,185 feet below ground surface, and will not flow across the land surface.

#148, Suzanne Davis -

(1) As a resident of the Florence and San Tan Valley Arizona area that will be impacted by the CURIS mining project, I am concerned that our water supply will be contaminated. Isn't ADEQ considered to be the custodian of our water supply and responsible to the area citizens to keep it safe? Has ADEQ considered the consequences of giving CURIS (or any mining company) permission to tamper with our precious water?

ADEQ Response –
See response to Commenter #3.

(2) Have you not considered hiring a US company to do the drilling/mining? Will jobs be created for our local people or will Canadians be working at the site? Why is ADEQ determined to have CURIS use the Florence area, even after the Florence City Council voted NO three times on the mining permit request?

ADEQ Response –
The nationalities of applicants are not a subject of APP requirements. ADEQ does not regulate the nationalities of employees or contractors working on the project.

The applicant has satisfied the requirements of the APP Program ARS Title 49, Article 3, and A.A.C. Title 18, Chapter 9, Articles 1 and 2. There are no regulatory criteria under ADEQ's statutes and rules to allow consideration of Town Council votes.

(3) Why not pick an area of government desert land where the underground water supply will not be affected? Why are there still open holes from a previous mining attempt that weren't closed or capped? What are the dangers of using sulfuric acid and doesn't the reaction with water cause dangerous fumes? Won't some chemicals remain in the ground and have an adverse affect on not only the water but vegetation?

ADEQ Response –
The areas selected for this type of study are based upon the presence of an appropriate ore body, not the presence or absence of groundwater aquifers. Coreholes are not required by law to be filled or capped, although conditions are set forth in the Temporary

APP that addresses this concern. Regarding fumes, worker protection is provided by Mine Safety and Health Administration (MSHA) and Occupational Safety and Health Administration (OSHA) laws.

Any minor amounts of acid remaining after rinsing operations will be buffered by the groundwater. The injection points are at a depth of about 500-1185 feet below ground surface, so there will be no significant risk to surface vegetation or animals.

#149, Donna Dunsey -

Commenter provided general comments expressing concern over aquifer water quality, including arsenic.

ADEQ Response –

See response to Commenter #3. An arsenic use protection level of 0.01 mg/L is established under the permit.

#150, Bill Brown -

(1) **The Curis PTF will be conducted near a prime drinking water aquifer for our area and may contaminate our drinking water.** I understand from our local water supply company, Johnson Utilities, that they draw drinking water for our area from the lower basin fill unit (LBFU) that is adjacent to the APP project area The APP allows Curis to inject sulfuric acid into the bedrock and dissolve the minerals to extract copper. There is no way to guarantee that this acid and resulting sulfate contamination will not migrate into the drinking water supply. The bedrock has faults and fractures and there are hundreds or thousands of unabandoned coreholes that may or will allow this sulfate contamination to leach into the adjacent water supply. This is a known problem previously in this area and in similar projects in other parts of the country. Properly abandoning coreholes in a 500 foot proximity to the PTF as required by the APP is a start, but this should be a much broader proximity. I believe this issue of faults, fractures and unabandoned coreholes should be sufficient reason to stop this project.

ADEQ Response –

See response to Commenter # 3.

The Johnson Utilities registered well is located approximately 1.2 miles northwest of the PTF and is screened in the LBFU. ADEQ is aware that the Johnson Utilities well is not connected to the drinking water system. The PTF will inject into the Oxide Unit between 500 to 1,200 feet below ground surface. Extraction wells, observation wells, monitoring wells and POCs are located between the PTF injection wells and the Johnson Utilities well. ADEQ concurs that injection at the PTF site in the Oxide Zone is taking place at the same depth below ground surface as the Johnson Utilities well could conceptually extract groundwater from, however, the PTF injection is taking place in a separate and distinct geologic unit (Oxide) then the screened interval of the Johnson Utilities well (LBFU) and the comparable depths below ground surface for the PTF Oxide injection

zone and potential groundwater withdrawal location in the LBFU are over 1.2 miles away from each other.

The faults and fractures should not hamper the ability to recover in-situ solutions as indicated by groundwater modeling. To verify that modeling assumption, ADEQ has required POC(s) M54-O and MW-01 adjacent to the PTF well fields, which are screened across fault zones in the downgradient groundwater direction, to monitor potential solution migration along the faults.

The commenter does not provide a rationale for expanding the Plan beyond the 500 foot radius.

(2) **Under the APP terms this project will not be adequately monitored.** Curis is proposing to monitor potential migration of the sulfate contaminants into the LBFU by way of existing wells. Curis' proposal shows a potential five-year contaminant migration plume. The closest monitoring well for this one-two year project is well beyond the alleged five-year plume area and is only proposed for sampling once every three to six months This means that if contamination is headed for the LBFU it will not be known until years after this PTF has ceased operation and (presumably) a commercial operation, pumping billions of pounds of sulfuric acid into the bedrock, is well underway. If this project were to proceed then more compliance wells need to be located much closer to the PTF to assure that any contaminant migration is discovered long before it has any chance to reach the drinking water supply. Further, monitoring should occur much more frequently (biweekly) to discover contaminant migration as soon as possible. While more wells and more monitoring costs more money this seems a prudent requirement considering the strong potential for contamination of our drinking water.

ADEQ Response –
A.R.S. §49-244 requires that POCs be established no more than 750 feet from the edge of the pollutant management area. The designated POCs comply with this requirement. Currently four POCs are installed at the site and three new POC will be installed in accordance with the permit Compliance Schedule, Section 3.0. POCs are required in the UBFU, LBFU and Oxide aquifers. POCs are established between the PTF and any potential downgradient drinking water user.

Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 will be sampled monthly.

(3) **Experimenting with in-situ mining in a residential area.** Curis has never developed nor operated a commercially successful mine of any type and has no prior experience utilizing in-situ mining. In North America, there are no commercially successful in-situ copper mines of the type proposed by Curis. Uranium mining

companies using similar extraction methods in Texas, Colorado, and other states have never been able to restore the aquifer to pre-mining conditions. Clearly, the technology and processes for in-situ mining are too new and risky to experiment with in an area in such close proximity to potable water sources for existing, nearby residential development.

ADEQ Response –
See response to Commenter #64(1).

(4) **What happens if the project fails and the drinking water aquifer** is **polluted?** Curis may fail in this project. They may pollute our drinking water. They may decide that if that happens, it is better to go bankrupt than spend the many millions of dollars it would take to restore the groundwater to its previous condition and compensate property owners for many more millions in lost property values. What is your backup plan? As the environmental agency in charge of overseeing this project, how have you assured, in the event of an environmental disaster that we and other citizens of Arizona are not left to foot the bill for cleanup?

ADEQ Response –
See response to commenter 24(12).

#151, Armand Young -
Commenter submitted information and an article regarding in-situ mining in Texas and Wyoming.

ADEQ Response –
See response to Commenter #64(1).

The compliance objective of the APP is to not exceed AWQS at the POCs, or cause further degradation relative to that pollutant if the AWQS is already exceeded at the time of permit issuance.

#152, Douglas J. Casad -
The applicant provides a generalized comment expressing concern over potential damage to the environment.

ADEQ Response –
The Aquifer Protection Permit is issued for the protection of groundwater resources only.
See response to commenter #3.

#153, Sue and Lee Schoetker -

(1) My husband and I are residents of Anthem Sun City in Florence, living very close to the proposed mining operation by Curis. It is our understanding that you have issued a temporary aquifer protection permit to allow a pilot project for Curis to pursue on

15 acres of State land in our neighborhood. We have been doing everything we can to better understand this permit and how it will affect us and frankly, we are extremely surprised that such a permit could ever be issued by an agency whose mission is to "protect and enhance public health, welfare and the environment in Arizona."

ADEQ Response –
The applicant has complied with the statutes (ARS Title 49, Chapter 2) and rules (AAC Title 18, Chapter 9, Articles1-2) governing the APP Program. ADEQ enforces the laws as written, and there is no provision for denying permit applications, if the Program requirements are satisfied by the applicant.

(2) From what we understand, this permit allows Curis to inject acid into the ground which will allow the release and extraction of copper. Unfortunately, their extraction method not only injects caustic acid which is of concern, but it will also release numerous other substances, some very dangerous, such as radiochemicals, magnesium, arsenic, aluminum and who knows what else. Curis has stated that all of the injected solution will be extracted; however, the bedrock in the area is riddled with numerous natural fractures and faults as well as several hundred KNOWN bore holes and thousands MORE bore holes from previous industrial use. ADEQ's permit does not require Curis to locate all these bore holes, much less seal them. It appears to us that there is no way that Curis can completely control the inevitable seepage of the dangerous substances, seepage which can all too easily reach our drinking aquifer which is located extremely close to the Curis land. Curis states that their in situ operations occur from 460 to 1200 feet below ground "beneath any drinking water supplies"; however it is our understanding that Johnson Utilities' wells are at 500-1000 feet in the lower basin fill unit and that their closest well is less than 2 miles downstream from Curis's land. This means that Johnson Utilities' wells are drilled at the same depth as the area to be injected and the area where various contaminants are very likely to seep. Given the close proximity of Johnson Utilities' wells, combined with the presence of large numbers of fracture, faults and bore holes in the injection site, allowing Curis to proceed even on a temporary or limited basis inarguably endangers the water supply and the health of the residents downstream from Curis's operations.

ADEQ Response –
See response to commenter #24(16).

The Johnson Utilities registered well is located approximately 1.2 miles northwest of the PTF and is screened in the LBFU. ADEQ is aware that the Johnson Utilities well is not connected to the drinking water system. The PTF will inject into the Oxide Unit between 500 to 1,200 feet below ground surface. Extraction wells, observation wells, monitoring wells and POCs are located between the PTF injection wells and the Johnson Utilities well. ADEQ concurs that injection at the PTF site in the Oxide Zone is taking place at the same depth below ground surface as the Johnson Utilities well could conceptually extract groundwater from, however, the PTF injection is taking place in a separate and distinct geologic unit (Oxide) then the screened interval of the Johnson Utilities well

(LBFU) and the comparable depths below ground surface for the PTF Oxide injection zone and potential groundwater withdrawal location in the LBFU are over 1.2 miles away from each other.

The permit's monitoring requirements include groundwater monitoring at Points of Compliance between the injection zone and all known downgradient groundwater supply wells in the area. An exceedance of the AWQS and/or an AQL at the Point of Compliance wells would constitute a permit violation that would need to be addressed by the permittee. In this way, groundwater supplies are continually monitored and protected under the terms of the permit.

The applicant has demonstrated hydraulic control of leach solutions through the use of groundwater modeling overseen by Arizona registered professional engineers and geologists. Minor amounts of leach solution that may remain in remote fractures after rinsing operations are complete will be buffered by natural groundwater. To verify that modeling assumption, ADEQ has required POC(s) M54-LBFU, M54-O and monitoring wells MW-01 adjacent to the PTF well field, which are screened across fault zones in the downgradient groundwater direction, to monitor potential solution migration along the faults.

The permittee has committed to conducting additional soil borings, geophysical testing, packers tests and aquifer tests to again confirm porous media using wells at the PTF in the Oxide Zone. For these reasons, discussions of fractures and fracture flow in the Oxide Zone are not applicable to this project because the Oxide Zone does not behave as a fractured media.

(3) It is also our understanding that your permit does not require adequate monitoring for contaminants in that the monitoring wells are insufficient in number and are placed outside of the area where the contaminants are likely to flow, especially during the limited time period allowed by a temporary permit. For that matter, the monitoring wells are not even placed within an area projected by Curis's estimated flume over a FIVE YEAR period even though the temporary permit is supposed to be only two years! From what we can see, instead of creating a trial process to "test" the viability and safety of a mining operation that is clearly of great concern to many local residents, your permit seems to INSURE that Curls will not detect any exceedances of water quality standards during the permit parameters! Worse, this would seem to set us up for an even more widespread and dangerous mining permit and operation following the PTF conclusion!

ADEQ Response –
A.R.S. §49-244 requires that POCs be established no more than 750 feet from the edge of the pollutant management area. The currently designated POCs comply with this requirement.

Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently

located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS.

(4) When you issued your temporary permit to Curis, what were you thinking?!? First, your permit endangers our water and our health with the injection of acid and the likely release of numerous (including radioactive) contaminants in an area with numerous fractures, faults and bore holes. But then you don't require adequate monitoring wells to locate the presence of those likely contaminants! On top of this, the sampling schedule is woefully inadequate, and worse, Curls will be "self" monitoring their own operation! Self monitoring?!?!? This is a company who has attempted to deceive us locals by saying that their operation will be completely safe while knowing full well that (1) they will be injecting a caustic substance (acid) into the ground, (2) the area being injected is riddled with high levels of radionuclides and other dangerous substances, (3) their caustic acid will not just release the copper but also these dangerous contaminants, (4) there are numerous fissures, faults and bore holes where the acid, radioactive substances and other dangerous contaminants can migrate through, (5) the drinking water aquifer for thousands of residents is adjacent to the injection site, and (6) not even ONE in-situ mine in North America has ever been able to restore the water to pre-mining conditions.

ADEQ Response –
Commenter does not indicate the level of monitoring desired. The placement of wells and monitoring requirements are similar to those required at other APP permitted mining operations, if not more stringent.

The self-reporting process is consistent with the way other APPs are implemented. Sampling results are reported to ADEQ by Curis on Self Monitoring Reporting Forms (SMRF's). The location and construction of POC wells will be overseen by Arizona registered geologists and engineers, and will be installed by Arizona licensed well drillers. The samples will be analyzed by Arizona licensed laboratories.

The rinsing process, required as a part of the mine block closure requirements will mitigate the acidity of the water resulting from the injection of the weak acid solution during pilot test operations. Any minor amounts of remaining weak acid solution remaining in remote fractures will be buffered by natural groundwater.

See response to Commenter #64(1) regarding pre-mining conditions.

(5) Have you googled in-situ mining dangers and/or pollution? We did, and it contained over a million entries. One that we hope ADEQ has spent some time reading is the EPA's 124 page October 1999 report, "Technologically Enhanced Naturally Occurring Radioactive Materials in the Southwest Copper Belt of Arizona" which was completed with the help of your own agency. We found this report ourselves — we were not told about it by any mine "opponent" group or business. This EPA report

specifically discusses the Curis site (then known as BHP Copper Florence In- Situ Project, and before that, Magma Copper) and how the data obtained from ADEQ indicates that "the PLS produced from the Magma Florence in-situ projects contain very high levels of radionuclides and that they are leachable." Clearly, this is evidence that ADEQ cannot ignore as it is from the EPA itself in conjunction with your own agency! Back then, perhaps there were fewer concerns about a mine in the area, but now there are many thousands of residents in very close proximity to the land addressed in your permit and with an aquifer adjacent to the Curis mining site.

ADEQ Response –
ADEQ is aware of referenced Report. It has been documented through studies like the one referenced in the Comment, that when copper ore is leached using sulfuric acid, radionuclide's can be released from the host rock. Generally radionuclides are naturally occurring in geologic formations that contain mineable copper ore. Currently, the permit contains discharge characterization for the PLS, Raffinate and Process Solution Impoundments which include radionuclide compounds to identify the concentration of these compounds in mining solutions contained at the site.

Additionally, groundwater monitoring at the POCs will contain permit limits (Alert Levels and Aquifer Quality Limits) for adjusted gross alpha and radium 226+ radium 228. The permittee has to meet the permit limits, such as AWQS for those compounds or the predetermined background concentrations based on ambient groundwater sampling, at all POCs for adjusted gross alpha and radium 226+ radium 228. In addition, uranium is a constituent on the groundwater monitoring parameter list. This ensures that adequate measures to protect water quality are specified in the permit. The permit contains required contingency actions that will be implemented if Alert Levels are violated at the POCs. Violation of the AWQS or a predetermined Aquifer Quality Limit at a POC is considered a permit violation.

(6) Contamination of our water could affect the health of thousands of residents, and in our case, we are especially vulnerable because of the number of children in the Parkside development and the number of elderly in the Sun City development, both of which are very close to the Curis project. And what about local residents like me (Sue) who have multiple chemical sensitivities and who cannot tolerate even small increases in contaminants? I (Sue) must already use bottled water for drinking and I also must use a special filter on our shower water. People with compromised immune systems, infants and some elderly are also highly likely to have adverse affects from even limited increases in contaminants. You need to take into consideration the fact that the proposed mine and the PTF is not out in the middle of nowhere, but rather in the midst of growing neighborhoods where vulnerable populations exist, If you lived here and had an infant son or an elderly or ill parent living with you, would YOU feel that the in situ process in its present location is safe? We feel that, based on the evidence, you certainly could not! And would you be concerned if the testing process of such a project seemed designed to insure positive results in the face of obvious dangers? Of course you'd be concerned! Curis must have gone through great lengths to design a trial project that could bypass your prior 26 page deficiency letter and

insure positive results that could lead to an even larger (and more dangerous) operation. That would make sense because as a business corporation their primary concern would not likely be the environment or the local residents. However, it is our understanding that you and your agency are here to protect the environment and the health of the huge number of residents living so close to the mining operation, not to protect the business interests of a corporation whose main interest from this operation would naturally be focused on profits.

ADEQ Response –
Any technical deficiencies associated with the pilot project have been satisfied.

The foreseeable use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. Groundwater monitoring in the UBFU, LBFU, and Oxide water bearing units at the POCs between the PTF and the Curis property boundary is protective of any potential downgradient groundwater users.

The water used in your subdivision is monitored by your supplier under Safe Drinking Water regulations.

(7) There are many more technical aspects to the temporary permit which we don't fully understand, but from what we were able to glean, it appears flawed on numerous grounds, including: Curis's PTF does not appear to be a short-term "pilot project," but rather just the first step in commercial mining and an effort to sidestep our town's zoning authority. The permit does not comply with regulations and should be revoked. ADEQ has authorized a temporary permit that will allow for a potential 12-year operation even though temporary permits are limited to only one year plus a one year extension.

ADEQ Response –
See response to commenter #45(2).

(8) Curis's PTF will not prove that commercial operations are safe and will not answer ADEQ's questions posed in its 26-page deficiency letter to Curis, nor can we find where your agency has required Curis to address those many deficiencies.

ADEQ Response –
The 26 page deficiency letter referenced in the Comment is an ADEQ Comprehensive Request for Additional Information (RAIS) Letter dated September 7, 2011. The September 7, 2011 ADEQ Letter was prepared as a result of a review of a Significant Amendment Application for P-101704 dated January 2011, for commercial mining operations at the site. Since the issuance of the September 7, 2011 ADEQ Letter, Curis Resources suspended the request for the Significant Amendment Application for P-101704 in a letter dated December 20, 2011. Since the request to conduct commercial operation at the site was suspended by Curis, the Applicant was not required to respond to the RAIS Letter. A new Application for a Temporary APP to conduct a small scale pilot test was submitted by Curis on March 1, 2012. ADEQ sent a Comprehensive

Request for Additional Information (RAIS) Letter dated May 2, 2012 based on a review of the Temporary APP Application. The two RAIS Letters sent by ADEQ, one for commercial operation in September 2011 and another for the pilot test in May 2012 are similar in nature, however based on downsizing of the overall scope of the project (from commercial to a small scale pilot test), the extent and nature of ADEQ's request for additional information has been reduced. Curis has adequately responded to all ADEQ requests for additional information.

The Temporary APP is to construct and operate a production test facility (PTF) which shall provide sufficient data to assess and to potentially develop a full-scale in-situ mining operation. ADEQ concurs that the information obtained from the pilot test will provide useful data regarding site conditions, project feasibility, to access the viability of in-situ leaching operations at the site and to potentially develop a full scale commercial operation based on results obtained from the pilot test.

(9) Curis's Pilot well field design differs significantly from the design proposed for commercial production. Curis's PTF will not prove that Curls can maintain hydraulic control during commercial operations.

ADEQ Response –
The subject of the temporary APP is the Production Test Facility. The Production Test Facility does not include full scale commercial mining operations. The Production Test Facility well field will be limited to conducting tests, on approximately 2.2 acres of land, within the State Trust Land parcel, to provide data which might be used in an application for a permanent individual aquifer protection permit. Following the completion of the Production Test project, Curis will have the option to submit an application to ADEQ for a significant amendment to the existing permanent individual APP to allow mining, and that the amendment would be subject to all of the requirements for public participation and appeal. Review of this application will include an evaluation of pilot test results. The design to be employed for commercial operation has not yet been approved by ADEQ.

The five-spot pattern well field design has been reviewed by ADEQ and determined adequate for the PTF. BADCT requires that injection and recovery wells be properly designed per BADCT Section 3.4.5. However, specific well field design layout is not covered under BADCT due to such site variables as field size and SX/EW plant location. There are a number of scientific field studies that have been completed over the years which include the use of the five-spot pattern.

Curis will be required to provide the results, evaluation, and data of the pilot testing which through interpolation confirms that hydraulic control can be maintained during commercial operations on the remaining State land property.

Following the completion of the Production Test project, Curis will have the option to make an application to ADEQ for an amendment to the existing permanent individual APP to allow mining, and that an amendment would be subject to the public participation requirements for an amendment of an individual APP. Review of this application will

include an evaluation of pilot test results. The design to be employed for commercial operation has not yet been approved by ADEQ.

Also, see response to item #7 above.

(10) ADEQ's permit requires compliance with an arsenic standard through calculated pollution levels rather than real world groundwater data.

ADEQ is not requiring standards to protect the aquifer for drinking water uses for many chemicals including sulfate, magnesium, aluminum, radiochemicals, etc.

ADEQ Response –
The arsenic standard, which is more stringent than the aquifer water quality standard (AWQS) for arsenic, will be implemented using an ADEQ Use Protection Level. The Use Protection Level (UPL) is monitored using real world groundwater data.

There are no numeric AWQSs for sulfate, magnesium, or aluminum; however the Temporary Permit includes Alert Levels in groundwater for sulfate, magnesium and aluminum. Selected radiochemicals, for which there are AWQSs, and for uranium which does not have AWQS, are included in the groundwater monitoring schedules required under the permit.

(11) The permit also failed to address the unrealistic groundwater pollution cleanup proposed by Curls given the evidence from uranium in situ mines around the country and from the previous BHP pilot.

ADEQ Response –
The terms, conditions, and restrictions of the Temporary APP, in conjunction with monitoring and enforcement activities, if needed, by ADEQ constitute adequate measures to prevent contamination of the drinking water aquifer. The rinsing and post-test monitoring operations are designed for the protection of exceedances of AWQSs limits or to cause no further degradation at the points of compliance.

(12) The permit does not adequately address the financial assurance issue in both amount and for the actual length of the project (only for the length of the permit). There are no details regarding any performance bond, and the bond will not cover excessive groundwater cleanup obligations which necessarily must be performed after the permit and bond expire.

ADEQ Response –
See response to commenter # 24(12).

The permittee shall in accordance with the Compliance Schedule, Section 3.0, submit an amendment application to incorporate all discharging facilities, and all closure/post-closure activities in accordance with an ADEQ approved Closure Plan per Section 2.9.1 from APP P-106360 into APP P-101704. The application shall also include updated

closure/post-closure cost estimates for APP P-101704 and a corresponding updated financial assurance mechanism for APP P-101704.

#154, Sierra Club, Grand Canyon Chapter -

(1) **ADEQ does not have statutory authority to issue a temporary individual APP to Curis Resources.** ADEQ does not have legal authority to issue a "temporary individual APP" to Curis Resources for the proposed Florence Copper Project. There is nothing in the Aquifer Protection Permit statutes providing legal authority for the issuance of a temporary individual APP. While the APP statutes contain references to "individual permits," "general permits," "agricultural general permits," "area wide permits," and "groundwater quality protection permits," there is no mention of a "temporary permit" or a "temporary individual APP," in the statutes governing the APP program found in Title 49, Chapter 2, Article 3.

The APP statutory scheme does not contemplate issuance of temporary Aquifer Protection Permits like the one issued here. A.R.S.49-241 prescribes statutory requirements for APPs but does not include any mention of temporary individual APPs. A.R.S. §49-242 prescribes procedural requirements for issuing individual APPs but does not contain procedural requirements for issuing temporary permits. There is no mention of temporary individual permits in A.R.S. §49-243, which prescribes information requirements for permit applications and the statutory criteria for individual APPs. Finally, there is no mention of fees for temporary APPs. In fact, there is no mention of temporary individual APP in any of the statutes in Title 49, Chapter 2, Article 3, which govern the Aquifer Protection Permit program.

Sierra Club notes that ADEQ did not cite the specific statutory authority that ADEQ relied upon to issue Temporary individual APP No. P-106360 in any of the permit documentation made available for public comment, as required by law. The Public Notice states that ADEQ issued the temporary individual APP pursuant to the agency's administrative rules in Title 18, Chapter 9, Article 1 of the Arizona Administrative Code. The Fact Sheet states that ADEQ issued the temporary individual APP pursuant to A.A.C. R18-9-A210(E). The Fact Sheet does not contain a citation to specific statutory authority that authorizes issuance of temporary individual APPs. Finally, Section One of Temporary Aquifer Protection Permit No. P-106360, which addresses authorization for Temporary Individual APP No P-106360, contains only generic references to the APP statutes and ADEQ administrative rules. Section 1.0 of the temporary permit states, in relevant part

> In compliance with the provisions of Arizona Revised Statutes (A.R.S'. Title 49, Chapter 2, Articles 1, 2, and 3, Arizona Administrative Code (A.A.C.) Title 18, Chapter 9, Articles 1 and 2, A.A.C. Title 18, Chapter 11, Article 4 and amendments thereto, and the conditions set forth in this permit, the Arizona Department of Environmental Quality (ADEQ) hereby authorizes Curis Resources (Arizona) Inc. to operate the Florence Copper Project-Pilot Test Facility...."

[See Temporary Protection Permit No. P-106360, Section 1.0 Authorization, P.1 of 42].

A generic reference to all of the statutes in Title 49, Chapter 2, Articles 1, 2, and 3 for legal authority to issue a temporary individual APP is insufficient. ADEQ issuance of a temporary permit in the absence of specific legal authority is illegal so the temporary permit must be revoked.

ADEQ Response –
A.A.C. R18-9-A210 was promulgated under the legislative grant of powers and duties found in A.R.S. § 49-104 and A.R.S. § 49-203. The APP statutes require individual permits be consistent with the processes and requirements found in A.R.S. § 49-241, A.R.S. § 49-242, A.R.S. § 49-243, and A.R.S. § 49-244. A temporary permit is merely an individual permit with an expiration date.

(2) **Temporary Individual Permit No. P-106360 does not comply with the requirements of A.R.S. §49-251, the statute authorizing temporary emergency waivers. A.R.S.49-251 does not provide legal authority to issue this temporary permit.**

The only state law in the APP statutes that is even remotely similar to the concept of a "temporary individual APP" is A.R.S. §49-251, the Arizona Revised Statute that authorizes temporary emergency waivers under certain limited conditions. A.R.S. §49-251(A) provides legal authority for ADEQ to issue a "temporary emergency waiver" from the requirements to obtain an APP or from any applicable permit requirement or with a surface or aquifer water quality standard or discharge limitation provided the issuance of a temporary emergency waiver will not endanger human health or welfare and the Director of ADEQ makes one of the two findings.

The Director must find either:

1. "That an emergency of such severity exists that water supplies for domestic uses will be inadequate to meet demand unless the facility is able to temporarily exceed one or more water quality standards or discharge limitations by its discharge into waters of the state" or

2. That there has been a breakdown of equipment or upset of operations resulting in discharge to waters of the state in excess of one or more water quality standards or discharge limitations, and both of the following apply:

   (a) The breakdown or upset was beyond the control of the facility owner or operator and the facility was being operated in compliance with this chapter before the discharge.

   (b) The breakdown or upset will be corrected in a reasonable amount of time."

It is clear that Temporary Individual APP No. P-106360 is not consistent with the requirements for a temporary emergency waiver authorized by A.R.S.49-251. None of the requirements of A.R.S. §49-251 are met.

First, there is no emergency threatening the adequacy of water supplies. Second, there has been no breakdown of existing equipment or upset of facility operations to justify ADEQ issuance of a temporary emergency waiver. Here, ADEQ is proposing a temporary individual APP to authorize discharges from an in-situ mining pilot project. The purpose of the temporary individual APP stated in the public notice is "...to allow Curis to conduct a 14- month pilot test for in-situ recovery in order to develop data needed to support potential full-scale commercial in-situ mining operations for the Florence Copper Project." *[See* paragraph 3 of the Public Notice]. There is no emergency or upset of any kind so the "temporary individual APP" cannot have been authorized by A.R.S. §49-251.

Finally, a temporary emergency waiver issued pursuant to A.R.S. §49-25 1 can remain in effect only "as long as necessary to accommodate the emergency, but in no event longer than 90 days" *[See* A.R.S.49-251(E)].The term of the temporary individual APP is one year with an option for renewal for a second year. Since these permit terms are inconsistent with the 90-day term prescribed by statute, ADEQ issuance of Temporary Individual Permit No. P-106360 cannot have been authorized by A.R.S. §49-251.

ADEQ issuance of this permit is illegal because ADEQ does not have statutory authority to issue a temporary individual APP. Until ADEQ cites the statute that provides the agency with authority to issue a temporary individual APP, then it must be considered illegal and void. ADEQ must revoke Temporary Individual Aquifer Protection Permit No. No. P-106360 and should repeal A.A.C. R18-9-A210(E) to prevent issuance of illegal temporary permits in the future.

ADEQ Response –
ADEQ issuance of the Temporary Individual Aquifer Protection Permit is not authorized under A.R.S. §49-251. As noted in the previous response, A.A.C. R18-9-A210 was promulgated under the legislative grant of powers and duties found in A.R.S. § 49-104 and A.R.S. § 49-203.

(3) **ADEQ cannot issue an individual APP to Curis Resources for the Florence Copper Project because the Florence Copper Project does not comply with applicable municipal zoning ordinances and regulations.**
A.R.S. §49-243(0) states that the Director of ADEQ: "...shall require an applicant for an individual permit to submit evidence that the discharging facility complies with applicable municipal or county ordinances and regulations. *The director shall not issue the permit* unless it appears from the evidence submitted by the applicant that the facility complies with the applicable zoning ordinances and regulations." [emphasis added]

The Fact Sheet for the Temporary Individual Permit fails to discuss relevant zoning issues or the specific requirements of A.R.S. §49-243(0) which requires that the applicant for an individual APP provide evidence of compliance with local municipal or county zoning ordinances and regulations. The Fact Sheet states only that "mining activity of greater than five contiguous acres is exempt from zoning requirements pursuant to A.R.S. 11-812." The Fact Sheet is completely silent with regard to the larger zoning issues and the specific statutory requirements of A.R.S. §49-243(0), which require compliance with local zoning ordinances.

ADEQ's failure to address the issue of the applicant's compliance with local zoning ordinances before issuing a temporary individual permit is a violation of A.R.S. §49-243(0). ADEQ must have been aware of the applicant's lack of compliance with the requirements of A.R.S. §49-243(0). The Town of Florence Planning and Zoning staff report for the Florence Copper Project is readily available on-line. The entire Planning and Zoning Staff Report for the Florence Copper Project is attached to this comment letter for your information. Major points from the staff report:

1. Curis Resources requested a Major General Plan Amendment o the Town of Florence 2020 General Plan in conjunction with the proposed Florence Copper Project to change the land use designation from Master Planned Community to Employment / Light Industrial.

2. The staff reported an unfavorable recommendation to the Mayor and Town Council on the request.

3. The planning staff found that the proposed major general plan amendment to change land use designations for the Curis Resources pilot project "will not enhance or support the goals, objectives, and strategies set forth in the Town's 2020 General Plan."

4. The proposed general plan amendment to change zoning for the Curis pilot project "fails to consider the implications of an isolated and dramatic change in land use within a Master Planned Community and within the immediate vicinity of the Anthem at Merrill Ranch Master Planned Community."

5. "The proposed General Plan Amendment and proposed development on the subject site, though implied as interim by the applicant, would not be considered interim if 'approved by the Town. This Amendment creates permanent consequences in how the site could be developed now and in the future and little foresight has been paid to such serious short and long-term potential ramifications....

On November 7, 2011, the Town of Florence, by a unanimous vote of the Town Council (7-0), denied Curis Resources request for a major general plan amendment. On December 19, 2011, the Florence Town Council voted 6-1 to approve Resolution No. 1324-11 urging the State Land Department, Arizona Department of

Environmental Quality, and U.S. Environmental Protection Agency to reject the Florence Copper Project. This resolution urged the other governmental agencies not to violate the Town's decision that the project is unsuitable for the area, as reflected by the unanimous 7 -0 vote to deny Curis zoning approval on November 7, 2011.

It is abundantly clear that Curis Resources did not submit evidence demonstrating that the Florence Copper Project complies with local zoning ordinances. On the contrary, the applicant's request for a change in zoning to allow the pilot project to go forward was denied and the Florence Town Council has expressed its almost unanimous opposition to the project by its 6-1 approval of Resolution No. 1324-11. Under A.R.S. §49-243(0), the Director of ADEQ cannot legally issue even a temporary individual APP to Curis Resources for the Florence Copper Project. For this reason, ADEQ must revoke Temporary Individual Permit No. P-106360.

ADEQ Response –
While the State Trust Land is located within two miles of the limits of the Town of Florence, the State Trust Land is owned by the State of Arizona, and is not subject to the regulatory authority of a city or town. The Town of Florence Ordinance 583-12 is not applicable to the Curis application for a temporary permit therefore A.R.S. §49-243(0) is not violated.

#155, D. Lee Decker – Gallagher & Kennedy -
The commenter provided detailed comments supportive of the mine, and with the intent to refute many of the arguments advanced against the mine. As there are no comments for which the commenter requests a response from ADEQ, we have not included the comments in this responsiveness summary. These comments are available for review in the public file for APP P-106360.

ADEQ Response –
ADEQ has determined that the permit application and resulting temporary APP are in compliance with the rules and statutes of the APP Program.

#156, Gregory Mendoza – Gila River Indian Community -
Commenter did not provide comments for an ADEQ Response. Commenter requested a consultation meeting.

ADEQ Response –
A consultation meeting was held on April 26, 2013.

#157, Helen Jones -
The commenter submitted a letter in support of the project due to new technology to protect water. "No one should worry about water safety". Husband and I are "so in favor of Curis coming in".

ADEQ Response –
The comment is noted.

#158, Robert and Rose Heathfield -
The commenters submitted a letter requesting denial of the Curis permit due to aquifer contamination by the Copper extraction process. Please "stop this project now".

ADEQ Response –
See response to commenter #3.

#159, Keith Kinney -
The commenter submitted a letter in support of the project due to ADEQ's decision, as an "independent third party", to issue an APP for one year "to determine if the in-situ process is feasible and to put at ease the uproar in this community about water safety".

ADEQ Response –
See response to commenter #3.

#160, Sr. Rose Marie Cummins –
The commenter submitted a letter opposing the "temporary demonstration plant for Florence Copper"; the process for extracting copper is not safe for drinking water, the use of sulfuric acid although a commonly used substance in U.S. does not make its use right.

ADEQ Response –
See response to commenter #3.

#161, Gene and Val Vollmin –
The commenters submitted a letter requesting denial of the Curis permit due to its "long-term disaster for our community, our health, and our environment". "A short, one or two-year pilot test facility cannot possibly detect the long-term effects of the in-situ process".

ADEQ Response –
See response to commenter #3.

#162, James M. Nadeau –
The commenter submitted **3** letters opposing the Florence copper mine. "Not a question of if it will it contaminate our water supply but when". Although I am pro-business and in "support of expansion and growth that bring jobs", there are better ways to grow the community other than this copper project.

ADEQ Response –
See response to commenter #3.

#163, William J. Polakowski –
The commenter submitted a letter requesting denial of the Curis permit as it will "poison the drinking water of Pinal County". Sulfuric acid "is a dangerous substance and should not be permitted to be injected into the ground that contains precious water that people, animals, and plants need for survival".

ADEQ Response –
See response to commenter #3.

#164, Larry M. Brown –
The commenter submitted a letter in support of the project and is "totally convinced groundwater will be protected". "Allow the initial phase to continue to show that the process is safe".

ADEQ Response –
See response to commenter #3.

#165, Dennis and Barbara Manning –
The commenters submitted a letter stating that "by issuing the Temporary Individual APP to the Florence Copper Project Production Test Facility, ADEQ has ignored its own mission statement and the reason for the department's existence, to assure groundwater quality".

ADEQ Response –
See response to commenter #3.

#166, Terry Larson –
The commenter submitted a letter in support of "science-based economic development". "Our country needs copper, Florence needs jobs, and our community needs to grow its property values".

ADEQ Response –
The comment is noted.

#167, Evelyn Davis –
The commenter submitted a letter requesting that ADEQ "not give in to greed and protect our water".

ADEQ Response –
See response to commenter #3.

#168, Vicki Marsh -
The commenter submitted a letter requesting denial of the Curis permit due to drinking water contamination resulting from "the leaking of acid".

ADEQ Response –
See response to commenter #3.

#169, Sue and Lee Schoetker –

The commenters submitted a letter requesting denial of the Curis permit due to aquifer contamination resulting from the Copper extraction process. The temporary permit has "so few demands with regard to contamination and monitoring parameters".

ADEQ Response –
See response to commenter #3.

#170, Michael E. Timm –
The commenter submitted a letter requesting denial of the Curis permit due to aquifer contamination resulting from the Copper extraction process and possible earthquake activity. Need to "weigh the gravity of the risks associated with this project vs. the limited rewards (for the residents of Florence and San Tan Valley)". "The potential for a "hypothetical" system failure should be enough to deny this permit".

ADEQ Response –
See response to commenter #3. Geologic hazards were evaluated as part of the Application.

#171, Denny Knudsen –
The commenter submitted a letter requesting that Curis "set aside funds for future potential problems and or future restoration" due to possible contamination. Need to "protect the drinking water in this area from all potential sources of mining contamination".

ADEQ Response –
See response to commenter #3 and #24(12).

#172, Dennis and Barbara Manning –
The commenters submitted a letter indicating that ADEQ issued a temporary permit that fails to protect Florence's water supply. "ADEQ should not allow Curis to conduct any work under this permit until documenting the location and abandonment of all coreholes and wells". "Curis has not met the requirements for any type of permit" and "failed to respond to 86 deficiencies in their original permit application". Their temporary APP will not provide "accurate data nor protect the groundwater".

ADEQ Response –
See response to commenter #3.

See response to commenter #24(10) and #24(16).

All technical deficiencies associated with the pilot test have been satisfied.

#173, Randall and Donna Cook -
The commenters submitted a letter asking ADEQ not to issue any more permits to Curis. "Curis can't guarantee that the water and hydrochloric acid will not get into our water supply" and contaminate the water and make it unfit to drink.

ADEQ Response –
See response to commenter #3. Hydrochloric acid is not proposed to be used at the site.

#174, Harry S. Oxenhandler, MD –
The commenter submitted a letter opposing the Curis Project. According to a research study done by CSIRO (the Commonwealth Scientific and Industrial Research Organization), "the quality of groundwater and the mined aquifer are permanently altered as a result of ISL mining". "The technique of ISL presents significant environmental problems". Severe contamination at some sites, and contamination of private water supply wells with residual leaching solutions.

ADEQ Response –
See response to commenter #3.

#175, Armand Young –
The commenter submitted a letter regarding in-situ mining. Chemicals such as sulphuric acid "can have serious environmental impacts and cause long-term and potentially irreversible changes to groundwater quality". ISL mining "is not controllable, is inherently unsafe and is unlikely to meet "strict environmental controls". "Please cancel the PTF (production test facility) for Curis and save our water".

ADEQ Response –
See response to commenter #3.

#176, Bruce Huillet –
The commenter submitted a letter regarding his grave concern about the Curis Copper Project. "This type of mining has never been proven successful". I ask "to permanently stop this dangerous project now before it is too late".

ADEQ Response –
See response to commenter #3.

#177, Beth and Darrel Randklev –
The commenters submitted a letter with strong opposition to the permit to allow Curis to operate an in-situ copper mine PTF. "Safe drinking water is too vital and valuable a natural resource to allow a "pilot test" to inject thousands of gallons of sulphuric acid into the ground". "No remediation of an ISR operation to date, in the US, has successfully returned the aquifer to baseline conditions. Please don't allow the experimentation of our safe drinking water".

ADEQ Response –
See response to commenter #3.

#178, Dan R. Scheff –

The commenter submitted a letter regarding the Curis copper mine. There is a "threat of water contamination from the injection of sulfuric acid into the ground and mobilizing other contaminates such as arsenic and nitrates". "There are no examples of water ever being restored once it is contaminated".

ADEQ Response –
See response to commenter #3.

#179, Patricia and Arthur Schaff –
The commenters submitted a letter regarding the Temporary Aquifer Protection permit to operate a PTF. This location is inappropriate to run an experimental, unproven in-situ mining operation that is almost guaranteed to contaminate the local water. "A short one or two year PTF cannot possibly detect the long term effects of the in-situ process". We urge ADEQ to stop Curis now and in the future to prevent long-term disaster for the community, health, and environment.

ADEQ Response –
See response to commenter #3.

#180, Fred E. Breedlove III –
The commenter incorporated by reference, comments submitted to ADEQ regarding the Florence Copper Project in letters dated January 24, 2012 and April 20, 2012.

In the January 24, 2012, letter, the commenter submitted a summary of events that led to the Town of Florence passing Resolution No. 1324-11. This Resolution urges all federal, state and county agencies involved in the permitting processes to deny the necessary approvals for the Florence Copper Project.

ADEQ Response –
ADEQ must grant Aquifer Protection Permits for applications that meet the requirements of APP statutes and rules. There is no provision in the Program with regard to resolutions from municipalities.

The letter also expressed concern about the effect that the Florence Copper Project would have on regional groundwater quality and the local public water supplier's ability to qualify as designated providers if the aquifer is contaminated.

ADEQ Response –
See response to commenter #3.

The foreseeable use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP.

#181, Southwest Value Partners -

1.0 Background

The commenter provided a document with several sections and subsections. In Section 1.0 Background, the commenter provided background information relating to comments provided in the subsequent sections.

ADEQ Response –
ADEQ acknowledges receipt of the background information. Comments relating to technical aspects within this section were also provided in detail in subsequent sections and they are discussed accordingly.

2.0 ADEQ Lacks Legal Authority to Issue the Permit
The commentator indicates that ADEQ lacks the authority to promulgate the Temporary APP rule, and thereby no authority to issue a permit under that rule, and the Curis's PTF does not qualify as a "pilot project" eligible for a Temporary APP. The commentator also indicated since the PTF operations cannot be completed within the two-year timeframe for a Temporary APP it should not be issued.

ADEQ Response
A.R.S. § 49-104 directs ADEQ to "formulate policies, plans and programs to implement this title to protect the environment." A.R.S. § 49-203 directs ADEQ's Director to "adopt, by rule, an aquifer protection permit program to control discharges of any pollutant or combination of pollutants that are reaching or may with a reasonable probability reach an aquifer." These statutes provide the legislative authority for ADEQ's aquifer protection permit program which provides for Individual Aquifer Protection Permits for the life of the facility and Temporary Individual Aquifer Protection Permits for a term of one year (with a maximum renewal of one year) and General Permits for durations of two, five, and seven years.

The project will consist of a 14 month leaching phase and a 9 month rinsing phase. The time period extending past the two-year period is for post-closure monitoring of groundwater quality to evaluate the effectiveness of closure activities. The closure and post-closure activities will be amended into existing APP P-101704.

Following the completion of the Production Test project, Curis will have the option to make an application to ADEQ for an amendment to the existing permanent individual APP to allow mining, and that an amendment would be subject to the public participation requirements for an amendment of an individual APP. Review of this application will include an evaluation of pilot test results. The design to be employed for commercial operation has not yet been approved by ADEQ.

2.1 The Temporary APP is Invalid

SWVP, along with several other parties, has filed suit against ADEQ in Arizona Superior Court. Among other things, the plaintiffs have alleged that ADEQ exceeded its authority, as circumscribed by the legislature, in promulgating the Temporary APP rule. Those issues will be decided in the pending litigation, but SWVP reserves the right to raise those arguments in an appeal of ADEQ's decision on the Permit. The Amended

Complaint has been included with these comments as Appendix E, and the facts, legal arguments, and allegations in the Amended Complaint are hereby incorporated by reference.

ADEQ must provide procedures to assure that the public has an "adequate" and "reasonable" opportunity to participate in the permit decision process. Although we appreciate ADEQ's recent efforts to facilitate public participation in this matter, the end result is the same—ADEQ made a final decision to issue the Permit before taking public comment. As a result, ADEQ failed to satisfy its statutory mandate to provide for reasonable and adequate public participation.

ADEQ Response –

The litigation filed by SWVP and three other plaintiffs has been resolved and ADEQ prevailed. The Court entered its ruling finding that A.A.C. R18-9-A210 constitutes a valid exercise of ADEQ's rulemaking authority.

Furthermore, ADEQ has followed regulatory requirements regarding public notice for the Temporary APP.

While the Temporary APP has been issued, it cannot become effective, and Curis cannot operate the Production Test Facility, unless and until the ***later of:*** *the completion of the public participation requirements, if there is no appeal; the final decision of the water quality appeals board, if an appeal is taken; or Curis' written notification that the permittee can use the authorization to operate the Production Test Facility. The public hearing process provisions were held in accordance with AAC R18-9-A210.*

ADEQ appears to believe that providing an opportunity for public comment *after* this permit decision was made is sufficient to satisfy its statutory duties. But the failure to provide for adequate public participation before the permit decision is not remedied by ADEQ's assurance that it will consider all public comments in deciding whether to revoke or amend the permit. The inertia of the decision-making process, coupled with political pressure from Curis, raises significant concern that little weight will be given to public comment. As one court has explained in the context of administrative rulemaking: Provision of prior notice and comment allows effective participation in the rulemaking process while the decisionmaker is still receptive to information and argument. After the final rule is issued, the petitioner must come hat-in-hand and run the risk that the decisionmaker is likely to resist change.' Further, ADEQ is effectively suppressing public comment by scheduling comment after a decision has been made. It is reasonable and foreseeable that members of the public would not bother to comment after the permit has been issued, seeing the matter as effectively settled and comment at this late date pointless. Such circumstances further undercut the legitimacy of this process, ADEQ's assurances notwithstanding.

ADEQ Response –

The issuance of the temporary permit, and the public participation process, were performed in accordance with A.A.C. R18-9-A210.

Under ADEQ's interpretation of its own authority, there is nothing preventing the agency from circumventing mandated public participation in other matters. ADEQ could simply finalize a decision before taking public comment, claim that any flaws in the process have been remedied by taking public comment after the fact, and then reaffirm its original decision. Even more significant in this case, ADEQ is taking public comment after litigation and appeals already have begun concerning this decision. As a result, ADEQ is in litigation defense mode and is focused on defending its decision, not on a reasoned and objective evaluation of issues raised during the public comment process.

ADEQ Response –
ADEQ followed all public participation requirements for this Temporary APP under A.A.C. R18-9-219 and all appealable agency action requirements under A.R.S. § 41-1092. As noted previously, the litigation mentioned has been resolved in ADEQ's favor.

ADEQ's handling of public comment in this matter also violates the law regarding substantive review of Curis's application. ADEQ was required to complete its substantive review of Curis's Permit application within 180 days. That substantive review time frame is statutorily required to include "[any public notice and hearings required by law."13 But ADEQ regulations and ADEQ's notice of the permit decision clearly indicate that the substantive review time frame ended on September 28, 2012 when ADEQ issued its final permit decision.14 ADEQ has no authority to deviate from the statutory requirements applicable to substantive review through its promulgation of the Temporary APP rule or through its individual actions in this matter. By postponing public comment and the public hearing until after the substantive review time frame ended, ADEQ is in violation of A.R.S. § 41-1072 and the Permit is invalid.

ADEQ Response –
The department followed public participation requirements found at A.A.C. R18-9-A210.D. ADEQ disagrees that following these regulations in some way violates A.R.S. §41-1072. The permit was granted within Licensing Time Frame requirements. Any future amendment to the Permit made under A.A.C. R18-9-A210.D.3 must comply with Licensing Time Frame Rules found at Title 18, Chapter 1. Additionally, under A.A.C. R18-9-A210.D.5, ADEQ must follow the public participation requirements of R18-9-109 if the amendment constitutes a significant amendment.

2.2 The PTF Fails to Constitute a Pilot Project Eligible for a Temporary APP.

2.2.1 The PTF is not designed to provide environmental data in support of an APP.

Even if the Temporary APP regulation is valid, Curis's application failed to satisfy applicable regulatory standards, such that the Permit must be revoked. Curis applied for a Temporary APP under A.A.C. § R18-9-A210(A)(1), which purports to authorize a Temporary APP for "a pilot project to develop data for an Aquifer Protection Permit application for the full-scale project." As will be explained in more detail throughout these comments, Curis's PTF is not designed to provide information needed to submit a complete application for full-scale ISL mining at this site, nor is it designed to answer the

agency's questions about Curis's ability to safely protect groundwater and the environment from acidic mining solutions. Instead, as currently designed and permitted, the PTF appears to have more to do with Curis proving up commercial viability to its investors than proving up the environmental safety of the project. Additionally, the PTF fails to incorporate known data and information into its the running of all licensing time-frames for an application.");
The arguments in Sections 2.2 through 2.5 necessarily assume that ADEQ's Temporary APP regulation is valid and enforceable. Southwest Value Partners is contesting the validity of that regulation in *Town of Florence v. ADEQ,* No. CV2012-014309 (Maricopa County Superior Court). Southwest Value Partners makes the arguments in these sections as an alternative basis for revoking Curis's permit and is not waiving its arguments in *Town of Florence* that the Temporary APP regulation is invalid. Projections and models, as should be required for a true proof-of-concept pilot designed to develop data to support an APP application for Curis's full-scale commercial project. As detailed throughout these comments, the Permit requires Curis to report shockingly little data from PTF operations: Groundwater quality data will be reported from the POC wells purportedly sited to monitor contaminants emanating from the PTF well field. But those wells are so far from the PTF well field that they may as well be in Scottsdale for all the good they will do.

ADEQ Response –
As noted previously, the litigation mentioned has been resolved in ADEQ's favor.

The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in ARS §49-244, such that all POCs are within 750 feet of the Pollutant Management Area (PMA). Monitoring well MW-01 will be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS.

Curis is not required to report *any* groundwater quality data from the PTF well field itself.

ADEQ Response –
The Applicant is required to establish ambient mine block concentrations at the PTF wells in accordance with the Pre-Operational Requirements in Section 2.2.3. Groundwater quality for MW-01, adjacent to the PTF well field shall be sampled on a monthly basis and reported in accordance with the Quarterly Reports Section 2.7.4.4. At closure, the mine block wells are required to be sampled in accordance with Section 2.9.2.

The PMA allows the permittee to place pollutants within the test mine block for the purposes of in-situ leaching, so elevated concentrations of sulfate and metals at this location during operations and into the initial rinsing phase are expected. Having the permittee report the chemical concentrations of the mine block wells during operation

would essentially indicate the viability of the mineral extraction for the site and not necessarily dictate the compliance objective of the APP. The compliance objective of the APP is to not exceed AWQS at the POCs, or cause further degradation relative to that pollutant if the AWQS are already exceeded at the time of permit issuance.

Curis is required to install a single monitoring well somewhere outside the well field, but is only required to report concentrations for three non-hazardous pollutants.

ADEQ Response –
Monthly testing of MW-01 is required for pH, sulfate and TDS. ADEQ believes these three chemical constituents will serve as the best indicator parameters that an excursion of in-situ mining solution has made it past the observation wells.

There are no enforceable standards established in the Permit at any locations that may be impacted by Curis's mining during PTF operations.

ADEQ Response –
The Production Test Facility will operate under the terms, conditions, and restrictions of the Temporary APP, in compliance with all applicable State and Federal environmental laws, and subject to monitoring and enforcement activities, if needed, by ADEQ.

ADEQ believes that enforceable standards exist throughout the permit in the form of the following: BADCT requirements, Pre-Operational Requirements, Operation Requirements, Monitoring Requirements, Contingency Plan Requirements, Alert Levels, Discharge Limitations, Emergency Response and Contingency Requirements, Reporting Requirements, Compliance Schedule Items, Closure and Post-Closure Requirements, groundwater monitoring at the PTF wells, MW-01 and at seven (7) Points of Compliance (POCs).

Post-mining monitoring for mining contaminants is too limited in scope and schedule to provide certainty that Curis has restored groundwater to permit standards.

ADEQ Response –
The PTF mine block closure requirements include sampling all of the PTF wells at a one month increment to assess initial groundwater restoration efforts. ADEQ anticipates additional mine block closure sampling beyond the timeframes discussed in the Temporary APP. Any additional closure and post-closure activities, such as additional sampling or rinsing will be amended into APP P-101704.

Monitoring of mining wastes dumped in the impoundment pond is too limited to establish the risks associated with that waste.

ADEQ Response –
ADEQ requires Discharge Characterization as described in Section 2.5.1. A one-time sample is usually enough to analyze process fluids since the constituents and quality are not expected to change over the duration of the pilot test. Other mining permits typically

require a one-time discharge characterization sample of process fluids for the entire operational life of the facility.

Any soil, sludge, or sediment sampling at the impoundments will be required at final closure and was considered as part of the Closure and Post-Closure costs.

Rather than having established a monitoring system that will develop data to prove or disprove Curis's many assumptions, calculations, and models, the Permit has effectively created a black hole around the PTF well field from which almost no information or data will escape. This will certainly enable Curis to claim success at the end of PTF operations, because there will be no data to disprove those claims. But there will not be enough information to develop a reasoned and defensible permit for fullscale operations, as required by ADEQ's own Temporary APP rule. For that reason, the Permit lacks legal foundation and should be revoked.

ADEQ Response –
ADEQ believes that sufficient environmental monitoring has been required in the permit. ADEQ provides detailed responses to detailed comments throughout this SUMMARY AND RESPONSE TO PUBLIC COMMENTS.

ADEQ established monitoring requirements and pollution control limits that were specific to the Production Test Facility. ADEQ has determined that the project, as proposed, satisfies the requirements of BADCT (A.R.S. §49-243(B)(1)), and the protection of AWQS at the points of compliance (A.R.S.§49-243(B)(2-3)). ADEQ believes the BADCT requirements established in the permit, in conjunction with groundwater quality monitoring will provide reasonable and defensible data to evaluate potential commercial operations.

ADEQ has required groundwater monitoring at the PTF wells prior to operations (Section 2.2.3), and into closure and post-closure to assess the rinsing operations (Section 2.9.2). Additionally, monitoring well MW-01 (Section 2.5.8) will be installed in the downgradient groundwater direction adjacent to the PTF well field boundary. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS. This well will also be sampled for the full suite of constituents prior to and after the pilot test.

In addition to groundwater sampling data at the PTF wells and MW-01, other permit conditions such as pre-operational requirements (i.e. plugging abandoned coreholes, passing mechanical integrity testing, aquifer pump tests, establishment of inward hydraulic gradient prior to injection, establishing ambient mine block concentrations), BADCT considerations (i.e. extraction rate greater than injection rate, maintaining an inward hydraulic gradient, maintaining the fracture gradient, etc.), operational monitoring (exclusion zone, limit injection to Oxide Unit, hydraulic control), closure (additional groundwater modeling) and other post-closure considerations will develop data to evaluate Curis's assumptions, calculations, and models.

2.2.2 Construction of a commercial-scale SX/EW plant is inconsistent with a pilot project.

Previously, Curis represented that it would use a temporary, portable solvent extraction/ electrowinning (SX/EW) plant in its Phase I pilot. But now, for this supposedly limited-scale PTF, Curis proposes to construct a permanent SX/EW plant capable of full-scale commercial production. Furthermore, Curis plans to produce one million pounds of copper plate during this "pilot project." Such large-scale commercial production goes far beyond legitimate hydrogeological investigation. Again, this calls into question whether the true intent of the project is to document protection of the aquifer or to further Curis's business and financial interests while trying to avoid a significant permit amendment.

When ADEQ released the prior project proponent from its financial assurance obligations through an "Other Amendment" to APP No. P-101704, it forbade Curis from engaging in commercial operations prior to securing a significant permit amendment.'6 Nevertheless, Curis plans to engage in commercial production as part of its PTF. According to Curis the PTF includes an SX/EW processing plant "that will produce copper cathodes for *commercial use."7* By Curis's own admission, its PTF will engage in commercial activities in direct contradiction to the terms of its existing permit. A temporary permit for Curis's PTF is not only inappropriate and inconsistent with regulatory authorities but is also contrary to the existing permit and thus lacks proper authority.

It appears that Curis and ADEQ discussed this very issue at some point and concluded that the existing prohibition did not apply. According to Curis, the agreement was that "because (1) the Temporary Individual APP will authorize separate, pilot-scale activity and (2) the Temporary Individual APP will reflect an entirely separate authorization for such pilot-scale activity, the conditions in the existing APP were not a concern." Somehow it was believed that the Temporary Permit would "complement the conditions in the existing APP."8 First, it is difficult to understand how a public agency can promise one thing in a permit and then take an entirely opposite position through the issuance of another permit to the same permittee. If allowed, this sort of action erodes the public trust placed in our regulatory agencies. Second, it is hard to see how the Permit is "an entirely separate authorization" when over and over again, the Permit requires Curis to make amendments to the existing APP and puts off various required activities for incorporation into the existing permit. Indeed, it appears that ADEQ staff purposefully relied upon a connection between the Permit and APP No. P-101704 in order to make PTF closure and post-closure requirements enforceable. If the Temporary Permit was intended to be a completely separate and stand-alone permit, the issued permit fails along with Curis's justification.

ADEQ Response –
ADEQ agrees that an application for a significant amendment to the existing APP was placed in suspension, and that ADEQ has separately issued a Temporary APP. The department also agrees that the Temporary APP requires Curis to modify the existing APP to allow for post-closure monitoring. ADEQ fails to see how selling the copper

made during the pilot study under the Temporary APP will violate A.A.C. R18-9-A210 or the existing APP.

2.3 The Expressed Intent to move Forward with the Commercial APP Before Finalizing PTF Operation & Analysis Makes the PTF Ineligible for a Temporary APP.

ADEQ's issuance of the Permit is invalid if **the** agency intends to move forward with consideration of Curis's application to amend APP No. P-101704 before PTF operations are complete. ADEQ has authority to issue a Temporary Permit to Curis for the PTF only if the PTF represents a "pilot project to develop data for an [APP] application for the full-scale project." This language clearly envisions a permit process under which data is developed during a pilot project that is then analyzed and incorporated into an application package for commercial operations. It should be obvious that the APP application for commercial operations could not be completed and submitted, much less reviewed by ADEQ until *after* the "pilot project" is complete.

The facts of this case call for just such treatment. ADEQ issued a request for additional information in September 2011 on Curis's original application to amend the suspended APP No. P-101704 for this project. Curis could not answer many of ADEQ questions and lacked much of the data that ADEQ was seeking. In December 2011, Curis changed course, indicating to ADEQ that it would be submitting a new application for a Temporary APP applicable only to the proposed "pilot test." Curis stated at that time that "implementation of the pilot test facility will allow for development of data to respond to ADEQ's Comprehensive Request for Additional Information dated September 7, 2011." Curis's application to amend the APP No. P101704 remains suspended until Curis addresses ADEQ's questions. Logically therefore, further consideration of the application by ADEQ cannot begin until the PTF is complete, data is collected and analyzed, and Curis responds to ADEQ's September 2011 questions.

Despite the factual circumstances and the clear regulatory requirements applicable here, however, ADEQ has expressed its intent to move forward with its review of the full-scale commercial APP before the PTF is complete. Curis has made numerous public statements echoing this intent: "To facilitate the process of reviewing the application, Curis Arizona requests that your office focus initially on the review needed for the approval of the Phase 1 PTF. This would enable the Phase 1 PTF to be installed and to commence operation while the review and approval of the Phase 2 CSF is being completed." "Curis will also advance, in parallel with Phase 1 operations, the completion of the amended Phase 2 commercial operating permit. Curis anticipates having the Phase 2 approvals in place well in advance of the start of commercial development in late 2013. Meetings with ADEQ officials indicate this application presents the best approach for facilitating the Phase 1 permit for the PTF, while simultaneously advancing full-scale commercial operating permits. . . . In parallel with the Phase 1 development and operations program, Curis will continue to work with ADEQ to secure a commercial-scale APP for Phase 2 operations at Florence Copper." "Curis Arizona plans to construct Phase 1 in the fall of 2012, pending permit approvals. Phase 1 will run through most of 2013, while permitting

for Phase 2 is being processed. Phase 2 will be constructed once the applicable permits have been received."25 "Curis anticipates having phase 2 commercial scale operating permit approvals well before it is ready to begin construction in late 2013, as Control Permit, Attachment 1 (Master Table of Contents), at x (June 1, 2012) (emphasis added) the phase 2 permits will 'really just be an extension of permits already in place.'

As recently as November 2012, Curis issued an investor presentation that indicated it expected to have an APP for full-scale commercial production by the fourth quarter of 2013, months before PTF injection is complete and potentially more than a year before Curis demonstrates whether groundwater rinsing will restore the aquifer.

Based on these statements, ADEQ and Curis appear to have agreed that ADEQ will continue review of the application to amend APP No. P-101704 while the PTF is running, with the intent of issuing the full-scale APP before the PTF is complete and before Curis has answered ADEQ's questions from September 2011. If this is the case, then the PTF is not a "pilot project" under the Temporary APP rule and ADEQ has no authority to issue the Permit. That fact alone renders the Permit invalid. Moreover, if ADEQ approves Curis's application to amend the APP No. P-101704 before the PTF is completed, ADEQ's next permit decision also will be invalid because ADEQ will have acted without all of the facts and information needed to evaluate Curis's application—a situation that is undeniable in light of ADEQ's September 2011 request for additional information.

The apparent intent to move forward on Curis's application to amend APP No. P-101704 before finishing the PTF operations renders the Permit and Curis's PTF operations ineligible for a Temporary APP. ADEQ should commit in writing to a process under which no further action will be taken on Curis's application to amend the currently-suspended APP No. P-101704 (or any other permutation of an APP that would allow commercial mining at this site) until all of the following have occurred: the Permit is revised to require adequate monitoring, investigation, and protections as detailed in these comments; the PTF is completed and the data is gathered, reported and analyzed; the application to amend APP No. P-101704 is revised as necessary to incorporate PTF data; and Curis fully responds to ADEQ's September 2011 request for additional information. Proactive Investors, Curis Resources set for fast pace development of Florence copper project, expects improved recoveries (July 25, 2012) (quoting Michael McPhie). Curis, Building a Next Generation Copper Producer, at 19-21 (November 2012).

ADEQ Response –
ADEQ disagrees. There are aspects of the significant amendment to the existing APP that can be considered while awaiting the analysis of data collected through the Temporary APP.

The project will consist of a 14 month leaching phase and a 9 month rinsing phase. The time period extending past the two-year period is for post-closure monitoring of groundwater quality to evaluate the effectiveness of closure activities. The closure and post-closure activities will be amended into existing APP P-101704.

Following the completion of the Production Test project, Curis will have the option to make an application to ADEQ for an amendment to the existing permanent individual APP to allow mining, and that an amendment would be subject to the public participation requirements for an amendment of an individual APP. Review of this application will include an evaluation of pilot test results. The design to be employed for commercial operation has not yet been approved by ADEQ.

ADEQ has no comment on public statements made by Curis.

2.4 Curis PTF Does Not Qualify for a Temporary APP Because PTF Operations Cannot be Completed in Two Years.

ADEQ can only approve a Temporary APP for a "pilot project to develop data for an [APP] application for the full-scale project" or for a discharge lasting no more than six months. A "pilot project" is a "a short-term, limited-scale test designed to gain information regarding site conditions, project feasibility, or application of a new technology." In other words, the project must be both short-term in duration and limited in scope to qualify as a pilot project. To ensure that a pilot project is truly "short term," a Temporary APP expires after one year, unless it is renewed for another one-year term.3°

Here, ADEQ has approved a Permit for a 12-year project by ignoring the time limits in its own rule, predetermining the decision to extend the permit after the first year, and attempting to cover some project activities under an entirely different permit. Nothing in statute, rule, or ADEQ's past handling of Temporary APPs provides a basis for ADEQ to approve Curis's project.

2.4.1 On its face, Curis PTF operations schedule cannot be completed in two years.

It was obvious on the face of Curis's permit application that Curis's PTF could not be completed in one year, much less two. Curis proposed in its application "to construct and operate the PTF over a two-year period." But even a cursory review of the construction and operation requirements for this "pilot project" would have revealed a project running well in excess of two years: Construction included the installation of injection, recovery, monitoring, observation and POC wells; installation of tanks and piping; and the construction of the SX/EW plant, impoundments, and other infrastructure. Although Curis provided no estimates for construction times, clearly this work would be measured in months, not weeks. Once the facilities were constructed, they would have to be tested before startup. Testing includes the aquifer testing and reporting required in the Permit. Once operations began, Curis proposed to conduct ISL mining for a minimum of 14 months. After ISL mining ceases, a groundwater rinsing phase of at least 9 months was proposed in order to demonstrate that groundwater can be restored to permit standards.33 After the groundwater rinsing phase, Curis proposed to conduct five years of monitoring, with the possibility of extending that monitoring another 5 years. As stated elsewhere, the evidence strongly suggests that scheduled tasks, such as groundwater rinsing operations, are likely to take much longer than Curis projects. But even if one accepts the rosy projections in Curis's application, Curis's proposed PTF has a potential life of over 12

years—six times the length allowed under the Temporary APP rule. It also will require massive amounts of infrastructure and associated facilities that will produce copper on a commercial scale that is inconsistent with temporary operations. On that basis alone, ADEQ should have rejected Curis's application.

The Temporary APP rule was not intended to apply to a 12-year project. Past short-term pilot projects that have applied for Temporary APPs have had projected durations shorter than the one-year initial permit term. For instance, the El Paso Natural Gas Copper Eagle Gas Storage Project sought a Temporary APP for a pilot project consisting of a 60-day hydrogeologic test followed by a 120-day reservoir pressure falloff monitoring period, a total duration of 180 days. Similarly, an application associated with the Blue Beacon Truck Wash in Eloy proposed an experimental wetland with a mere six-month proposed life.37 Not only does Curis's proposed PTF fail to meet the common-sense meaning of "short-term" but it also flies in the face of project durations previously considered by the agency under the Temporary APP regulation. Curis's proposed 12-year project, six times the maximum permit duration, simply does not qualify as a "pilot project" under the Temporary APP regulation and the Permit should be revoked. Curis, *Temporary APP Application,* Attachment 9 (Design Documents), § 9.2. Curis, *Temporary APP Application,* Attachment 16 (Closure Plan), § 16.3.1. Curis, *Temporary APP Application,* Attachment 16 (Closure Plan) § 16.3.2. *See, e.g.,* Section 6.0. Arcadis, El Paso Hydrogeologic Test, Final Temporary Aquifer Protection Permit Application (August 19, 2004). See Blue Beacon Truck Wash Temporary APP Application (January 26, 2001); see also Blue Beacon Truck Wash Notice of Intent to Construct an Experimental Wetland (December 20, 2000).

ADEQ Response –
ADEQ agrees that all of the activities described by the commenter cannot be completed in two years. The department does not agree that all of these activities must be covered under the Temporary APP. For example, facilities can be constructed without prior authorization under an APP. Operation of the PTF, and any testing that requires discharge, must be conducted under the Temporary APP. Data developed during the pilot study will be used for the amendment to the existing APP for a full scale project, in compliance with A.A.C. R18-9-A210.A. Finally, that longer term groundwater monitoring is required through amendment of the existing APP after the Temporary APP expires does not violate the requirements of A.A.C. R18-9-A210.A.

2.4.2 In violation of its own rule, ADEQ already has determined that it will extend the Permit for a second year.

ADEQ Response –
See response to comment # 116. ADEQ has not decided to re-issue the permit for a second year. In accordance with the permit Compliance Schedule, Section 3.0, the permittee shall submit a renewal application for the Temporary APP.

2.4.3 ADEQ has not avoided the two-year limit on Temporary APPs by covering parts of the PTF under another permit.

ADEQ Response –
See response to comment 2.4.1

2.4.4 The Permit improperly allows Curis to delay the effective date indefinitely.

ADEQ Response –
ADEQ agrees that the Permit allows Curis to delay the effective date indefinitely. However ADEQ fails to see how this permit condition is improper. The language allows Curis to obtain all other required permitting, including a UIC permit from EPA, prior to starting the timeframe for operations under the Temporary APP.

2.4.5 The Permit improperly allows Curis to place the PTF into temporary cessation indefinitely.

ADEQ Response –
ADEQ agrees that the permit allows Curis to place the PTF in temporary cessation. However ADEQ fails to see how this permit condition is improper. A.A.C. R18-9-A209 provides requirements for temporary cessation that are applicable to all APPs.

2.5 ADEQ has Made Improper Use of the Compliance Schedule.
The commentator indicates that some compliance schedule requirements fail to meet the requirements of R18-9-A208.C. This regulation prohibits use of a compliance schedule to defer any requirement necessary to satisfy the criteria under A.R.S. § 49-243(B). In particular, the commentator refers to these compliance schedule items: that Curis must submit calculated alert levels for an Arsenic UPL; results of a pump test; ambient groundwater concentrations for the PTF mine block; and documentation that coreholes and wells within 500 feet of the PTF well field have been properly abandoned, all before start up of the PTF.

ADEQ Response –
In summary, A.R.S. § 49-243(B) requires that a facility will be designed, constructed, and operated so as to ensure the greatest degree of discharge reduction achievable, and that no discharge will cause an exceedance of an AWQL at a POC, or further degrade an aquifer where an AWQS is exceeded. Curis has demonstrated that their facility will meet these requirements. The compliance schedule item for submittal of calculated alert levels for the arsenic UPL is a permit condition voluntarily agreed to by the permittee. Submittal of pump test information and ambient groundwater concentrations is required to establish ambient conditions, much as the compliance schedule requirement to install and sample new groundwater monitoring wells. Submittal of documentation that all coreholes and wells near the PTF well field have been properly abandoned simply documents what Curis has said it will do prior to operation.

3.0 The Permit Fails to Require Curis to Develop the Data Needed to Prove-Up Project Assumptions & Eliminate Project Uncertainties.

The Permit has two fatal flaws—it does not require Curis to use the data that already exists at this site to validate key modeling assumptions and it does not require Curis to gather the data needed to develop a commercial mining permit. The first flaw undermines the assertions and assumptions upon which many key Permit requirements are founded, thereby resulting in an inadequate permit in need of significant revisions. The second flaw results in an inadequate "pilot project" that does not justify approval of a Temporary APP and that, if left unaddressed, could result in issuance of a commercial APP that lacks a foundation in the law and facts associated, with this project.

ADEQ Response –
The Applicant has incorporated data that already exists to validate groundwater modeling assumptions (corehole data, geophysical logs, groundwater elevations, groundwater sampling, tracer studies, packer tests, aquifer pumps tests, etc.). Over 15 years of site specific groundwater data was used in the model, and regional data from ADWR as far back as 1983 was also incorporated into the modeling assumptions. Other parameters used in modeling were obtained from previous site data which includes the acid consumption and the make-up water composition from the UBFU that is estimated in Table 3.1 of the March 2012 Application.

With regard to relevant data and information about ISL mining impacts, the Permit has created a black hole in the area within and surrounding Curis's well field from which almost no data will flow to ADEQ or the public. Under the Permit, Curis is not required to provide *any* groundwater quality data from the PTF mine block well field and is required to report only sulfate, pH and TDS data from a single monitoring well to be located in the general vicinity of the well field. Reporting from the POC wells is largely worthless because the POC wells are located so far from the PTF mine block well field that contaminants will never reach them during the PTF's operational life. As a result, within the area that might be impacted by Curis's mining fluids during the Permit's term, Curis will provide data on just three groundwater parameters from a single sampling point. No other information on groundwater quality within approximately 500 feet of Curis's injection well field has to be reported. This means that this "pilot project" will produce little or no data that is of any use to ADEQ in evaluating the impacts of ISL mining on Florence's drinking water supply. If ADEQ does not intend to significantly amend the Permit, then the PTF is not a "pilot project" under the Temporary APP rule and ADEQ has no choice but to revoke the Permit.

ADEQ Response –
ADEQ has required groundwater monitoring at the PTF wells prior to operations (Section 2.2.3), and into closure and post-closure to assess the rinsing operations (Section 2.9.2). Additionally, monitoring well MW-01 (Section 2.5.8) will be installed in the downgradient groundwater direction adjacent to the PTF well field boundary. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS. This well will also be sampled for the full suite of constituents prior to and after the pilot test.

In addition to groundwater sampling data at the PTF wells and MW-01, other permit conditions will provide relevant data about potential in-situ leaching (ISL) mining impacts such as the following: pre-operational requirements (i.e. plugging abandoned coreholes, passing mechanical integrity testing, aquifer pump tests, establishment of inward hydraulic gradient prior to injection), BADCT considerations (i.e. extraction rate greater than injection rate, maintaining an inward hydraulic gradient, maintaining the fracture gradient, etc.), operational monitoring (exclusion zone, limit injection to Oxide Unit, hydraulic control), closure requirements (additional groundwater modeling) and other post-closure considerations.

3.1 All Model-Based Assumptions—Including Flow, Arsenic, & Geochemistry—Must Be Validated Through PTF Operations.

If intended to act as a proof-of-concept "pilot project," then the PTF must develop the data needed to prove-up Curis's models, calculations, and assumptions. As discussed by Dr. Wilson in Appendix A, the PTF should be designed to validate all of Curis's models, including those for flow, arsenic, and geochemistry. To do this, the Permit must be modified in many respects.

In the 1990s, Magma Copper and BHP relied heavily on models and calculations in the permit applications. Because of this, ADEQ and USEPA emphasized the need for verifying the model over time with real world data. The agencies had good reason for exercising caution. Two third-party studies have concluded that the predictive modeling upon which many mines base their water quality impact predictions often fail to match reality. In the late 1990s, USEPA reviewed the groundwater modeling supporting BHP's application and commented both on the mining proponent's heavy reliance on modeling and the importance of auditing the model used to support the permit. These concepts remain relevant the Permit, but have been largely ignored. Like its predecessors, much of Curis's application and proposals relied upon modeling, calculations and assumptions. This is not unusual for a project of this type. What is unusual and unreasonable is that Curis did not validate its models and calculations with existing data, nor did it propose to do so with data developed during PTF operations.

ADEQ Response –
The three previous comments on post-PTF groundwater modeling at the facility are addressed in Section 2.9.1 of the permit. The permittee is required to perform post-operational modeling in order to update the model. Normal protocol for post-operational modeling includes validation and auditing of the groundwater model. These tasks will be required by ADEQ through the provisions of Section 2.9.1 after operation of the PTF is complete.

3.1.1 Curis should have been required to validate its models as part of its Temporary APP application.

In its Temporary APP application, Curis relied heavily on models and calculations first developed by Magma Copper and BHP in the 1990s. Assuming those models and

calculations were reasonable, Curis nevertheless had one distinct advantage over its predecessors. Curis had over 15 years of data from this site that it could use to validate those models and calculations. Curis has never done so, however, and ADEQ did not require Curis to do so. As a result, ADEQ has no assurance that Curis's model- based projections and predictions have any validity. In fact, there are clear indications that Curis's modeling does not reflect real- world conditions. For example, Curis's flow model predicts water levels at the test site of 1,295 feet, but water table data indicates the actual water level is 40 feet higher. This indicates a poorly calibrated model that could be vastly improved with a better understanding of project conditions.56 It is questionable whether Curis could ever replicate the results of the BHP pilot test with its groundwater model. Curis could, however, use existing data from that pilot and subsequent groundwater data to more accurately calibrate its model to reflect real-world conditions at the start of PTF operations. Without an accurate model, ADEQ lacks a reasonable basis for issuing the Permit. Therefore, before allowing Curis to begin PTF operations, ADEQ should require that Curis verify its models with the data generated by the BHP pilot and subsequent monitoring. ADEQ should then perform its own review of the results to verify Curis's assumptions. Only then should Curis be allowed to begin operations under the Permit.

ADEQ Response –
The Applicant has incorporated data that already exists to validate groundwater modeling assumptions (corehole data, geophysical logs, groundwater elevations, groundwater sampling, tracer studies, packer tests, aquifer pumps tests, etc.). Over 15 years of site specific groundwater data was used in the model, and regional data from ADWR as far back as 1983 was also incorporated into the modeling assumptions. Other parameters used in modeling were obtained from previous site data which includes the acid consumption and the groundwater composition that is estimated in Table 3.1 of the March 2012 Application. The intent of the modeling was not to replicate the results of the BHP pilot test. The Applicant completed calibrations of the data in accordance with industry standards. ADEQ reviewed and accepted the groundwater modeling assumptions.

3.1.2 Curis should be required to conduct an audit of its models after PTF operations.

The purported purpose of the PTF is to develop data for a full-scale APP. Presumably, Curis's models will be used again in its commercial APP application, so the data developed during PTF operations should be used to validate Curis's models and calculations as part of the application process. The importance of verifying the model and model-based assumptions is a key principle with which ADEQ technical staff appears to have agreed. For instance, ADEQ staff proposed permit language requiring a post-project audit of the computer modeling used to support the Permit:

The permittee shall conduct a post audit of the computer modeling which was used during the Temporary APP permit application process to predict and verify the fate and transport of pollutants discharged at the PTF. The permittee shall submit a report to

ADEQ GWS describing the post audit groundwater modeling as well as any changes in the conceptual model, any model redesign, and any changes in predicted post-closure conditions. The conceptual model of the hydrogeologic system shall include a detailed water balance, the identification of hydrostratigraphic units, the system boundaries, purpose of the model, presentation of the hydrogeologic data used, model conceptualization, model calibration, hydrologic stresses, the assigned aquifer parameters, areas of impact, revisions to the Pollutant Management Area, and or revisions to the Discharge Impact Area. The groundwater modeling results shall be completed at the end of PTF rinse timeframe and submitted within 90 days of the rinse period and at the completed at the end of the five year post closure groundwater monitoring period and submitted within 90 days of the cessation of the 5 year post-closure monitoring period. Clearly, ADEQ staff recognized the need for auditing Curis's model with PTF data after completion of PTF operations. Yet the Permit contains only a vague reference to "updated groundwater modeling" that is a far cry from a proper audit of Curis's model. Furthermore, nothing in the Permit describes with any certainty what is required in the "model update," nor is Curis required to provide it before the full-scale APP is issued. ADEQ should revise the Permit to require an audit of Curis's model after PTF operations and groundwater restoration are complete. Data needed for proper model verification would include: background data collected before PTF operations, including background water levels from all wells; regional flows during PTF operations; and local flows during PTF operations, including water levels from all wells.

With respect to the arsenic fate and transport modeling required by the Permit, ADEQ must ensure that the model is able to simulate the real-world data from the BHP pilot and subsequent monitoring and that it incorporate data from PTF operations. Failure to verify the model could lead to violations of water quality standards at the State Land boundary that could directly impact drinking water supplies. In terms of the geochemical modeling that Curis has relied upon in its application submittals, the Permit must be revised to require that specific PTF data be collected, analyzed, and reported in order to allow proper model validation. As it is, Curis's geochemical modeling is unlikely to provide accurate predictions of pollutant concentrations. For example, Curis has estimated the composition of the pregnant leach solution produced by its recovery wells by multiplying old BHP data by eleven. Curis's geochemical model also do not account for actual rebound data from the BHP pilot, thereby likely underestimating the time required to restore groundwater after PTF operations. The importance of proper geochemical modeling cannot be overestimated as it is critical to Curis's ability to achieve effective rinsing. This should also be important to Curis (and its investors) because the geochemical modeling speaks to the commercial viability of the project. ADEQ should modify the Permit to require auditing, verifications, and calibration before, during and after the PTF. At a minimum, the Permit should require a post-project model audit that requires:verification of flow models with PTF data after 6, 12, 18 and 24 months of PTF operations; evaluation of Curis's water balance data to address agency concerns about impacts from the river, canal and farm recharge and farm pumping;verification of the arsenic fate and transport model to address data indicated an increasing trend in arsenic concentrations after the. BHP pilot; verification of the geochemical model, which is one of the foundations of Curis's predictions and assumptions; and assessment of

groundwater restoration, including a determination of the relationship between rinsing, pH levels and sulfate concentrations.

ADEQ Response –
PTF groundwater modeling at the facility is addressed in Section 2.9.1 of the permit. The permittee is required to perform post-operational modeling in order to update the model. Normal protocol for post-operational modeling includes validation and auditing of the groundwater model. These tasks will be required by ADEQ through the provisions of Section 2.9.1 after operation of the PTF is complete.

The purpose of the modeling was not to replicate BHP Test data. Real world data was incorporated into the Curis modeling assumptions, and is discussed in other Sections of the Comments.

Updates to the model would include information such as ambient mine block concentrations, site specific water level elevation data, and regional water level elevation, among other hydrologic properties collected as part of the pilot test.

3.2 The PTF Does Not Qualify as a Pilot Project Because the Permit's Monitoring Requirements are Inadequate & Will Not Develop the Data Needed for a Commercial Mining Permit.

Curis is entitled to a Temporary APP only if it is implementing a "pilot project to develop data for an [APP] application for the full-scale project." In light of the multiple requests for additional information from both ADEQ and USEPA since 2010, a significant amount of reliable data still is needed to justify commercial operations at this site. If Curis's monitoring program for the PTF does not develop the data needed to answer the agencies' questions, then the PTF does not qualify as "pilot project" under the Temporary APP regulation. Although the Permit requires more monitoring than Curis proposed, it still fails to require enough relevant data to develop and support a full-scale APP permit for a commercial mining permit. Because of this failure, the PTF does not qualify as a "pilot project" and the Permit must be revoked or significantly modified.

ADEQ Response –
Pursuant to AAC R18-9-101(30) a "pilot project" means a short-term, limited-scale test designed to gain information regarding site conditions, project feasibility, or application of a new technology. The Temporary APP permits the operation of the production test facility (PTF) to provide data to assess and to potentially develop a full-scale in-situ mining operation. ADEQ concurs that the information obtained from the pilot test will provide useful data regarding site conditions, project feasibility, to access the viability of in-situ leaching operations at the site and to potentially develop a full scale commercial operation based on results obtained from the pilot test.

3.2.1 **Curis proposed limited monitoring that was completely inconsistent with public statements regarding the purpose of the PTF.**

When Curis changed course in December 2011 and put its APP amendment request on hold to pursue the PTF, Curis stated that "implementation of the pilot test facility will allow for development of data to respond to ADEQ's Comprehensive Request for Additional Information dated September 7, 2011." In public comments soon after this change in course, Curis indicated that the PTF would provide much- needed data related to copper recovery rates, environmental safety, groundwater use, and other aspects of the project:

First, it allows us the opportunity to confirm expected copper recovery rates and optimize the various engineering and scientific aspects related to in-situ recovery. Second, it allows us to continue to build upon the significant amount of data and testing from the work conducted by BHP in the late 1990s, taking this knowledge steps further to optimize well recovery techniques and actually produce plated sheets of copper through a processing plant. Lastly, and most importantly, it allows us to confirm and further enhance design parameters related to optimizing solution recovery rates and minimizing groundwater usage throughout the 20-year proposed life span of the Florence Copper project. ... Findings from the production test will ultimately shape future applications to state and federal regulatory agencies as we finalize the highest and best use of the Florence Copper project site.

What Curis did not say publicly, however, was that it had proposed minimal groundwater monitoring requirements for PTF operations. Curis proposed to sample for just seven "Level 1 Contaminants" (pH, specific conductance, temperature, fluoride, magnesium, sulfate, and total dissolved solids) at the POC wells on a quarterly basis. Curis proposed to sample for a group of other contaminants, including toxic substances such as arsenic, lead, mercury, selenium, and radiochemicals ("Level 2 Contaminants") only once every two years at the POC wells. Curis proposed *no* other monitoring wells of any kind. In other words, Curis proposed to sample for the full range of potential groundwater contaminants that could be mobilized by its mining activities just once—if at all—during the 14 months of active ISL mining at the PTF site.

This proposal clearly contradicted Curis' public position that the PTF is intended to prove the commercial feasibility and environmental safety of ISL mining at this site. If that were really the purpose of the PTF, a reasonable mine operator would have proposed a much more rigorous sampling program with more frequent sampling and additional monitoring wells to identify the impacts of mining on the groundwater system.

ADEQ Response –
Regardless of the statements made by Curis, or of the commenters interpretation of those statements, ADEQ believes the groundwater monitoring parameters and frequency specified in the Temporary APP are adequate for the proposed pilot test. The permit requires quarterly and semi-annual groundwater monitoring at the POCs, and monthly monitoring at monitoring well MW-01. This is an accelerated groundwater monitoring program compared to other mining permits.

3.2.2 Groundwater monitoring plans must be designed to verify hydraulic control,

monitor for contaminants in relevant locations, and demonstrate that groundwater conditions can be sustained over time once mining ends.

Traditional copper mines process the copper ore above ground. Curis's ISL mine will effectively process the copper ore within the groundwater itself through the interaction of injected acid solutions with the rock and water of the aquifer. As a result, this site presents unique challenges and requirements that are quite different from the typical copper mines ADEQ has dealt with previously. Furthermore, this form of mining is of relatively short duration. Curis's express intent is to release the site for other uses when copper mining is no longer economically viable, in keeping with its status as a lessee of the State Land parcel. Therefore, Curis may not be on-site for decades after mining ends with the continuing capacity to address environmental contamination, as is the case at many other Arizona mines. Because Curis's form of mining has direct and significant impacts on a major drinking water source for the Town of Florence, and because ADEQ can assume that Curis will not be around to address long-term impacts, it is imperative that steps are taken before mining begins to protect the groundwater resources of this community.

The importance of groundwater monitoring at ISL projects has been aptly described by USEPA in the context of uranium mining:
Proper monitor well placement and data collection . . . assures that the aquifer constituents are detected, and then restored, to pre-mining levels. Without adequate monitoring well placement and proper data collection, including consideration of sample frequency and sampling timeframe, mine operators and regulators (1) may not detect excursions of lixiviant outside the mining area during operations, and (2) may not be able to Curis, confidently determine whether the impacted aquifer needs further restoration or has been restored to its pre-mining state or another suitable condition that satisfies regulatory requirements.

Curis's ultimate goal is to extract as much copper from the site as possible and then return the site and underlying groundwater to permit standards. Therefore, the entire groundwater monitoring program should be geared toward the ultimate determination of whether the aquifer has been restored to a post-mining condition that meets permit conditions, is verifiable and sustainable, and allows for post-mining use of the aquifer by drinking water suppliers and other users.

That determination necessarily relies "on the accurate characterization of baseline groundwater conditions before active mining (leaching) begins." To avoid misinterpretations of later data and to ensure permit conditions are protective of groundwater resources, the baseline monitoring program should be designed to capture the natural variability in groundwater chemistry at the site, over both space and time. To ensure that baseline conditions have been accurately characterized before mining begins, "[monitoring for spatial variability within the permit area for mining should include wells upgradient, downgradient, laterally adjacent to, and within the proposed leach area, sufficient to identify high and low permeability zones. Monitoring should also include overlying and underlying aquifers, which could become contaminated from leaching

activities." Similarly, post-mining monitoring should include the placement of monitoring wells "in and surrounding the injection-extraction field" with a sampling program designed to provide enough information to determine if restoration of the aquifer is complete and steady-state conditions have been achieved after mining is complete. The Permit's baseline monitoring requirements completely fail to meet these goals.

The design of the monitoring program should be based upon all of the available data relevant to conditions at the site. Too often, a mine owner possesses significant amounts of data that are relevant to the design of an adequate monitoring network, but only a "limited fraction" of that information is provided to regulating agencies in the permit application process. This appears to be the case here, as Curis's proposals for POC and monitoring wells were clearly predicated on financial and scheduling concerns, rather than the analysis and incorporation of the decades of data that undoubtedly exists in Curis's files. Curis's Temporary APP application contained no discussion or justification of its proposed monitoring well field design. Nor did it contain a meaningful discussion of the data quality objectives for monitoring during the various phases of the PTF process. Such analysis is a rudimentary component of any reasonable monitoring well field design. The application also failed to justify the location and relative density of monitoring locations within the affected portions of the aquifer. As USEPA's Science Advisory Board has noted:

The monitoring system must be designed to provide adequate coverage for all aquifers deemed to be affected by ISL uranium mining according to the hydrological survey and hydro-geochemical modeling. The term "adequate coverage" implies both selecting locations with most affected groundwater (e.g., potential hotspots) and overall assessment of pre- and post-mining/restoration aquifer conditions. Any "cherry-picking" of affected locations for underestimating long-term changes due to ISL mining and recovery operations must be avoided. Curis has not demonstrated that "adequate coverage" exists for the PTF.

ADEQ Response –
ADEQ can not comment on Curis's stated plans regarding future uses of the site after mining operations cease.

ADEQ believes that within a reasonable time frame the impacts of in-situ mining can be assessed. This can be done through components of BADCT such as the ability or inability to maintain an inward hydraulic gradient, extracting more solution out than goes in, maintaining fracture gradient pressures, groundwater chemical concentrations at MW-01, groundwater chemical concentrations at the POCs and the chemical concentrations in the mine block during closure. Taking all these engineering and monitoring components into consideration, particularly the post-rinsing mine block concentrations, one can make some assumptions about the impacts of in-situ leaching at the site in a relatively short time frame, not for decades after mining ends, as the commenter implies.

ADEQ requires background groundwater concentrations in the PTF well field to be established prior to operations as stated in the Pre-operational requirements in Section 2.2.3. One sample is required from each of the mine block wells (24 wells) to determine ambient groundwater quality. ADEQ believe there will be an adequate number of samples to determine background water quality at the mine block in the Oxide zone. Subsequent sampling of the mine block wells will be required at the cessation of the PTF and well into the closure and post-closure periods. ADEQ believes the amount of sampling will determine background concentrations in the Oxide Unit and ultimately determine when the aquifer has been restored to background AWQS parameter groundwater conditions. Additionally there are 15 years of groundwater monitoring data under permit P-101704, which include groundwater sampling data from wells screened in the Oxide Unit, in addition to the LBFU and UBFU.

The monitoring system of the POCs is designed to provide adequate coverage for all aquifers deemed to be potentially affected by the in-situ mining. The point of compliance for the groundwater monitoring is required to be established in the uppermost aquifer. (i.e. – the shallowest groundwater). In the case of Florence Copper project, ADEQ has required POCs in three separate water bearing zones, the UBFU, LBFU and Oxide Units (the Oxide Unit being targeted for in-situ leaching). The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in ARS §49-244, such that all POCs are within 750 feet of the Pollutant Management Area (PMA). The points of compliance established under the APP will be adequate for the protection of groundwater at the edge of the pollutant management area and are located between the PTF well field and potential downgradient groundwater users. The APP Program has no provision for monitoring compliance with AWQS in areas internal to the PMA. One main APP Program requirement is that the AWQS not be exceeded at the points of compliance or no further degradation relative to that pollutant occurs at the POCs. MW-01 located in the downgradient groundwater direction adjacent to the PTF well field boundary, and screened equivalent to the injection zones, will provide useful monitoring results within the effective time frames of the Temporary APP.

3.2.3 ADEQ requested additional monitoring but inexplicably abandoned its position in finalizing the Permit.

ADEQ staff did request additional monitoring wells within and around the PTF mine block well field, as well as additional POC wells and a more rigorous sampling schedule. ADEQ staff also requested that Curis justify and explain why its meager monitoring proposals were sufficient. Most of these requests were ignored or minimized by Curis. Had ADEQ stuck to its guns, this would have been a much better permit. Instead, ADEQ ultimately required inadequate changes to the POC well field and only one additional monitoring well, at a location to be determined later, with only rudimentary monitoring requirements. Although the monitoring schedule was improved slightly, it still is not rigorous enough to develop the data needed for commercial operations. In regard to the monitoring schedule, ADEQ rejected Curis's original monitoring proposal for biennial sampling of Level 2 contaminants and "requested" that Curis conduct sampling for Level 2 Contaminants on a quarterly basis. Curis responded to that request with a proposal to

sample for Level 2 Contaminants just once a year. Again, this would have limited data to one or two samples during the course of this "short-term" project. Curis argued that quarterly sampling for the full range of potential contaminants was not necessary because quarterly sampling of Level 1 Contaminants would indicate if contaminants were escaping Curis's control. Curis provided no support for this conclusion, however. Curis's justification for limited annual sampling ignored the fact that it was proposing sampling at POC wells located too far away from the PTF injection well field to detect problems during the PTF operations and that it had not proposed any other monitoring wells to detect unexpected movement of Level 1 Contaminants closer to the PTF well field.

Unfortunately, the Permit does not require Curis to undertake reasonable monitoring during PTF operations. The Permit requires quarterly monitoring at the POC wells for Level 1 Contaminants and only semi-annual monitoring of Level 2 Contaminants at the POC wells. Although the Permit requires installation of a single monitoring well near the PTF well field, Curis is only required to monitor for pH, sulfate, and total dissolved solids monthly and for certain of the Level 2 Contaminants once before PTF operations and once after groundwater rinsing. Thus, the Permit does not provide for an adequate and reasonable monitoring program that will ensure protection of Florence's drinking water resources.

Agency representatives also believed that Curis's proposed POC wells were not compliant with statutory requirements. Staff noted the statutory requirements for POC wells and described Curis's failure to appropriately locate their proposed POC wells. Internal ADEQ correspondence, as well as correspondence between agency representatives and Curis, reflect the agency's belief that additional monitoring and POC wells were necessary. For example, ADEQ staff requested that Curis propose additional POCs surrounding the PTF well field to monitor potential preferential pathways, setting forth various requirements for the additional POCs. Ignoring the purported purpose of the PTF as a proof-of-concept for commercial operations, Curis relied upon a technical and restrictive reading of the APP statutes to argue against additional POC wells.

Soon after, ADEQ reiterated a previous request for monitoring upgradient of the PTF well field and placement of POC wells to monitor faults in the area. Rather than acknowledge these legitimate concerns, Curis again hid behind a restrictive reading of the APP rules to object that it "does not agree that there is a requirement in rule for up gradient monitoring." This response ignored ADEQ's clear authority to require additional monitoring as needed and the relevancy of upgradient data to determining the impacts of Curis's mining on the aquifer.

Within days of Curis's response, ADEQ issued to Curis an *Inadequate Response to Substantive Deficiencies* letter. In that letter, ADEQ staff requested additional information and proposed additional monitoring requirements for reasons that demonstrate a clear understanding of the data quality objectives and design goals that should be the basis of the PTF monitoring program:

While ADEQ believes that modeling is a useful tool for evaluation of groundwater

injection, extraction and geochemistry, ADEQ cannot rely entirely on modeling to predict groundwater flow, hydraulic capture and injectate distribution. Therefore, based on the above mentioned remaining concerns, ADEQ is requesting additional monitoring well(s) surrounding around the test mine block for the following reasons: Because acidic solution is being injected into the fractured and faulted oxide zone that has been shown through aquifer pump tests to be hydrologically connected to the LBFU aquifer; To validate that the fracturing and faulting in the proposed oxide zone is not a preferential pathway for in-situ solutions to migrate beyond the PTF well field; To monitor groundwater quality and groundwater flow (that may or may not be consistent with the regional groundwater flow direction) in a fractured and faulted media that is undergoing pressurized injection and recovery; To measure any rebound effects to groundwater quality and flow in fractured and faulted media once groundwater rinsing has ceased; To confirm the. Applicant's claim that hydrologic control of subsurface in-situ leaching solutions could be maintained for the fourteen month mining phase, nine month rinsing phase, and the initial post-closure period given the geologic/hydrologic conditions present at the site; To verify the Applicant's groundwater modeling results.

The Application shall propose monitoring well(s) near the PTF in the LBFU and Oxide aquifers to verify hydraulic control of injected in-situ leaching solutions. The criteria for the requested wells shall include the following: Located within a reasonable distance from the PTF well field to measure potential groundwater. One or more wells located within a highly fractured and faulted zone of the Oxide unit (i.e. Sidewinder fault and other documented faults in the vicinity of the PTF). Screened throughout the injection zone (dependent on the depth and location of geologic contacts between the LBFU/Oxide and the Oxide/Sulfide Unit relative to the depth of injection). Screened partially through the LBFU (dependent on depth and location of geologic contact between LBFU/Oxide relative to the depth of injection).

Curis's response to ADEQ's request consisted of a single paragraph stating that it had proposed two additional monitoring wells in response to a USEPA request and that the wells should be monitored monthly for Level 1 contaminants only. Curis provided no justification for the location, depth, or construction of the wells, nor did it bother to describe how the two wells answered the data quality objectives listed by ADEQ.

Despite the inadequacy of Curis's response, the Permit was issued just one week later. Most of ADEQ staffs' concerns were not addressed. The Permit required two additional POC wells and one monitoring well, but nothing that comes close to an adequate monitoring well field. The sampling requirements and schedules are similarly inadequate and will not develop the data needed to develop a permit for commercial operations. Nothing in the record justifies ADEQ's decision to require such limited monitoring after having made multiple requests for wells and monitoring requirements that were designed to provide data in support of numerous important objectives. The result is a monitoring well program in the Permit that fails to satisfy the statutory requirements of A.R.S. § 49-243 and 49-244 and that fails to establish the PTF as a "pilot project" that qualifies for a Temporary APP.

ADEQ Response –
ADEQ determined that the response by Curis was adequate to complete the temporary APP. ADEQ has determined that the permit does satisfy the rules and statutes of the APP Program, with the monitoring program as established in the permit.

In accordance with Section 2.6.2.4.1 of the permit, if there is a verified alert level exceedance for an indicator parameter(s) listed in Table 4.1-6 (i.e. Level 1), the permittee shall increase the frequency of monitoring to monthly and analyze for the entire list of parameters in Table 4.1-7 (Level 2). ADEQ accepted this Contingency Action, in lieu of analyzing the full suite of parameters listed in Table 4.1-7 (Level 2) on a quarterly basis. ADEQ believes the indicator parameters, such as sulfate (Level 1 parameter), which is required during the quarterly sampling event, will better serve as an early indication of a potential release.

Monitoring well MW-01 is not designed to satisfy the statutory requirements of A.R.S. § 49-243 and 49-244 in order to determine APP compliance objectives. Rather as the name implies, it is a monitoring location to determine potential impacts within the time frames of the Temporary APP. ADEQ will review the chemical concentrations at MW-01 from the Quarterly Reports as required by Section 2.7.4.4. The sampling results from MW-01 will be used for the following: (a) calibrate the geochemical modeling for commercial operations, (b) estimate aquifer loading (c) demonstrate hydraulic control beyond the observation wells, and (d) confirm the DIA for the PTF operations.

ADEQ believes that the downgradient fault plane projection from the PTF well field is adequately monitored by proposed MW-01 and POC M54-O, both in the Oxide Unit. Monitoring well MW-01 is proposed to be installed in the downgradient groundwater direction at or near the PTF well field boundary. MW-01 will be a nested well screened equivalent to the proposed injection intervals and to the same depth of injection. MW-01 may intercept up to three of the projected fault planes; Rattlesnake, Thrasher, and Sidewinder Faults, depending on placement of the well. POC well M54-O is proposed to be installed to the same depth of injection, and is screened across the projected fault planes of the Rattlesnake and Thrasher Faults further downgradient from the PTF. Any "theoretical" solution migration (i.e. contaminant bypass) along those faults under the proposed PTF well field would be evident by downgradient groundwater quality changes observed in MW-01 and/or M54-O.

3.3 A True Proof-of-Concept Pilot Requires Robust Monitoring, Reporting & Contingencies.

As explained in Appendix A, if ADEQ intends this PTF to be a true proof-of- concept pilot then it must mandate the development of sufficient monitoring data to prove up Curis's assumptions and eliminate uncertainties to the extent possible. The groundwater monitoring improvements described by Dr. Wilson are intended to verify key assumptions, provide a more robust characterization of containment system performance, validate the flow model, validate the arsenic model, and validate the geochemical model.

ADEQ Response –
ADEQ believes there is sufficient monitoring in the permit to verify data assumptions and eliminate uncertainties. Quarterly PTF Operational and Monitoring Reports will be submitted in accordance with Section 2.7.4.4. ADEQ considers the data provided in the Quarterly Reports as a proof-of-concept validation (system performance, monitoring information, etc.) throughout the PTF monitoring period, in addition to a PTF Summary Report required at the cessation of rinsing. Additionally, as described in Section 2.9.1 post-audit groundwater modeling is required at the end of the pilot test and after the initial 5-year post-closure monitoring. While not explicitly spelled out within Closure Plan requirements, updated groundwater modeling would include validating the original groundwater model assumptions.

3.3.1 ADEQ must revise the Permit to mandate proper POC well locations that protect drinking water as the aquifer's current and reasonably foreseeable future use.

For ADEQ to approve the Permit, Curis must demonstrate that pollutants discharged will in no event cause or contribute to a violation of AWQS at the POC or further degrade aquifer quality at the POC if the AWQS are already exceeded at the time of permit issuance. The POC is "the point at which compliance with aquifer water quality standards shall be determined" and is to be "a vertical plane downgradient of the facility that extends through the uppermost aquifers underlying that facility." Importantly, the POC must be located to ensure protection of all *current and reasonably foreseeable future uses* of the aquifer. ADEQ must consider the risk to nearby drinking water sources, other area groundwater users, and the surrounding area as a whole in determining POC locations and determining whether Curis can meet the statutory standards at that POC. Curis's application characterizes the area as if it is still 1997, a time when there were no nearby groundwater uses. Nothing could be further from the truth. As discussed earlier in Section 1 of these comments, the aquifer into which Curis proposes to inject acidic mining solution is in direct contact with a major drinking water supply for Florence residents. By agreeing to Curis's improper POC locations, ADEQ has not complied with its statutory obligation to recognize and protect the current and reasonably foreseeable future drinking water use of this aquifer.

Curis's application minimizes current uses of the aquifer and completely fails to identify reasonably foreseeable future uses. Curis attempts to show that vicinity wells are minimal, mostly irrigation in nature, with few downgradient of the PTF. After ADEQ pointed out Curis's failure to even mention area wells and groundwater uses,91 Curis submitted Figure 7-2, a depiction of wells within 1.5 miles of the Pilot. The figure and associated table of data, however, still fail to accurately capture the relevant well information. For example, SWVP's Well No. 627648 is inaccurately portrayed as a mineral exploration well, despite ADWR records listing it as a water production well. Additionally, SWVP's well numbers 627617 and 627610 should be designated as downgradient. ADEQ should require Curis to revise its application and correctly identify the current and reasonably foreseeable drinking water uses of the aquifer.

In terms of reasonably foreseeable groundwater uses, the Town of Florence has already identified the aquifer as a drinking water source. The Town's Assured Water Supply Plan identifies the Merrill Ranch water and wastewater facilities as water resources that it will utilize to maintain a sustainable future within the Pinal Active Management Area, including proposed wells that will be located directly downgradient of the Curis mine. In order to prevent contamination of the aquifer, it is imperative that ADEQ establish multiple POCs with numerous POC wells designed to protect the aquifer for drinking water use. The current and future land uses reflect the need to rely upon the aquifer for drinking water purposes. Curis attempts to characterize the area around the mine as open desert or agricultural land, minimize its proximity to Anthem, and downplay the fact that it proposes to mine on land located within a master planned community. Yet the proposed PTF is less than 2 miles from a well-developed residential community, is surrounded by land slated for future development, and is essentially an island in the middle of the Town of Florence. One need only look at the Town of Florence's General Plan for a visual depiction of the past mining property holdings and Curis's current land holdings within the Town of Florence boundaries. As discussed in detail within Appendix B of these comments, the area surrounding Curis's proposed PTF has drastically changed since the late 1990's when the site was previously permitted and when many of the studies upon which Curis now relies were actually conducted. The area has tremendous development under detailed long-range plans, as well as significant public and private investment in infrastructure. The Town is roughly centered in the Arizona Sun Corridor, between Phoenix and Tucson, an area that will continue to have one of the fastest growing populations in the State. The aquifer into which Curis proposes to inject sulfuric acid solution is and will be used for drinking water purposes and must be protected for such uses.

ADEQ Response –
AAC R18-9-A202(A)(1), requires depiction of wells locations within one half mile of the facility on site map. Due to a known ADWR registered well down gradient, approximately 1.2 miles from the PTF, ADEQ requested an expanded well inventory, up to 1.5 miles from the PMA. The comment regarding the correction to well locations and numbering is noted for the expanded well inventory search. The corrections to the well location and numbering are not significant enough to change the conditions of the Temporary APP.

ADEQ considers the POC locations to be adequate to monitor compliance at the downgradient edge of the PMA. The uses of water in nearby aquifers were considered during the application review, and a use protection level was established for arsenic in Permit Section 2.5.7. Groundwater monitoring in the UBFU, LBFU, and Oxide water bearing units downgradient from the PTF well field and upgradient from the Curis property boundary is protective of any potential downgradient groundwater users. The Oxide injection zone is a separate and distinct geologic unit from the drinking water LBFU.

3.3.2 Curis has not justified placement of the POC wells in the locations approved by ADEQ.

Aquifer water quality standards must be met at the POC or multiple POCs, in the case of a large site. The POC is a vertical plane downgradient of the project extending through the aquifer and extraction zone. POCs must be located so that they ensure protection of all current *and reasonably foreseeable future uses* of an aquifer.

In order to determine the appropriate POC, the Pollutant Management Area (PMA) and the Discharge Impact Area (DIA) must be determined. The PMA is defined as "the limit projected in the horizontal plane of the area on which pollutants are or will be placed. The pollutant management area includes horizontal space taken up by any liner, dike or other barrier designed to contain pollutants in the facility. If the facility contains more than one discharging activity, the pollutant management area is described by an imaginary line circumscribing the several discharging activities."

The DIA is "the potential areal extent of pollutant migration, as projected on the land surface, as the result of a discharge from a facility," According to ADEQ, the DIA is necessary to provide an understanding of the extent and degree of contamination to be expected in the aquifers underlying the site, and in the vadose zone. Establishment of the DIA allows the agency to develop conditions and requirements in the permit designed to protect potential receptors that may be impacted. It is defined for the expected life of the facility through a hydrogeologic study.

The study must also demonstrate that the discharge will not cause or contribute to an AWQS exceedance or in the case of an existing AWQS exceedance that no additional degradation will occur. Both a map of the DIA and an explanation of the methodology by which the DIA was defined are required in an APP application. Despite this requirement, Curis admits that "no significant additional hydrogeologic characterization activities have been conducted at the PTF site and surrounding vicinity since the Brown and Caldwell (1996a) study was completed." Reliance upon these 1996 studies fails to account for the significant area changes that have occurred in the last 16 years. Those studies also do nothing to justify placement of POC wells associated with Curis's PTF on the State Land parcel. Thus, it is hard to believe that ADEQ would allow Curis to rely on this outdated hydrogeologic study for POC well placement at the PTF. ADEQ should require Curis to conduct its own hydrogeologic study accounting for current-day conditions and reasonably foreseeable future downgradient groundwater uses and explain how its POC wells meet regulatory standards in relation to the PTF.

As shown in Figure 3-1, ADEQ has previously represented to the public that POC wells should be placed within the DIA. And this is a reasonable requirement because one would hope that the state agency tasked with protecting the environment would want to be alerted — through monitor well sampling data and timely reporting — of the potential contamination flowing from the facility discharge into the area expected to be impacted by the discharge.

ADEQ's own procedures state that when considering the number of POCs and the exact locations of POCs, the agency should consider site specific conditions including, but not limited to, the expected pollutants, the location of potential receptors, aquifer uses, aquifer characteristics, and the location of discharging facilities. POC wells should be located "at those points where contamination emanating from the facilities is most likely to be detected the earliest.

Despite these reasonable agency criteria for POCs, Curis proposed and ADEQ accepted POC wells far outside the DIA. Curis has proposed a DIA that is depicted below in Figure 3-2, which depicts Curis's version of the DIA five years after closure based on sulfate migration as indicated by Curis's geochemical modeling.'03 As can be seen, the POC monitor wells are hundreds of feet from the area impacted by Curis's mining during PTF operations. So even if the well field discharges contaminants that then escape hydraulic control and flow into the DIA — the area expected to show an impact from the discharge — the POC wells will not detect that contamination and alert the agency (and the public) to the problem. Nor will the POC wells provide useful data about most PTF impacts that could occur before ADEQ's evaluation of a full-scale operation, including containment system performance and hydrologic and geochemical assumptions relating to injection and recovery. Given this, ADEQ should revise the Permit to move the POC wells inward to be located within the DIA.

In correspondence between ADEQ and Curis regarding the POC well locations, Curis appears to be arguing that ADEQ cannot require it to move the POC wells within the DIA but that they need only consider the PMA. If ADEQ chooses to accept Curis's argument, then ADEQ should still move the POC well locations inward from those depicted in the Permit. According to A.R.S. § 49-244, the POC is "the limit of the pollutant management area." Similarly, ADEQ's own procedures state that the PMA will be used to determine the number and location of POCs.' Curis's proposed PMA is depicted in Figure 3-3 as the area within the black outline. The four POC wells designed to monitor westerly flows from the PTF well field—Wells M14-GL, M15-GU, M22-O, and M23-UBF — are all located outside the PMA in violation of statutory requirements.

Admittedly, the legislature afforded ADEQ some latitude to designate an alternative POC location outside the PMA under limited circumstances. An alternative POC location can only be considered in two scenarios: (1) where it is technically impracticable or inappropriate to monitor at the PMA boundary considering the likely fate or transport of a pollutant in an aquifer', or (2) where an alternative POC will allow for monitoring installation and operation that are substantially less costly. Curis has not argued that it is technically impracticable or inappropriate to monitor at locations closer to the PTF well field.

The second or "substantially less costly" alternative is only available when supported by a two-pronged technical analysis demonstrating (a) the volume and characteristics of the pollutants that may be discharged, and (b) the ability of the vadose zone to attenuate the particular pollutants that may be discharged. In the PTF's case, because Curis plans to inject at depth directly into the aquifer, there is no vadose zone that can attenuate the

discharged pollutants. Because of this practical impossibility, Curis cannot meet the two-pronged predicate to the "substantially less costly" alternative. For this reason, Curis's PTF is not eligible for a "substantially less costly" alternative POC and the Permit locations for the existing POCs are invalid."

Inappropriate POC locations are one of the more common deficiencies noted in APP applications and Curis's permit submittals are no different. Curis's POC monitor wells are far from the PMA and unlikely to detect potential contaminants until years after the PTF's monitoring is complete and commercial operations have likely been well underway. Curis appears to have selected the POC wells downgradient of the PTF well field based upon financial considerations rather than scientific and technical considerations. It was cheaper to use existing wells than properly locate and drill new POC wells.

ADEQ Response –
In accordance with ARS 49-244, the POC is a vertical plane downgradient of the facility that extends through the uppermost aquifers underlying the facility. In addition to monitoring the uppermost aquifer at the site commonly referred to as UBFU, POCs are also located in the LBFU, and the Oxide Zone. The foreseeable use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. Groundwater monitoring in the UBFU, LBFU, and Oxide water bearing units between the PTF well field and the Curis property boundary, in the downgradient direction, is protective of any potential downgradient groundwater users.

Additional data at the site since 1996 up until current day, has included collection of groundwater level elevations, sampling of the groundwater, sampling of the underground workings, drilling additional boreholes and updating the groundwater modeling. While some of the assumptions and information obtained prior to 1996 was used as part of the hydrologic study (as there was no reason no exclude this data), information such as drilling of boreholes, geophysical log, additional groundwater elevation measurements, groundwater sampling at the mine block wells, groundwater sampling at the POCs, and aquifer pump tests at the proposed PTF test site, will assist in assessing current day groundwater conditions, with most of these site characterization activities being completed before the pilot test begins.

Figure 3-1, provided with the Comments, is a generalized depiction for a PMA, DIA, POCs for a presentation made by GWS staff. POC wells may or may not fall within the boundaries if the DIA, and is largely dependent of the criteria and methodologies used to determine the DIA. Figure 3.1 is not an all-inclusive depiction intended to show that all POCs are located within the DIA. In this case, ADEQ accepted the criteria and methodology used to determine the DIA. POC locations are required by A.R.S. § 49-244 to be placed on the downgradient edge of the pollutant management area. The seven POCs are located correctly, as required by the cited statute.

When considering the number of POCs and the exact locations of POCs, the agency did consider site specific conditions including, but not limited to, the expected pollutants, the

location of potential receptors, aquifer uses, aquifer characteristics, and the location of discharging facilities. POC wells shall never be further downgradient than any of the following (i) the property boundary, (ii) any point of an existing or reasonably foreseeable future drinking water source and (iii) seven hundred and fifty feet from the edge of the pollutant management area. Wells M14-GL, M15-GU, M22-O, and M23-UBF are correctly located downgradient from the facility, within the property boundary, between an existing or reasonable future drinking water source and the discharging facility, and within seven hundred and fifty feet from the edge of the PMA.

The well field discharges that could potentially escape hydraulic control and flow into the DIA would be evident from changes in chemical concentration observed at MW-01. The containment system performance will be evaluated by components of BADCT requirements in addition to Operational Requirements (maintaining an inward hydraulic gradient, extracting more solution out than goes in, maintaining the fracture gradient, etc.), and the Discharge Limitations (hydraulic control over the injected solutions shall be maintained during the operating life of the facility, and in-situ solutions shall be injected and contained within the oxide unit) specified in the permit. The hydrologic and geochemical assumptions relating to injection and recovery will be evaluated and confirmed through groundwater sampling at the mine block wells after the pilot test and into Closure and Post-Closure. Sampling concentrations at the mine block wells at the cessation of rinsing, in conjunction with the required updated groundwater modeling required at the end of the pilot test, shall provide useful data for predicting future impacts at the POCs.

While 4 POCs are existing wells (M14-GL, M15-GU, M22-O, and M23-UBF) at the site, three new POCs (M54-LBF, M54-O and M52-UBF), and one monitoring well (MW-01) are required to be installed as part of the Temporary APP.

3.3.3 The number and location of POC wells is inadequate.

Curis proposed even fewer POC wells for the PTF on State Land than BHP used to monitor the 224-acre mine area of the previous pilot. Review of groundwater data and interpretations of flow direction maps prepared using the BHP data indicate that the number of POC wells used in the BHP pilot was inadequate. Because the BHP pilot did not generate data points for the western-most and southwestern-most areas, a true determination of local groundwater flow direction cannot be made. This lack of data has led to proposed PTF POC wells that are inadequate in both number and location with a complete lack of coverage to the west, south and southwest.

The agency previously questioned Curis's proposed POC well placement and adequacy. Even so, as currently proposed the POC locations are inadequate and fail to account for varying groundwater flow directions as demonstrated by previous area groundwater monitoring. The two POC well clusters required by the Permit near the PTF well field are located in the direction of the regional groundwater gradient (northwest) from the PTF well field. No POC wells are located to the west or southwest of the well field. Although Curis justifies its POC well locations based on a series of contour maps depicting groundwater flow in the Oxide Zone, a review of those figures for the Oxide Zone reveals

only limited data points supporting each contour map, and in some cases, no data points for the entire southwest third of the study area.

Two of the figures, Figures 14C-32 and 14C-47, demonstrate westerly groundwater flow direction in the Oxide Zone. Because of the hydraulic connection between the LBFU and Oxide Zones, and the close proximity of the LBFU to the injection zone within the Oxide Zone, figures depicting groundwater flow direction within the LBFU should also be considered when determining appropriate FCC well locations. LBFU flow contour maps demonstrate three periods (Figures 14C-40, 14C-42, and 14C-47) where flow direction was to the west or southwest. Currently, there are no proposed POC wells located directly west of the PTF, even though historical groundwater flow direction maps suggests that flow has alternated from the northeast to the west.

Depending on the rate of pumping from off-site agricultural wells, flow direction also could be towards the southwest, but there are no POC wells in that area. Active farming is conducted southwest of the PTF site. Review of ADWR records shows extensive pumping occurred in several wells located southwest of the site over the past several years. The rate and timing of off-site irrigation pumping creates gradient changes that can result in flow toward the west and southwest from the PTF site. Peak pumping rates occur during the growing season and the warmer months of the year. But in all of the contour maps that Curis relies upon POC well locations are from data collected primarily in January and February, times when off-site pumping demands would be at their lowest and would influence subsurface flow patterns the least. Curis should be required to use year-long data to evaluate groundwater flow patterns, as POC wells are almost certainly required to monitor this area.

ADEQ should require POC wells to monitor each of these downgradient areas. Merely because one direction is not downgradient all year long, does not mean that ADEQ should disregard it. Instead, failure to account for that downgradient pathway, even if sporadic in nature, would allow an excursion to go undetected.

Curis's proposed POC wells also fail to account for area mounding and local recharge. In areas exhibiting mounding, ADEQ has previously represented that POCs may be required surrounding the area. According to Curis's own application, groundwater mounding is already apparent in the area." So it is imperative that ADEQ require Curis to add POC monitor wells radially around the discharge areas to detect potential contamination caused by groundwater mounding or exacerbated by Curis's PTF. Additionally, it appears that mounding can contribute to western flow components and allow acidic mining solution to migrate off-site.

Curis also fails to address the potential detrimental effects of local recharge from the nearby unlined canals on the PTF's injection of sulfuric acid and Curis's ability to maintain hydraulic control. Although ADEQ highlighted this issue for Curis in the September 2011 and again in the May 2012 deficiency letters, Curis dismissed it as a non-issue for PTF operations. Similarly, ADEQ asked Curis to evaluate potential impacts from wastewater treatment plant recharge and the potential impacts from the mine on

recharge. But once again, despite the agency's prompting, it does not appear that Curis has adequately addressed recharge. Curis should be required to include in its modeling all known aquifer stresses, including those posed by recharge.

ADEQ Response –
The 31 POC wells for the BHP permit issued in 1997, were the number and location of POCs established to monitor the effects of commercial mining operations for the entire site as envisioned at that time.

ADEQ believes the POCs for the PTF are adequately located on State Land based on fifteen years (15) of site specific and regional groundwater data. While groundwater flow direction fluctuations are evident in the data, on-site pumping wells such as BIA-9, BIA-10 and WW-3 will be taken off line during PTF operations, or abandoned. ADEQ does not anticipate large seasonal groundwater flow fluctuations from on-site groundwater pumping. Groundwater modeling indicated that off-site groundwater pumping will not materially affect PTF operations in the Oxide zone. Therefore, additional POCs were not warranted to the west and southwest.

While not part of the Temporary APP, continued quarterly and biennial groundwater monitoring is being conducted under APP P-101704 for approximately 31 POCs. Any changes in groundwater quality observed as part of compliance ground water monitoring under APP P-101704 will be evaluated.

Attachment 14C of the Application provides potentiometric surface maps depicting groundwater conditions at POCs wells associated with APP Permit P-101704 in each of the water bearing units beneath the site. Active monitoring at the site was conducted between the years of 1996 to 2011, excluding 2009. Groundwater flow directions based on the potentiometric surface maps is predominantly toward the north-northwest direction during the entire period of monitoring, with some variations in the UBFU and LBFU. The variations in the UBFU and LBFU are mostly likely due to off-site pumping. Based on figures provided in the Application there is no significant groundwater flow shift within the bedrock Oxide Unit. No significant changes in groundwater flow in the Oxide Unit is mostly likely due to fewer recharge impulses from the Gila River due to its greater depth below ground surface, reduced hydraulic conductivity as compared to the UBFU and LBFU, and due to the geologic unit being less susceptible to off site pumping. The groundwater flow within the Oxide Unit has remained consistently to the north-northwest throughout the monitoring period with little variation. The data compiled at the site since the inception of groundwater monitoring in 1996 is consistent with the regional groundwater flow direction provided on the ADWR Groundwater Sites Inventory (GWSI) Maps provided in the Application.

ADEQ believes there is an adequate number of groundwater monitoring locations (POCs and other monitoring wells already on-site) in each of the water bearing units, to provide accurate information to determine groundwater flow direction specific to the site. For the purposes of the Temporary APP, quarterly groundwater measurements and

groundwater contour maps for POC wells are required to be submitted in accordance with Section 2.7.4.4

Apparent groundwater mounding was observed on a groundwater elevation contour map prepared for October 1995 in the LBFU and Oxide Units. The groundwater mounding amounted to an increase in 1 to 2 feet in the LBFU and 2 to 3 feet in the Oxide Unit. While a localized groundwater mound was observed, the overall groundwater flow direction remains to the north/ northwest. Numerous potential explanations are given for the apparent groundwater mounding observed in October 1995 such as; not distinguishing wells by depth of screen interval with respective to the separate water bearing units, measurements may have been taken during active on or off-site pumping, downward groundwater flow at wells screened across multiple units, and/or contouring wells completed at different depths. After 1995, no apparent groundwater mounding is observed in the subsequent groundwater elevation data. The magnitude of the mounding, approximately 1 to 3 feet, has an insignificant effect to the overall groundwater gradient and/ or flow direction, and does not warrant additional POCs based on the amount and extent of groundwater mounding.

The Applicant addressed the effects of local recharge from the nearby unlined canals, the Gila River and a nearby recharge facility. Recharge from the surface water features such as the canals (which would be intermittent in nature since the canal is dry most the year), and from the Gila River, will primarily affect the alluvium and upper portions of the UBFU. The alluvium is present at the land surface and the UBFU is the geologic unit immediately below the alluvium. Injection will take place in the Oxide Unit between 500 to 1,185 ft. bgs. It is unlikely that recharge from surface water features will effect the ability to maintain hydraulic control within the Oxide Unit. Additionally, the Applicant evaluated the North Florence Wastewater Treatment Plant (WWTP) and determined the amount of wastewater recharge is relatively small and therefore should have no affect on PTF operations. Volume 3, Tab 14A discussed the inflows used for groundwater modeling and includes Gila River Recharge, canal leakage, and agricultural returns. The recharge of the North Florence Wastewater Treatment (73 acre-feet-per-year (AFY)) was not included in the groundwater modeling due to its relatively small volume as compared to recharge from Gila River (10,000 to 1,000,000 AFY). ADEQ concurred with the rationale for including or excluding certain inflows for groundwater modeling.

Gila River Recharge, agricultural returns and leakage from unlined canal were evaluated as inflows for the groundwater modeling (regional scale inputs), however they were not included in the generalized site-wide water balance (small scale of PTF well field 200 feet by 200 feet by 685 feet). Essentially regional scale factors could not be quantified in the form of a small scale PTF water balance. ADEQ concurs with the Applicants rational to exclude this input from the generalized water balance.

3.3.4. Curis's POC well design is inadequate.

The design of the POC wells is deficient because it attempts to use existing wells, installed for other purposes years ago, instead of drilling and installing proper wells specific to this pilot. First of all, Curis's proposed injection wells contain perforations of

400 feet. If injection wells are perforated at 400 feet, then Curis needs to install a number of observation and monitoring wells that cover that depth. POC wells M23- UBF, M22-0, M15-GU, and M14-GL are located in an area that Curis has identified as being "potentially down-gradient." It is unacceptable that two-thirds of the POC wells are located in areas that Curis does not classify as downgradient. POC well M23- UBF (located in the "potentially down-gradient" cluster of wells) is perforated from 210 to 250 feet and is proposed to monitor water in the UBFU. Curis does not propose to conduct any monitoring of the UBFU in the "down-gradient" cluster of wells as the uppermost water to be monitored is in the LBFU at 500 feet in POC Well M54-LBF. This appears to be an inconsistent monitoring plan with no explanation for why the UBFU will be monitored at one location, but not the other.

POC wells M54-LBF (500-750 feet perforations) and 013-0 (770-1393 feet perforations) are feet for 013-0). It is unclear where the pump will be placed in these wells and which specific zones will be monitored. As Curis has demonstrated in their explanation of the POC Well P49-0. sulfate exceedance, a pump setting difference of only 50 feet can result in a change in sulfate concentrations from 1,320 mg/L to 99 mg/L. ADEQ should require Curis to specify where the pumps will be set and what depths will be monitored in the POC wells. In any event, it is apparent that no matter where the pumps will be placed in the POC wells, there will be large zones that will not be adequately monitored.

The "potentially down-gradient" POC wells M23-UBF (210-250 feet perforations), M15-GU (554-594 feet perforations), M14GL (778-838 feet perforations), and M22-0 (932-1130 feet perforations) with the exception of M22-0, have smaller perforated intervals. There are, however, relatively large gaps in coverage between the perforated intervals in those wells. For instance, there is a 304 feet gap between the UBFU and the LBFU in POC wells M23-UBF and M15GU, and a 184 feet gap in the LBFU in POC wells M15GU and M14GL. As noted above, Curis should be required to specify at what depths the pumps will be placed and based on the pumping and sampling techniques utilized, and what zones will be monitored. Again the differences in the perforated intervals between the two clusters of POC monitoring wells demonstrate the inconsistencies of Curis's proposed monitoring plan.

ADEQ should require Curis to appropriately locate, design, and operate the POC wells to ensure protection of the drinking water aquifer. And if the PTF is truly intended to be a proof-of-concept pilot then even more POC wells, sampling and data should be required to prove up Curis's theories prior to commercial operations. Wells should include the ability to conduct multi-level, multi-port sampling near and just outside the injection and extraction well field. In order to produce representative data that can be used to truly protect the drinking water aquifer, Curis should be required to sample wells at the same level of ongoing injection. As demonstrated by Curis's responses to the recent exceedances in POC well P49-0, proper placement of the pump sampling intake is important. To effectively monitor groundwater downgradient of the PTF well field, the POC wells should be capable of monitoring discrete zones throughout the entire injection intervals.

ADEQ Response –

POC locations are required by A.R.S. § 49-244 to be placed on the downgradient edge of the pollutant management area. The seven hazardous POCs are located correctly, as required by the cited statute. Over fifteen years of site specific and other regional groundwater data indicated the overall groundwater gradient in the Bedrock Oxide Unit is to the northwest, the geologic unit targeted for in-sit leaching. The cited statute does not limit that the POCs have to be newly installed wells. The POCs are installed within the State Land lease property boundary in the downgradient direction and between the discharging facilities and the foreseeable or known downgradient drinking water sources.

ADEQ is aware that injection will take place at approximately 500 feet bgs., not at 400 feet. The injection zone between 500 and 1,185 feet bgs. is being monitored by POCs in the LBFU and Oxide Zone. POCs are placed in the UBFU downgradient of the impoundments and at the well cluster downgradient of the PTF at M23-UBF. ADEQ believes it is adequate to measure one well downgradient from the PTF in the UBFU because if any excursion occurs, it would most likely be detected at equivalent depths of the injection in the Oxide Unit or possibly in the LBFU, not the UBFU. The depths of injection 500 to 1,185 are adequately covered by the screened intervals of the POCs, at two separate POC well clusters.

The physics and chemistry of a contaminant plume in groundwater dictates that contamination does not flow in a straight line or disperse uniformly away from the source radially in each direction. Rather the plume will move in the direction of groundwater flow, typically in a conical shape due to absorption, advection, dispersion, dilution, etc. Therefore, one can assume as a plume flows away from the source in the dominant groundwater flow direction and spreads conically, that either one of the two well clusters downgradient from the PTF will intercept the potential contamination. While each of the well clusters may monitor a separate groundwater zone (i.e. different well screened intervals), each well cluster does not need to monitor the same specific groundwater interval based on constraints of contaminant transport in groundwater.

The injection zone is between 500 and 1,185 feet bgs. MW-01 will be a nested well screened equivalent to the proposed injection intervals and to the same depth of injection, adjacent to the PTF well field. For the POCs, M23-UBF monitors between 200-275 ft. bgs., M54-LBF monitors between 500-640 ft. bgs., M15-GU monitors between 554-594 ft. bgs., M22-O monitors between 660-1,200 ft. bgs., M14-GL monitors between 778-838 ft. bgs., M22-O monitors between 932-1,130 ft. bgs. The only vertical depth that a screened interval of a POC does not cover within the injection zone, is the 640-660 ft. bgs. ADEQ does not consider the lack of a screened interval between that depth 640-660 ft. bgs. inadequate POC coverage and construction, considering the entire injection zone, from 500 to 1,185 ft. bgs. (except for 20 feet at 640-660 ft. bgs.) is being adequately monitored by screened intervals of other POC wells. Again, considering the fate and transport of a contaminant plume, such as sulfate, the screened intervals in POCs above 640 and below 660 ft. bgs. would intercept any contaminant flow as evident by groundwater quality changes at those locations.

In the May 23, 2012, Response to Comprehensive Request for Information to Comment 8 the Applicant indicated that for wells with high volume pumps, the wells shall be purged of least three borehole volumes or until field parameters are stable, whichever represent the greater volume. For wells with low-flow pumps, Curis will conduct the sampling using the low flow purging methods described in Arizona Water Resources Research Center, March 1995 Field Manual for Water Sampling. The well will be purged until two of the indicator parameters stabilize. ADEQ reviewed the groundwater sampling protocols and agreed to methods proposed by the Applicant. Both proposed methods are accepted industry standards for well purging.

The four Westbay wells enable multi-level, multi-port sampling near the injection and extraction well field. The permit requires sampling at MW-01 just outside of the mine block and will be sampled at the depths equivalent to injection.

3.4 Additional Monitoring Wells Are Needed.

The numerous problems associated with the POC well field design are exacerbated by the fact that ADEQ has required only a single monitoring well for this project. That well will be the only monitoring location within 750 feet of the PTF mine block well field. Furthermore, Curis is only required to monitor for three groundwater parameters at that well, so the data collected at this single site will be minimal. Such limited monitoring is insufficient to establish the PTF as a "pilot project" that is eligible for a Temporary APP.

As discussed previously, to properly characterize baseline conditions, monitor changes in geochemistry during PTF operations, and demonstrate that groundwater meets permit standards after mining is complete, monitoring must be conducted upgradient, down-gradient, and cross-gradient of the PTF well field, as well as in aquifer zones above the ore body. Monitoring also must be conducted within and surrounding the PTF well field, at locations close enough to detect excursions and chemical changes. A single monitoring well cannot meet these needs.

Some of these monitoring needs could be met, in part, by moving the currently-designated POC wells to appropriate locations and adding other POC wells. These needs also could be met, in part, by requiring Curis to report data from the PTF mine block wells, especially the observation and Westbay wells. Especially in the absence of properly placed POC and monitoring wells, data from these wells is critical to a determination of Curis's ability to control mining solutions and restore groundwater after mining is complete. Data gaps not covered by these wells could be filled with additional monitoring wells. Dr. Wilson has described in more detail the need for additional monitoring at this site, including recommendations for additional monitoring with the existing wells required by the Permit and new wells at new locations.

USEPA apparently concurs with these recommendations. That agency has recently requested several new monitoring wells around the PTF well field. USEPA has asked for a monitoring well east of the PTF in the LBFU, above the level where the Sidewinder fault meets the Oxide-LBFU contact. It has also asked for monitoring wells at the most

northern, western, southern, and eastern extent of Curis's projected five- year sulfate plume. ADEQ should not rely upon USEPA to enforce these requirements, however, but should itself require similar monitoring locations in the Permit.

ADEQ Response –
MW-01, within 750 feet of the PTF mine block well field, will be sampled for all parameters listed in Table 4.1-5 one month prior to start-up and one month after rinsing. In addition to chemical concentrations measured in MW-01 monthly, the mine block wells (where actual injection will be taking place) will be also sampled during the closure and into the post-closure period. ADEQ has accepted one well (MW-01) screened in the injection zone in the dominant downgradient groundwater direction as acceptable to evaluate potential excursions from the test block. ADEQ accepted this one monitoring well in lieu of other POCs potentially up to 750 feet away radially around the test block. ADEQ deems MW-01 to be appropriately located, as the most likely place to detect excursions of mining solutions would be adjacent to the PTF well field and in the downgradient groundwater direction.

ADEQ believes that monitoring of the actual injection zone at the injection, recovery and observation wells during closure will effectively monitor chemical changes at the source. The PMA allows the permittee to place pollutants within the test mine block for the purposes of in-situ leaching, so elevated concentrations of sulfate and metals at this location during operations and into the initial rinsing phase are expected. Having the permittee report the chemical concentrations of the mine block wells during operation would essentially indicate the viability of the mineral extraction for the site and not the compliance objective of the APP. The compliance objective of the APP is to not exceed AWQS at the POCs, or cause further degradation relative to that pollutant if the AWQS is already exceeded at the time of permit issuance.

The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant.

ADEQ has no comment on the number and location of groundwater monitoring points required by the EPA.

3.5 Robust Monitoring & Reporting Should be Required.
The monitoring schedule required in the Permit does not qualify the PTF as a "pilot project" eligible for a Temporary APP because the monitoring is not designed to develop the data needed to develop an APP permit for commercial operations. Almost no background sampling will be done, such that baseline conditions will remain uncertain. Operational monitoring is too limited to reasonably understand the impacts of ISL monitoring on the aquifer. Restoration and post-closure monitoring is too limited to determine if Curis has restored groundwater to permit standards and is further hampered by the lack of background monitoring before the PTF begins operations. Curis is not even required to report all of the data it will be collecting, much less the full range of data necessary to understand this project. Because the Permit does not require Curis to get the

data it needs for a full APP, the Permit should be revoked or significantly amended in accordance with the comments below.

ADEQ Response –
Comment refers to Comments below. See ADEQ Response to Comments below in 3.5.1, 3.5.2, 3.5.3, and 3.5.4

3.5.1 The groundwater monitoring schedule does not provide the data needed to understand the impacts of ISL mining on Florence's groundwater.
Curis has portrayed the PTF as a pilot test designed, at least in part, to develop data to answer the significant questions that exist about the environmental impacts of this mine. That goal requires a rigorous monitoring program. Instead, Curis proposed to sample for Level 2 contaminants (which include heavy metals and radiochemicals) only once every two years and only at the POC wells. Given that the PTF will operate for only 14 months and that the POC wells are too far from the PTF well field to detect any contaminants escaping during that period, Curis's monitoring schedule is completely inadequate. To its credit, ADEQ rejected Curis's original monitoring proposal. The Permit requires quarterly Level 1 monitoring at the POC wells and semi-annual monitoring of Level 2 contaminants. The Permit also requires monthly monitoring for pH, sulfate and TDS at MW-O1. Although we applaud the agency for making the Permit more stringent than Curis proposed, the Permit's monitoring schedule remains woefully inadequate for a first-of-its-kind project with serious risks and many unknowns.

A monitoring schedule must be designed to ensure that adequate data is collected so that Curis can detect excursions of mining contaminants outside the PTF well field during operations and can determine with confidence that groundwater has been restored to pre-mining conditions once PTF operations are complete. Although it is clear from the administrative record that significant negotiations occurred between ADEQ and Curis over the monitoring schedule, no justification could be found in the record for the Permit's meager monitoring requirements. It cannot be argued that ADEQ lacked authority to impose stricter monitoring requirements, as ADEQ has ample authority to "specify to the permittee" the type and method of monitoring, the frequency of monitoring, and reporting requirements. Nor can it be argued that additional monitoring is too costly. Curis's own figures indicate that Level 2 Contaminant monitoring costs just $1,630 per event, which seems a worthy investment in the safety and protection of the community's drinking water resources.

ADEQ should require Curis to propose a monitoring schedule for pre-mining, operational, restoration, and post-closure conditions that will ensure enough data is collected to analyze and understand the impacts of Curis's PTF on groundwater conditions. This involves analysis of both spatial and temporal factors. There can be little dispute that the Permit has not required adequate monitoring to assess groundwater impacts spatially, for reasons discussed earlier. But the monitoring schedule needs to be analyzed as well for sampling events relevant to Curis's activities. A fundamental approach to determining sampling frequency is to analyze whether concentrations change slowly or quickly across space and time. If Curis can demonstrate that concentrations

change slowly—which seems unlikely given the purpose of this project—then fewer samples may be appropriate. If concentrations of contaminants and conditions change quickly over space and time, however, more sampling will be necessary. Furthermore, sampling frequencies may change depending upon the project's status. For instance, rapid changes in groundwater conditions are likely immediately after injection stops, so more frequent sampling may be necessary in the months immediately following cessation of mining. Similarly, when injection begins, it is likely that groundwater conditions will change rapidly until the system re-equilibrates. There is no evidence that ADEQ has considered any of these factors in designing the Permit's sampling schedule.

ADEQ Response –
ADEQ believes there is sufficient monitoring in the permit to verify data assumptions, eliminate uncertainties and detect excursions of mining solutions. Quarterly PTF Operational and Monitoring Reports will be submitted in accordance with Section 2.7.4.4. ADEQ considers the data provided in the Quarterly Reports as a proof-of-concept validation (PTF system performance, groundwater gradient information, groundwater sampling and monitoring well sampling data, etc.) throughout the PTF monitoring period, in addition to a PTF Summary Report required at the cessation of rinsing.

ADEQ requires background groundwater concentrations in the PTF well field to be established prior to operations as stated in the Pre-operational requirements in Section 2.2.3. Subsequent sampling of the mine block wells will be required at the cessation of the PTF and well into closure and post-closure period. ADEQ believes the amount of sampling will determine background concentrations in the Oxide Unit and ultimately determine when the aquifer has been restored to background AWQS groundwater conditions.

3.5.2 The Permit fails to require adequate sampling to establish background groundwater conditions.
Logic dictates that in order to understand the impacts of ISL mining on the drinking water aquifer, one must understand conditions in that aquifer before mining began. The Permit does not require adequate baseline monitoring to establish those conditions. Therefore, any conclusions regarding the impacts of ISL mining and Curis's ability to restore the aquifer will be no more than guesses. Guesswork is not a reasonable basis for the issuance of a commercial APP. Unless ADEQ requires additional baseline monitoring before PTF operations begin, in accordance with the following comments, the Permit should be revoked because the PTF will not produce the data Curis needs to develop a commercial permit and is ineligible for a Temporary
APP.

The importance of valid, representative ambient water quality monitoring has recently been recognized by the EPA in the hydraulic fracturing context. After residents of Pavillion, Wyoming complained of poor drinking water quality, EPA began an investigation focused on the nearby hydraulic fracturing operations. The EPA's draft report, linking the observed groundwater impacts with hydraulic fracturing, highlighted

the difficulties posed by the lack of reliable background data. ADEQ should take notice of EPA's experience by revising the Permit to require the detailed, statistically valid ambient groundwater quality monitoring suggested within the body of these comments.

A monitoring schedule should be adequate to ensure that statistical analysis of pre-mining and post-mining conditions is possible. Ideally, such a schedule would include a series of samples collected over a span of time at equally-spaced intervals using identical collection methods. USEPA's Science Advisory Board has stated that "at least as much effort should be devoted to establishing baseline conditions as is put into post-closure monitoring."135 Here, ADEQ has the opportunity to develop background data against which the impacts of this first-of-its-kind mine can be measured. Given that other ISL mines can be anticipated in Arizona,'36 this data is vital not just to this project but to ADEQ's overall understanding of this type of mining statewide. But aside from the available data at existing POC wells and data to be collected at the new POC wells, the Permit's monitoring schedule requires almost no sampling of ambient conditions before mining begins.

At the PTF mine block wells, ambient, pre-mining groundwater conditions must be established "using an ADEQ approved statistical method." In early drafts of the Permit, no statistical method was defined although ADEQ staff apparently understood the need for adequate background sampling at these wells. But just before the Permit was issued, ADEQ added language that defined the "approved statistical method" as the results of one sampling event. Thus, background groundwater conditions in the PTF mine block wells—which are vital to the determination of the impacts of ISL mining on the aquifer—will be determined from a *single sample* taken from each well. A similar approach was taken with regard to the single required monitoring well. At MW-O1, only one pre-mining sample has to be taken.

It appears likely that ADEQ required only a single sample to establish background conditions because it knew that statistically-meaningful sampling of mine block and monitor wells would take months—months that were not available under the two-year timeframe of a Temporary APP. Indeed, notes on a July draft of an ADEQ Request for Information indicated that there was "no way to statistically determine preoperational water quality" and no time "to establish AQLs and ALs through ambient groundwater sampling." Actually, there is a way to establish background conditions, but it requires time to take a series of meaningful samples through a reasonable sampling process. The fact that ADEQ shortcut that process and thereby undermined the value of the PTF as a pilot project, is just one more reason that this project should not be pursued through the Temporary APP process.

A single sample has no statistical meaning and does nothing to establish background conditions, especially in an aquifer that is heavily impacted by seasonal ADEQ raised this same concern, asking Curis to explain why a single sample at the PTF wells "is an adequate number of samples to determine background concentrations prior to injection." ADEQ *Comprehensive Request for Additional Information with Suspension,* at 4 (May 2,

2012). The record contains no response from Curis to that request pumping and recharge.' EPA's Science Advisory Board has recently spoken directly to this point:

A single sample from each well is insufficient to determine whether water-quality parameters are stable and representative of the groundwater at the sample location. Background chemistry should be based on a statistical analysis of groundwater chemistry data from a sufficiently large set of wells sampled over a period of time. The RCRA requirements (40 CFR 264 Subpart F) for the frequency of sampling are appropriate and applicable for this purpose.

The RCRA requirements cited by the Board mandate a "sequence of at least four samples, taken at an interval that assures, to the greatest extent technically feasible, that an independent sample is obtained."

Both USEPA and the Nuclear Regulatory Commission have recommended a minimum of four quarterly sets of samples to establish baseline conditions and ensure that temporary variability in groundwater conditions are captured at uranium ISL mines. More are needed where, as here, there are seasonal variations in groundwater conditions due to irrigation pumping and recharge and higher residential and commercial water use during the summer months. ADEQ should re-evaluate the Permit's requirements for pre-mining sampling and impose more stringent requirements that will produce a realistic and statistically meaningful data set by which mining impacts can be measured. Otherwise, the PTF is unlikely to produce data that can be interpreted with any certainty, rendering it ineligible for a Temporary APP, and the Permit should be revoked.

ADEQ Response –
ADEQ believes there will be adequate data to understand conditions in that aquifer before PTF operations begin. Large sets of groundwater data already exists for each of the water bearing units at the site. Ambient groundwater monitoring will be required for the new POCs at MW54-LBF in the LBFU, M54-O in the Oxide Unit and M52-UBF in the UBFU in accordance with Section 2.5.3.2. POCs currently installed MW14-GL, M15-GU, M22-O and M23-UBF have had Alert Levels and Aquifer Quality Limits previously established, in addition to over 15 years of groundwater sampling data from those wells located in the UBFU, LBFU, and Oxide aquifers. While not reviewed as part of the Temporary APP Application, other groundwater monitoring conducted under APP P-101704 at approximately 31 wells (including 4 of the PTF POCs), has been on-going since 1995 in the UBFU, LBFU and Oxide aquifers. Background groundwater quality in the Oxide Zone at the PTF well field will also be established prior to operations as stated in the Pre-operational requirements in Section 2.2.3 using 24 groundwater samples. While the PTF mine block ambient sampling consists of one sampling event, each of the 24 wells will be sampled to determine baseline concentrations prior to operations. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant.

ADEQ believes there will be adequate amount of sampling information to determine background water quality in each of the water bearing units.

The compliance requirements of the APP Program are focused on the protection of the aquifer water quality standards at the points of compliance.

3.5.3 Almost no relevant operational monitoring is required for this proof-of-concept pilot test.

Curis proposes to purposefully inject pollutants into the aquifer to mobilize copper for extraction in surface facilities. This process will radically change the quality and chemistry of the groundwater, while also directly changing how groundwater moves within the various geologic units constituting the aquifer. It is beyond dispute that these changes will occur rapidly, otherwise the PTF would need to operate much longer than 14 months. Frequent and detailed monitoring is needed during operations to measure these rapid changes and develop data needed for an effective and protective commercial APP. The failure to require such monitoring justified revocation of the Permit or substantial amendments to address the comments below.

Once acid injection begins at the PTF, almost no relevant operational monitoring is required. The quarterly and semi-annual monitoring requirements referenced throughout the Permit apply only at the POC wells. As discussed previously, the POC wells are located so far from the PTF mine block well field that they will never detect contaminants during the 14 months of PTF operations. Therefore, the data collected from the POC wells is largely worthless for determining the impacts of Curis's mining on groundwater.

Aside from the POC wells, the only other routine operational monitoring required is monthly monitoring for pH, sulfate, and TDS at monitoring well MW-O1. Curis is not required to report any groundwater data from the PTF mine block wells and no other monitoring is required anywhere in the permit. Therefore, the only relevant data that Curis is required to report during PTF operations are the monthly results for just three groundwater parameters at a single monitoring well. Such limited data will not allow ADEQ to accurately gauge the impacts of mining on groundwater conditions over time and does not allow meaningful comparisons of pre-mining conditions to operational conditions. By focusing on the monitoring schedule for the irrelevant POC wells, ADEQ has left a gaping hole in the permit monitoring requirements. The quarterly and semi-annual monitoring now required only at the POC wells should be applied equally to MW-O1, the additional monitoring wells that were discussed previously, and at the FTF mine block wells.

Even if the POC well data were relevant, the Permit's monitoring schedule at those wells still would be inadequate. If the PTF is truly intended to develop data necessary to develop a permit for commercial operations, one would think that monitoring requirements would exceed what ADEQ requires for normal operational monitoring. But the Permit's monitoring schedule at the POC wells is not as stringent in some regards as other full APPs, despite the PTF's purported purpose of providing data for a full AFP

application. For example, monthly monitoring is typically required for both nitrates and metals'in a normal APP, but are only required semi-annually here. Furthermore, operational groundwater monitoring schedules at other ISL mines are much more stringent than the Permit's quarterly and semi-annual monitoring requirements. For example, at the Smith Ranch and Nichols Ranch uranium ISL mines in Wyoming, sampling is conducted at two-week The same is true at the Crow Butte, Nebraska ISL mine.

The lack of operational monitoring could be addressed, in significant part, by a requirement that Curis report data from the observation and Westbay wells inside the PTF well field. This requires no additional work on Curis part, as Curis almost certainly will be sampling these wells on a regular basis as ISL injection occurs. Specific recommendations for additional data that should be obtained from observation, Westbay, monitoring, and POC wells are contained in Appendix A including: at reasonable intervals, taking depth-specific water samples and frequent pH probe data; after operations are at steady state, conducting depth-specific temperature profiling; using exclusion zone ports to the multi-port wells to monitor water level, pH and selected ions; collecting data to allow verification of the sulfate plume; and collecting POC water level data sufficient to build area-wide gradient maps.'

ADEQ Response –
The Temporary APP contains operational requirements in addition to quarterly and semi-annual groundwater monitoring at the POCs. Operational monitoring for the APP Facilities is listed in Table 4.1-3 and also consists of the following; discharge characterization for the PLS Tank, Raffinate Tank, Process Water Impoundment and Runoff Pond, sampling of the underground working including groundwater elevations throughout the duration of the project including mine closure, maintaining an inward hydraulic gradient at the PTF well field, measuring rates of injection and recovery rates at the PTF well filed, monitoring injection pressures at the PTF well filed, sampling of MW-01 adjacent to PTF well field monthly, freeboard conditions for the impoundments, liner leakage measurements at the impoundments, groundwater contour elevation maps, fissure inspections, and updated well inventory within the DIA. ADEQ believes there is adequate operational monitoring contained within the permit to the measure the progress of the pilot test and evaluate impacts to the aquifer.

Wastewater Treatment Plants (WWTP) APP permits, not APP mine sites, typically require monthly sampling for the fecal coliform, nitrate-nitrite species, and Total Kjeldahl Nitrogen (TKN) at the POCs. Metals in WWTP APPs are usually analyzed annually, however sometimes semi-annually and occasionally on a quarterly basis. Is it not typical for mine sites to conduct monthly groundwater monitoring, unless during the ambient groundwater monitoring phase. Additionally, other APP mine sites typically analyzed the full suite of parameters on a biennial basis, whereas the Temporary APP for Curis requires the full suite of parameters to be analyzed on a semi-annual basis for the duration of the test. A contingency action for an exceedance of alert level for any of the quarterly parameters (Level 1) in the Temporary APP, requires the analysis of the full

suite of parameters (Level 2), which is not a typical contingency action in other mining APPs.

ADEQ has no comment in regards in sampling schedules accepted by other states such as Wyoming or Nebraska. The requirements of the APP Program are unique to Arizona.

ADEQ has not requested sampling data from wells inside the PTF well field during operations because sulfate and metals within the mine block are expected to be elevated while active in-situ leaching is taking place. A comparison to this would be monitoring the solution within a heap leach pad to determine if the extraction process is working (i.e. to determine copper recovery rates), which is not a typical APP requirement for any mine site. Other than for APP discharge characterization purposes, a sample of solution(s) from a discharging facility within the PMA to determine mineral compositions for compliance purposes, are outside the purview of the APP Program. The permit does require discharge characterization of the PLS, Raffinate and other impounded solutions at the site in accordance with Section 2.5.1. Again, the APP Program does not evaluate feasibility of mining; but rather gives the permittee authorization to operate a discharging facility. The use of engineering best available demonstrated control technologies (BADCT), along with the protection of aquifer water quality standards at the points of compliance are the legal foundation of the APP Program. In-situ mining is allowed under that Program, as long as the Program requirements are satisfied.

The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant.

Verification data of the sulfate concentrations will be available once all the PTF well blocks are sampled after rinsing. PTF wells will be sampled at the cessation of the rinsing period as part of closure as described in Section 2.9.2. and into post-closure as described in Section 2.9.1.

The Applicant will be taking multilevel, multiport and pH readings and analyzing other chemical constituents at the Westbay wells. Water levels at the POCs will be collected to generate area-wide gradient maps as specified in Section 2.7.4.4.

3.5.4 Requirements for restoration-phase monitoring should include more stringent sampling requirements and a clearer process to confirm aquifer restoration and **discontinue hydraulic control. By definition, the PTF will pollute the aquifer beneath Curis's property.**

Regardless of how much copper Curis can pull from the ground, commercial operations cannot proceed unless Curis demonstrates that it can clean up its groundwater pollution once mining ends. The Permit does not require monitoring sufficient to make that demonstration. If the Permit is not significantly amended to address the concerns noted below, it should be revoked entirely.

No relevant groundwater monitoring is required outside of the PTF mine block during the rinsing and restoration phase of the PTF, aside from monthly monitoring at MW-01 for pH, sulfate, and TDS. Groundwater monitoring should be required at additional monitoring wells surrounding the mine block during groundwater rinsing. The monitoring should include analysis for a wider array of contaminants to ensure a better understanding of how the aquifer reacts to Curis's restoration efforts. Such monitoring also should be conducted more frequently than during PTF operations, because the groundwater system can be expected to change rapidly from conditions prevalent during operations as acid mining solutions are flushed from the aquifer. Measuring these rapid changes with weekly or bi-weekly monitoring would provide vital data regarding contaminant trends and for validating and verifying Curis's groundwater and geochemical models.

Within the PTF mine block, the Permit uses sulfate as an indicator parameter to determine whether groundwater conditions have been restored to permit standards, with verification sampling for the full suite of contaminants listed in Table 4.1-7. Although the permit requirements are not entirely clear, our understanding of the sampling requirements at the mine block wells are as follows: Curis must monitor the mine block well field headers—not the individual mine block wells—for sulfate. No particular monitoring schedule is required. When sulfate in the samples at the headers falls below 750 parts per million, Curis must sample for the full suite of contaminants in Table 4.1-7. Curis must continue groundwater rinsing until concentrations of those contaminants in Table 4.1-7 that have an AWQS are below permit standards in the well field header samples. At that point, Curis must sample each mine block well individually for sulfate and pH. If sulfate is above 750 parts per million or pH is below 5.0 at a well, then rinsing must continue at that well. Otherwise, rinsing at that well can stop. Once all individual wells are below 750 parts per million sulfate and above 5.0 pH, Curis may temporarily discontinue hydraulic control for 30 days. After 30 days, Curis must sample at the well field headers— not the individual wells—to see if sulfate remains below 750 parts per million and pH remains above 5.0. If that is the case, Curis may permanently cease rinsing activities and hydraulic control. Thirty days after rinsing and hydraulic control stop, Curis must sample the individual mine block wells for the full suite of contaminants in Table 4.1-7 to measure for rebound. The wells must be sampled again six and twelve months after rinsing and hydraulic control stop. Although not clear, it appears that if no rebound is detected one year after rinsing stops, the wells may be abandoned. There is no information in the record justifying or explaining the 30-day period between cessation of rinsing and hydraulic control and sampling for rebound. Nor is there an explanation of why six and twelve month sampling events were chosen as appropriate for measuring rebound. ADEQ requested that Curis "include a justification for the timeframe between the post groundwater sample and cessation of groundwater rinsing. To this, Curis responded "One month is considered sufficient to detect changes in constituent concentrations at each of the wells. Such a conclusory statement, citing no support whatsoever, does nothing to answer ADEQ's question. Nor does the record contain any subsequent analysis of this issue. Although ADEQ ultimately required three sampling events over the course of a year, there apparently has been no analysis of whether those events are sufficient to detect rebound at this site. ADEQ's requirements for rebound

sampling cannot be based upon a reasoned evaluation of the facts because Curis has provided no facts to support the plan.

There are several other issues with this process that should concern ADEQ. First, Curis is only monitoring for sulfate initially as an indicator parameter, in reliance on its geochemical model. That model is suspect for reasons discussed elsewhere. Curis has not yet demonstrated that sulfate is an adequate indicator parameter.

Second, confirmation sampling through analysis of the contaminants listed in Table 4.1-7 may help verify groundwater conditions, but such sampling should be conducted at individual PTF mine block wells, not just at the well field headers. Sampling for these contaminants only at the headers will not identify potential issues at individual wells. Furthermore, ADEQ should want to see data on all contaminants from each of the mine block wells to better assess Curis's restoration efforts.

Third, the decision to discontinue hydraulic control should be based upon analysis of sampling for all contaminants listed in Table 4.1-7, not just analysis of sulfate and pH. Hydraulic control is the only protection afforded downstream users. Discontinuing that protection should not be based on analysis of just two groundwater parameters. At a minimum, Curis also should be required to demonstrate compliance with AQLs in all mine block wells before hydraulic control stops.

Fourth, the decision to permanently discontinue hydraulic control should not be based upon a single sample at the well field headers that is only analyzed for pH and sulfate. As discussed previously, a single sample is statistically meaningless and does not demonstrate that the aquifer has been restored. Confirmation sampling to demonstrate that restoration is complete and hydraulic control can be safely stopped should involve statistically meaningful sampling conducted over an appropriate period of time.

Finally, the rebound sampling requirements are inadequate. Rebound sampling should be conducted quarterly, at a minimum. It is nonsensical to require quarterly and semi-annual monitoring at POC wells that are far-removed from the impacts of these wells, but not require similar sampling at the wells themselves (at a minimum). Furthermore, the Permit does not state what is required if rebound sampling detects a problem. Nor does the Permit clearly allow for extended rebound sampling beyond the first year if upward trends are detected in contaminants.

This issue is highlighted in Attachment 6 of Appendix A, in which Dr. Wilson discusses issues with Curis's geochemical modeling. He specifically notes that the modeling that resulted in process solution predictions fails to account for rebound effects demonstrated by the BHP pilot testing. That test demonstrated that rebound impacts can be seen more than a decade after rinsing. If ADEQ intends for this act as a proof-of-concept pilot, then the agency must require more robust monitoring to determine if rebound is occurring. Furthermore, ADEQ should require Curis to incorporate that real-world data into any models upon which they intend to rely for future operations.

ADEQ Response –
The subject of the temporary APP is the Production Test Facility, and does not include commercial operations. ADEQ concurs that commercial operations should not occur until the evaluation of the aquifer restoration for the PTF is complete.

The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant.

ADEQ considered a 30-day time frame between cessation of rinsing and hydraulic control and sampling for rebound, an acceptable time frame to make an initial evaluation of the rinsing process in a relatively short time. ADEQ considered the time frame of 6 months to assess rebound concentrations at the mine block wells a sufficient timeframe to allow for groundwater flow through to occur, and an adequate time frame for equilibrium to occur in groundwater surrounding the mine block. However, any mine block confirmation sampling, frequency or parameters, outside the scope of the Temporary APP will be amended in APP P-101704. Confirmation groundwater sampling is generally a site specific task and takes many factors into consideration. The location, frequency and parameters of confirmation mine block sampling will be re-evaluated during the submittal of the proposed Closure Plan required by Section 2.9.1. The confirmation sampling amended into P-101704 will be based on site specific considerations. The Closure Plan will include contingencies to complete additional rinsing or more frequent mine block sampling based on the concentration of the latest mine block confirmation sampling round (such as an open-ended sampling frequency). ADEQ understands rebound groundwater sampling at the PTF will extend beyond one year after the cessation of groundwater rinsing. The permit does not indicate that if no rebound is detected one year after rinsing stops, the wells may be abandoned; rather it includes a statement that indicates that ADEQ written approval shall be obtained prior to abandoning PTF wells.

Initial sampling for closure at the PTF wells will include samples collected from well headers for sulfate and constituents in listed in Table 4.1-7. The sampling results from the well headers have to meet 750 mg/L sulfate and predetermined AWQS. Then the permittee will have to sample all of the wells for pH and sulfate to determine if the concentrations meet the 750 mg/L sulfate and a pH above 5.0 SU. When all individual wells meet the sulfate and pH concentration standards the permittee can discontinue hydraulic control for 30 days. The permitting requirements to cease hydraulic control are initial triggers to end the rinsing phase. Each well is to be sampled individually during the mine block confirmation sampling phase. Confirmation samples at each individual well, 30 days after hydraulic control has ceased, will provide specific concentrations for each of the parameters in Table 4.1.-7 (Level 2 parameters). Sampling at each individual well for all the constituents in Table 4.1-7, one month after the rinsing period will adequately assess Curis's initial restoration efforts. While not explicitly stated in the Temporary APP permit, additional groundwater rinsing would be required if the closure permit conditions are not met, along with additional sampling of

the individual mine block wells to measure rebound effects. Any permit conditions that fall outside the scope of the Temporary APP, such as additional rinsing or mine block confirmation sampling, will be amended into APP P-101704.

ADEQ has included an evaluation that hydraulic control shall also be demonstrated through the submittal of potentiometric groundwater contour maps that depict the monthly minimal, monthly average, and monthly maximum inward hydraulic gradient toward the injection and recovery wells (i.e. cone of depression), using groundwater elevations collected at the PTF well field. ADEQ will include that evaluation as part of the requirement to be submitted within the Quarterly Reports.

When sulfuric acid is applied to a copper oxide ore the result is a copper sulfate solution (also known as pregnant leachate solution or PLS). Sulfate is soluble, which means it readily dissolved in water and tends to be a more mobile constituent in groundwater than other constituents such as metals. In general, because sulfuric acid is being injected into the ground and because sulfate is generally more mobile in groundwater that metals, sulfate may indicate a potential release from the PTF and will serve as an early warning indicating a potential violation of either an aquifer water quality standard at the applicable point of compliance or other permit condition may occur. It is common to use sulfate as an indicator parameter in other APP copper mining permits. Therefore, ADEQ has determined that sulfate is an appropriate indicator parameter for the Curis site.

The BHP pilot test did not necessarily show significant rebound effects, rather the pH remain relatively low after the rinsing phase was completed. According to information provided to ADEQ, BHP used solutions contained within the on-site impoundment as rinse water for a limited period of time, and did not use neutralization agents during the rinsing process.

Real-world data will be updated into the groundwater model at the cessation of the pilot test, and at the end of 5 year post-closure monitoring period as stated in Section 2.9.1. Normal protocol for post-operational modeling includes validation and auditing of the groundwater model. Additional groundwater modeling may be required as part of the extended post-closure monitoring period (beyond the initial 5 year post-closure monitoring period).

3.6 ADEQ Should Strengthen the Permit's Reporting Requirements and **Require Curis to Make PTF Reports Available to the Public** and **Interested Persons.**

The Permit should be amended to require public reporting that will make this a more transparent project arid to strengthen the reporting to further the PTF's purported purpose as a pilot project. Curis will have to notify ADEQ and USEPA of exceedances of AWQSs, AQLs and ALs. But such exceedances also should trigger notice to the public, including adjacent landowners, the Town of Florence, and Johnson Utilities. ADEQ has recognized this need specifically with respect to arsenic data, and should do the same with all the other required reports. As ADEQ is well aware, there is a great deal of community interest and concern over Curis's proposed mine. Mandating that Curis make

its reports available to the public is one way of recognizing that concern and alleviating the current widespread mistrust of this process.

Consistent with the recommendations to strengthen the PTF well field monitoring requirements, the Permit should also be revised to require the data be reported in the PTF Operations and Monitoring Quarterly Reports. This reporting should include all the components discussed in these comments, including Dr. Wilson's recommendations in Appendix A. Curis should not be allowed to hide data from the PTF mine block wells under the guise of proprietary information. Instead, if ADEQ intends this project to function as a true proof-of-concept pilot to generate data for evaluating commercial operations, then all data from all PTF wells should be reported to ADEQ. Furthermore, the various graphical representations currently required in the Permit and the inward hydraulic gradient demonstration should be revised to include the 3-point comparison recommended in Appendix A. Finally, as elaborated upon in Section 3.1.2 of these comments, the Permit should be revised to require detailed Post- Audit Groundwater Modeling Reports.

ADEQ Response –
Documentation submitted to ADEQ can be reviewed by contacting ADEQ Records Center at (602) 771-4380. Groundwater Monitoring Section 2.6.2.4. Exceeding an Alert Level for a Narrative AWQS and Section 2.6.4 Aquifer Quality Limit Violation does require the notification of downgradient groundwater users of the aquifer who may be directly affected by the discharge. ADEQ believes the contingency requirements set forth in Section 2.6.2.4.3 and 2.6.4 adequately addresses the concern for notification to downgradient groundwater user(s) for a verified AL exceedance for arsenic or a verified AQL violation. Additionally, as part of the Permit Compliance Schedule, Section 3.0, the permittee is required to submit an updated Contingency Plan. The updated Contingency Plan shall contain the specifics of the downgradient groundwater notification process.

In addition to the Quarterly reports required in Section 2.7.4.4., the applicant must submit a PTF Summary Report as described in Section 2.9.1. which shall summarize the data used to evaluate the results of the PTF. ADEQ does not believe the permittee is required to report concentrations at the injection well site for reasons specified in the previous ADEQ Response to SWVP Comment 3.5.3. The permittee is required to perform post-operational modeling in order to update the model. Normal protocol for post-operational modeling includes validation and auditing of the groundwater model. These tasks will be required by ADEQ through the provisions of Section 2.9.1 at the cessation of the PTF and at the end of the initial 5 year post-closure monitoring period.

3.7 The Permit Fails to Require Reasonable Contingency Actions if Contaminants or Permit Violations Are Detected.

The Permit must "specify a contingency plan that defines the actions to be taken" if a discharge from the PTF results in violations of Permit standards, violations of groundwater quality standards, or an imminent and substantial endangerment to public health or the environment.' The Permit should be significantly amended because required contingency actions are inadequate, vague, and not designed to address issues that may

arise during the short operating life of this unique and first-of- its-kind project. Furthermore, reporting requirements are insufficient to timely notify downgradient water users of potential impacts to the drinking water supply.

In general, many of the contingency deadlines imposed on Curis after a violation is detected do not appear to be tailored to the short lifespan of this permit. For example, if Curis violates an AQL at a POC well and the violation continues for 90 days, then Curis must submit an investigation work plan to ADEQ. But the work plan is not due until 30 days after receiving the results of the sixth monthly sampling conducted under contingency monitoring. Under this schedule, Curis could have up to eight months or more before it submits the work plan, much less takes action to address the issue. This means that pollutants violating an AQL could continue to flow past the POC wells and on toward downgradient users for eight months or more before Curis takes action. Such a delay is unreasonable and unjustifiable with respect to a 14-month project. Quicker action, up to and including immediate cessation of injection, should be required.

Another example of contingency actions that are not properly designed in light of the Permit's short life is for exceedances of AL No. 1 for normal liner leakages. For continuing exceedances of AL No. 1 that remain below the trigger levels for an AL No. 2 exceedance, Curis can wait to submit its leakage assessment until one of the two annual reports that will be submitted during PTF operations. This is the case even though Curis will be securing data on a daily basis pursuant to the Permit's daily monitoring requirement for the impoundment's leak collection and removal system. No reason exists to delay reporting for a year when the data can be included in quarterly reports that are already required, thereby allowing for earlier notice to ADEQ in case further action is necessary.

ADEQ Response –
In accordance with Compliance Schedule, Section 3.0, the permittee is required to submit an updated contingency and emergency response plan that complies with the requirements of Arizona Administrative Code R18-9-A204. The permit also includes a number of these provisions for contingency actions in events such as violations of permit standards, violations of groundwater quality standards, or an imminent and substantial endangerment to public health or the environment in Section 2.6. ADEQ believes the contingency actions set forth in the permit are specific to the project and are adequate and in fact, are similar to other mining permits, if not more stringent.

ADEQ believes time notification is adequate. For example in Section 2.6.2.4.3, the permittee shall notify all downgradient users of the aquifer who may be directly affected by the discharge within 24 hours of receiving the results of verification confirmation sampling. Under Section 2.6.4, after verifying the sampling results, if an AQL violation continues for sixty (60) days, then the permittee shall notify downgradient or downstream users who may be directly affected by the violation and has 90 days to prepare and submit a hydrologic workplan. The sixty days takes into account time for verification sampling, the time to receive sampling results from the lab, conduct initial investigations, and other contingency actions prior to notification. The updated Contingency Plan shall

contain the specifics of the downgradient groundwater notification process in the event of a UPL arsenic exceedance or an exceedance of an AQL. That documentation, submitted to ADEQ as part of the Compliance Schedule can be reviewed by contacting ADEQ Records Center at (602) 771-4380.

ADEQ did identify a typographical error in Section 2.6.4.6 ADEQ will change the first sentence to read "If the violation continues for ninety (90) days, then the permittee shall prepare and submit for ADEQ approval a hydrogeologic investigation work plan within thirty (30) days after receiving the laboratory results of the third (not sixth) sampling event."

Other contingencies require revision in light of the specifics of the PTF, the aquifer, and the surrounding groundwater uses. AL No. 2 signifies a leak of more than 16,250 gallons per day from an impoundment pond into the leak collection system. Although this does not mean that impounded mining fluids are leaking into the environment, it does represent a significant cause for concern. Furthermore, a leak of this magnitude can continue for up to 90 days before Curis has to submit a corrective action plan for ADEQ approval. This could result in over 1.4 million gallons of impoundment fluids—more than ten percent of the process water impoundment's total capacity—leaking into the leak collection system during this period. It is not clear that the leak collection system could handle such volume, or what Curis would do with overflow. Under these circumstances, it would seem prudent to add a requirement for Curis to conduct a hydrogeologic study to assess the extent of any soil, surface water or aquifer impacts as authorized by A.A.C. § R18-9-A204(B)(7). This way any corrective action plan would be supported by reliable data on the extent of any impacts to the environment.

ADEQ Response –
The Large Leakage Rate (LLR) or AL No. 2 is 16,250 gallons per day (41 gallons per minute). The Process Solution Impoundment (Water Impoundment) leak collection and recovery system (LCRS) geonet has a transmissivity of $1x10^{-3}$ m^2/s which results in a capacity of 14,000 gallons per minute (gpm). The geonet capacity provides a factor of safety of greater than 100 based on the estimated LLR. The Water Impoundment is designed with a sump for collection of liquid at the low-point of the impoundment and is equipped with a submersible pump to remove the incoming liquid. The flow capacity of the pump system, based on the LLR, is 85-gallons per minute. The pump capacity provides a factor of safety of two based on the estimated LLR. The water impoundment is also designed with strip drains at the corners of the impoundment to assist in transferring any liquids collected in the LCRS sump. This information is found in Volume 1 (March 1, 2012), Attachment 9, Section 3.0 of the APP Application. The Contingency Plan states that exceedance of the Water Impoundment LLR will require Curis to repair the leak within 90-days of discovery and within 30-days submit a written report to ADEQ that initiates the action necessary to mitigate the impacts of the exceedance. This information is found in the document titled Response to ADEQ Notice of Inadequate Response to Substantive Deficiencies dated September 10, 2012, Attachment 13, Contingency Plan, Section 2.6.2.5.

Other contingency provisions also should be revised. In the case of AL exceedances for pollutants with numeric AWQS, the Permit's explicit allowance for a proposal to modify ALs or reduce monitoring should be reconsidered. As we have shared with ADEQ before, uranium mines across the country have time and time again merely proposed that limits be revised to ones they can meet, in lieu of properly investigating and addressing problematic sampling results. This pattern is repeated whenever the mines cannot meet the established and revised standards. This issue can be avoided by mandating proper ambient water quality monitoring at the outset. The suggestion in the Permit itself that Curis should be able to simply raise the standards upon an exceedance or violation should be avoided and removed from the Permit.

We applaud ADEQ for requiring Curis to notify downgradient groundwater users upon exceedance of ALs for pollutants using narrative AWQS. But we request that the agency remove the uncertainty built into this requirement. The Permit currently requires Curis to "notify downgradient users of the aquifer who may be directly affected by the discharge" if verification sampling demonstrates an exceedance of the Alert Level for arsenic at a POC well. ADEQ does not specify how Curis should provide this notice, nor does it define how Curis is to determine which downgradient users "may be directly affected" by the arsenic violation. Apparently, ADEQ intended to leave this notice requirement up to Curis's discretion. That is not acceptable because the definition of who may be affected is subject to widely-varying interpretations. If the arsenic AL is exceeded, the public should be notified. ADEQ should define a notice process that includes, at a minimum, written notice to the Town of Florence, downgradient water providers within five miles of the State Land parcel border, and adjacent landowners; and published notice in a local newspaper.

ADEQ has not required notice of other AL exceedances at POC wells. There is no reason to distinguish the AL for arsenic from other ALs. ADEQ should, therefore, require public notice of any AL exceedances during PTF operations, cleanup, and closure.

ADEQ Response –
In accordance with AAC R18-9-101(2), alert level means "a value or criterion established in an individual permit that serves as an early warning indicating a potential violation of a permit condition, including a concentration of a pollutant or a physical or chemical property of a pollutant." Exceeding an alert level may require adjustment of permit conditions or appropriate actions as required by a contingency plan.

The language quoted in the comment is typical permit language used in all recently issued APPs. ADEQ does not concur that the language should be changed for an AL exceedance in the Temporary APP. ADEQ does not and will not arbitrarily raise the standards upon an AL exceedance. As with any other permittee, an alert level exceedance is not a violation of permit, but rather a mechanism for early warning of unexpected conditions developing that require either the attention of contingency action or an adjustment to the permit so that a facility can still function to meet the objectives of the APP. It cannot be automatically assumed that an alert level exceedance is a result of a discharge from a facility. There are cases where an alert level exceedance at a site is

unrelated to discharge activities at the site, such as impacted groundwater flowing onto the site from upgradient sources, or a monitoring device malfunction. In these instances, the permittee has opportunity to initiate an investigation of the cause of the AL exceedance, including inspection of all discharging facilities and all related pollution control devices, review of any operational and maintenance practices that might have resulted in an unexpected discharge, and hydrologic review of groundwater conditions including upgradient water quality from existing wells.

Although ADEQ has required public notice of AQL exceedances, the notification process is again inadequate. The notice requirement uses the same vague language as was used for AL exceedances, and is insufficient for the reasons discussed previously. Furthermore, Curis is not required to provide notice unless the AQL violation continues for 60 days. There is no justification for withholding notice to the public that Curis has violated a state and federal water quality standard at a POC well. As with arsenic, notice should be provided within 24 hours of verification that a violation exists. The delay in notice under the existing permit language is even more outrageous in light of the fact that Curis is not even required to take action to correct an AQL violation until after it has submitted a "hydrogeologic investigation work plan." That work plan is not required until after *90 days* of a continuing violation. As a result, the contaminant at issue will be moving past the POC well for months before Curis takes action to stop it. Not only should Curis be required to take action quicker, but Curis should not be allowed to delay public notice for 60 days after a known AQL violation at a POC well.

ADEQ Response –
See ADEQ Response to Comment 3.7.

The contingencies set forth for violations of the injection and recovery rates and hydraulic control parameters set forth in Table 4.1-8 also appear to be incomplete. Compliance with these parameters is vital, because failure to meet them can mean that Curis has lost control of its mining solutions. Table 4.1-8 contains ALs for five parameters: injection rate, recovery rate, recovered volume to injected volume, inward hydraulic gradient and maximum injection pressure. No contingency actions could be found in the Permit for AL violations of the first two parameters.178 With respect to the contingencies required for exceedances of any of these five parameters, a true proof-of concept pilot test's contingencies would include increased groundwater monitoring after an AL exceedance to ensure that the loss of hydraulic control did not result in contaminant escape and to provide data that could be used in evaluating the larger- scale commercial mine proposal. The contingency provision should also be revised to include a statement that ADEQ may require additional monitoring, reporting, investigation, and other corrective action in response to the exceedance.

ADEQ Response –
The Contingency Plan will be amended to include Table 4.1-8 (In-Situ BADCT Monitoring). The requirement for additional monitoring, testing, assessment, investigation, inspection, reporting, other operational control, and frequency of monitoring has already been covered in Section 2.6.2.5 and 2.6.2.6.

It is unclear exactly when the Permit requires action under Section 2.6.2.5 (Exceeding of BADCT Alert Levels for Injection/Recovery Well Operation) as opposed to Section 2.6.3.4 (Unexpected Loss of Fluid in the Injection/Recovery Wells at the PTF). Both scenarios appear to envision a loss of hydraulic control at the PTF well field but with very different contingency actions required. ADEQ should clarify the scope of both provisions, or if intended to cover the same scenarios, combine the two provisions into one and require swift and thorough actions to address the loss of control. Furthermore, more stringent contingency actions should be required in response to any of these violations, as they represent a loss of control of toxic mining fluids. Injection should cease immediately and recovery pumping should continue until the problem is rectified. Prompt notification — within 24 hours of discovery — should be made to ADEQ with inspections ensuring proper operations and a root-cause evaluation beginning simultaneously. Curis's investigation—including inspections; reviews of recent process logs and other documentation currently specified in 2.6.2.5(4); pressure testing; and repair or other corrective action—should all be conducted within one day of discovery as suggested by ADEQ staff. Injection should not resume until ADEQ has issued approval to do so.

ADEQ Response –
The Contingency Plan does adequately cover the loss of hydraulic control using the "within 24-hour period" requirement. The Plan requires Curis Resources, within 24-hours, to a) cease injection in all injection and recovery zone (IRZ) wells; b) operate recovery wells until excess solutions have been removed from the IRZ and all observation pairs indicate that hydraulic control has been re-established; c) initiate pressure testing of wells if the loss of hydraulic control cannot be determined to be the caused by a failure of facility components; d) verify proper operation of all facilities and monitoring devices within the In-Situ Copper Recovery (ISCR) circuit; and e) perform necessary repairs. ADEQ believes that the next quarterly report is adequate for reporting the date of loss of hydraulic control, causes, impacts, corrective action, and effectiveness of those corrective action(s). This information is found in the document titled Response to ADEQ Notice of Inadequate Response to Substantive Deficiencies dated September 10, 2012, Attachment 13, Contingency Plan, Section 2.6.3.2.

The AQL violation contingency should also be revised. In the event of an AQL violation, Curis is not required to comply with ADEQ's own regulation for 5-day notification. Instead, as currently drafted, the Permit allows Curis to wait to report the violation until five days *after* confirming or learning of the violation. In other words, Curis can receive the initial violation results, wait 5 days to conduct verification sampling, wait for the analytical results and then wait 5 more days before reporting the violation to ADEQ. This is contrary to ADEQ's rule which requires notification "within five days after becoming aware of a violation of a permit condition Furthermore, because exceedances of AQLs and ALs can be an indication that Curis has lost control of the mining fluids, the current sampling and verification procedures would allow contaminants to flow past POC wells for days or weeks. Verification sampling must be done more quickly to prevent such an occurrence.

ADEQ Response –
The comment refers to typical permit language, where permittees are allowed to first verify an exceedance of an AQL. ADEQ does not concur that the language should be changed in the Temporary APP.

If this is a true proof-of-concept pilot project, ADEQ also should tie observation well data to contingency plan requirements so that ADEQ can require additional sampling, verification, investigation, reporting, and other actions as needed in the event that pollutants are detected in the observation wells at levels requiring further investigation. Currently, Curis is not required to report data from the observation wells, much less take action in response to problems in those wells. Similar contingency actions should be tied to sampling results from monitoring well MW-01 and any other monitoring wells that may be required. ADEQ should retain ample authority to address exceedances, excursions, and other issues as data is produced from the PTF.

ADEQ Response –
ADEQ will review the chemical concentrations at MW-01 provided in Quarterly Reports as required by Section 2.7.4.4. MW-01 is not a compliance point. The sampling results from MW-01 will be used for the following: (a) calibrate the geochemical modeling for commercial operations, (b) estimate aquifer loading (c) demonstrate hydraulic control beyond the observation wells, and (d) confirm the DIA for the PTF operations.

The observation wells at the PTF are mainly to monitor hydraulic control to ensure that ISCR solutions are contained within the IRZ. It is not inconceivable to detect groundwater chemistry changes at the observation wells, as the recovery rates could be increased to extract additional solutions from the localized area using the recovery wells. ADEQ allowed this operational flexibility within the PMA. ADEQ believes MW-01 will adequately access groundwater quality changes adjacent to PTF within the time frames of the pilot test.

Overall, the Permit contains excessive boilerplate commonly found in permits for surface facilities. Such language is not necessarily appropriate for a facility that is injecting pollutants directly into an aquifer. ADEQ should carefully reconsider all of its contingencies provision to ensure that they make sense in the context of this unique, first-of-its kind facility. For instance, the Permit lists requirements for repair of the impoundment pond, but does not appear to address how those repairs will be made on a timely basis. There is nowhere for Curis to move impoundment pond fluids so as to expose a leak or tear for repairs. It is conceivable that repairs could be done underwater, but it is not apparent that ADEQ has evaluated that possibility or otherwise thought through how such repairs would be conducted.

ADEQ Response –
ADEQ considers the contingency actions required under the permit adequate for this type of permitted facility. This permit contains similar language and contingency requirements as compared to other APP projects that contain injection wells, such as

Morton Salt, Enterprise Adamana Petroleum Facility and APS Cholla Power Plant (Carbon Sequestration Pilot Test).

Finally, Section 2.6 generally references an approved contingency plan as listed in Section 5.0. No approved contingency plan is listed in Section 5.0. Curis submitted a proposed contingency plan in its Permit application, but that plan was to be revised based on the requirements in this Permit.' It is impossible to determine from the record if that proposal has been approved by ADEQ. If that proposed plan is what ADEQ intended to reference, the plan should be finalized in its approved form and included in the record for this action.

ADEQ Response –
ADEQ will update Section 5.0 of the APP permit to reference the revised and approved Contingency Plan of September 2012. The Plan was submitted to ADEQ on September 24, 2012 as Attachment 13 of the document titled Response to ADEQ Notice of Inadequate Response to Substantive Deficiencies dated September 10, 2012, and prepared by Hunter Dickinson Inc. (HDI)-Curis.

4.0 The Permit Does Not Contain Adequate Requirements to Confirm Hydraulic Control or to Develop Needed Hydraulic Control Data for Commercial Operations.

The Permit fails to require the types of information and data that will be needed to provide meaningful insight into how a commercial scale containment system may operate. If ADEQ truly intends Curis's PTF to act as a proof-of-concept pilot project, then the Permit should modified to produce more data specific to hydraulic control. Necessary permit modifications are described in Appendix A and include: background water level measurement and mapping; pre-project dye tests, if heterogeneity, anisotropy or discontinuity is observed as it was in the BHP pilot; containment demonstrations using three data points — the two nearest observation wells for each recovery well — rather than only a well pair; installation of additional observation wells in suggested strategic locations; collection of ambient background water quality data over time, rather than a single sample; geophysical logging of all new wells, including caliper, gamma-ray, temperature, directional, resistivity, neutron, density, and sonic; depth-specific water sampling and frequent pH probe data from observation wells; depth-specific temperature profiling; evaluation of pH data for values suggestive of acid solutions in the aquifer; adding an exclusion zone port to the multi-port wells to monitor water level, pH and selected ions; additional monitoring at predicted locations of sulfate impacts from PTF; collection of regional water level data using POC wells; and assembly of a complete water level data base from PTF operations, including the multi-port Westbay, injection, recovery, observation, monitoring, and any other required wells.

ADEQ Response –
In response to Dr. Wilson's suggestions, ADEQ has the following comments:

- *Background water level measurements and contour mapping will be conducted prior to, during and for years following the pilot test.*

- *While dye tests are not proposed to be completed, a number of aquifer tests will be completed to prior to the PTF, in order to assess aquifer conditions and to verify assumptions made as part of the hydrologic study.*
- *ADEQ has included an evaluation that hydraulic control shall also be demonstrated through the submittal of potentiometric groundwater contour maps that depict the monthly minimal, monthly average and monthly maximum inward hydraulic gradient toward the injection and recovery wells (i.e. cone of depression), using groundwater elevations collected at the PTF well field. ADEQ will include that evaluation as part of the requirement to be submitted within the PTF Operations and Monitoring Quarterly Reports referenced in Section 2.7.4.4.*
- *ADEQ believes that 24 samples from the Oxide Unit will provide adequate information to determine background water quality at the mine block wells. Mine block wells will be required to be rinsed to AWQS or predetermined AQL.*
- *Geophysical logging of all new wells, potentially including caliper, gamma-ray, temperature, directional, resistivity, neutron, density, and sonic will be conducted.*
- *Acid consumption values will be assessed at the end of the pilot test, in order to calculate a mass balance consumption and recovery of acid.*
- *The multi-port Westbay wells will not be screened into the LBFU. The Westbay wells are located to monitor the flow of ISCR solutions between the injection and central recovery wells.*
- *Curis is required to submit copies of reports submitted to the EPA as required by the UIC Program as part of the PTF Operations and Monitoring Quarterly reports referenced in Section 2.7.4.4.*
- *Collection of site specific water level data using POC wells, monitoring wells and other on-site wells will be required.*

4.1 The PTF Well Field Design Has Not Been Shown to Prevent Acid Mining Solutions from Polluting the Drinking Water Supply During Commercial Operations.

Arizona law requires that the well field "be so designed, constructed and operated as to ensure the greatest degree of discharge reduction achievable through application of the best available demonstrated control technology, processes, operating methods or other alternatives, including, where practicable, a technology permitting no discharge of pollutants." Appropriate BADCT measures are determined through consideration of, among other things, "site specific hydrologic and geologic characteristics and other environmental factors.

ADEQ Response –
To clarify, ADEQ "director shall take into account any treatment process contributing to the discharge, site specific hydrologic and geologic characteristics and other environmental factors ..." (A.R.S. 49-243.B.1). BADCT Manual (Section 3.4) guidance for In-Situ Leaching was applied in the review and approval of the PTF well field operations.

Primarily, Curis is relying upon hydraulic control of the mining solutions to meet BADCT requirements. But the Permit lacks the monitoring necessary to determine if hydraulic control is being maintained or to provide the data necessary to determine if hydraulic control can be maintained on a commercial scale. The Permit also requires a hydraulic control system that is nothing like the system Curis proposes for commercial-scale operations, yet ADEQ has not required Curis to explain how the data from this pilot project can be extrapolated to commercial-scale operations to show hydraulic control. Much more is needed to demonstrate that Curis's proposals for hydraulic control will work.

ADEQ Response –
The Temporary APP requires Curis Resources to maintain hydraulic control by pumping more solution than is injected. Hydraulic control will be monitored by measuring the water levels in the outermost recovery wells with that of water levels in the closest observation wells. Water levels in the paired observation-recovery wells will be measured and recorded (data collection). The Temporary APP covers the appropriate monitoring to maintain hydraulic control for the PTF well field and is outlined in Table 4.1-8, Section 2.2.4, and Permit Section 2.6.2.6. The revised Contingency Plan provides the actions necessary whenever flow rates or water levels indicate a failure to maintain hydraulic control. To date ADEQ has not approved an APP Application for an Individual Permit (commercial-scale) and the PTF has not yet started operation (data collection, etc.). Consequently, ADEQ would not have the information necessary to determine what Curis's proposal for the hydraulic control "system" will be used for a commercial operation.

4.1.1 Curis proposes to inject acid mining solutions into a highly fractured ore body.

ADEQ's BADCT guidance states that "hydrogeology and structural geology (e.g., subsidence zones, slope failure, faults, etc.) within the ore body and surrounding area are usually of key importance to solution control at in-situ mining facilities." As a result, Curis is required to evaluate geologic hazards up to one-half mile or more outside the facility's perimeter and then account for the findings within their BADCT design.

What purportedly makes Curis's proposed mine feasible (i.e., injection into and recovery from a "highly fractured" ore body) is also what makes this project risky. The following statement by Mr. Dan Johnson, P.E., Curis Manager of Environment and Technical Services at the Florence project illustrates this point.

The high frequency of prolific fracture patterns and densities observed during the most recent drilling program further confirm that the Florence copper oxide deposit represents the ideal conditions for in-situ recovery of copper. The porous nature of the deposit creates significant hydraulic communication both laterally and vertically across geologic structures and rock types throughout the oxide deposit.

Although the highly fractured nature of the ore body makes it conducive to in- situ leaching, it also makes movement of injected acidic solution and groundwater

unpredictable and difficult to control. Fractures can short-circuit anticipated solution migration pathways, allowing injected acidic solution to travel to unanticipated and unintended areas underground, potentially including drinking water aquifers. 191 If Curis loses control over the injected acidic solution, the "porous nature of the deposit" may allow the solution to migrate laterally with the potential to impact the adjacent drinking water aquifer.

Curis only intends to use the Observation wells located outside of the injection and recovery wells for measuring groundwater elevations. This data would be compared with elevation data from the recovery wells, with hydraulic control purportedly maintained as long as the elevations in the observation wells were higher than those in the recovery wells. But if injected solutions were migrating beyond the observation wells through a discrete fracture network or other subsurface conduit, there would be no way to make this determination under the current monitoring plan. This concern is highlighted in Figures 4-1 and 4-2 below, which shows that the nearest well in which water quality samples will be collected at a depth equal to the depth of injection is located over 700 feet away at POC well M54-LBF.

ADEQ Response –
The loss of hydraulic control would be recognized during the daily monitoring. If fracturing is the cause of loss of control (one of several possibilities), the loss will show as a volume differential. The injection versus extraction volumes will be metered (see permit Table 4.1-8) at the wellheads, thus providing another mechanism for identifying the loss of hydraulic control. The actions required for an unexpected loss of fluid is covered under Section 2.6.3.4 of the permit.

In its Permit application, Curis claims that fractures and faults will actually enhance the cone of depression created by its recovery wells, thereby decreasing the chance of excursions. Such an affect may be seen in some areas, but it is equally likely that variations in hydraulic conductivity caused by faults and fractures will significantly increase the chance that mining pollutants will escape Curis's control. For instance, if the hydraulic conductivity in the area of injection is low, mounding of injected fluids could occur. If the hydraulic conductivity in the area of the recovery wells is high, it would most likely require significant pumping at the recovery wells to affect a water level that would be lower than that of the associated observation well. Although Curis indicated that it will, if necessary, tighten well spacing in areas of "increased hydraulic conductivity," Curis provided no details and made no firm commitments in this regard.' The Permit does not mention, much less require, contingency actions related to well spacing requirements.

Nor does Curis have an adequate understanding of this fractured ore body. For instance, in discussing the injection pressure projections, Curis cites to the 1995 BHP analysis supporting a minimum fracture gradient of approximately 0.71 psi/ft for rock within the oxide zone and the establishment of a 0.65 psi/ft fracture gradient limit. Curis has not updated and does not even plan to update the fracture analysis upon which these calculations are based, relying instead data and analysis that is 17 years old. Curis is

attempting to skate by with a "one size fits all" approach to the control arid recovery of acidic mining solutions and contaminants within a complex and highly fractured system.

ADEQ Response –
Although the data are 17 years old, the same approximate fracture gradient is to be expected upon re-testing due to the formation's depth, extent, and consistent characteristics.

There is no dispute that water flows through the oxide ore body into the drinking water aquifer. The BHP studies that Curis relies upon in support of the Permit made clear that the ore body and the LBFU are in hydraulic communication:

The maximum difference in head between the vertical gradient contours between the LBFU and the bedrock oxide zone is plus or minus 2 feet. These observations are interpreted to mean that *the LBFU and bedrock zone are in hydraulic communication.*

As illustrated in Figure 4-3, drinking water in the LBFU is in direct contact with the copper ore body. The ore body drops off precipitously along the western portion of Curis's property, directly under the PTF well field. If acidic solution escapes Curis's control, it is a short distance through the oxide ore body to the drinking water aquifer. Therefore, absent hydraulic control, acid mining solutions injected into the ore body will find their way into the drinking water aquifer. Neither the MFGU nor any other geologic barrier will prevent the pollution of Florence's drinking water. Florence and its residents will be completely dependent upon the success of hydraulic control measures that, to date, have been proven to work at this site only in theory.

This does not even take into consideration the fact that the ore body is also filled with anthropogenic subsurface conduits, all of which provide potential pathways for groundwater movement. As explained in more detail within these comments,196 the property has been the site of historic mineral exploration activities resulting in numerous coreholes, mine shafts, and wells, many of which will be nearly impossible to locate and properly abandon. The combination of a naturally-fractured ore body along with these man-made conduits creates an incredibly challenging environment for the maintenance of hydraulic control. Curis has not demonstrated that it is up to the challenge of maintaining hydraulic control under these conditions.

ADEQ Response –
Previous aquifer tests at the site indicate that the LBFU and bedrock zone are in hydraulic communication. The Applicant has demonstrated that pressure differentials and differences in hydraulic head maintained at the injection and recovery zone will be adequate to contain in-situ mining solutions within the Oxide Unit.

ADEQ believes that potential pathways for solution migration have been adequately addressed in the Application or addressed by the permit conditions.

When exploration and technical work began at this facility, it became apparent that the Oxide Zone behaved hydrologically like a porous media rather than a fractured media. Since 1996, work at the facility has been conducted using the Equivalent Porous Media Assumption (EPMA). The EPMA has been confirmed and re-confirmed on numerous occasions using many different approaches.

Aquifer testing- In 1995 aquifer tests of 40 wells were performed and the results analyzed. In every aquifer test, the Oxide Zone behaved with the characteristics of a porous media, including exhibiting confirmed interference from offsite agricultural wells. A 1996 technical report on the aquifer tests established the EPMA based on test results.

Corehole packer testing-Fourteen corehole packer tests were conducted in 1995 for the purpose of formation fracture testing. Corehole packer tests indicated porous media flow in the Oxide Zone.

Tracer studies- Two tracer studies were conducted, beginning in 1998. Based on tracer recovery from monitor wells arranged in a radial pattern around the tracer injection well, the Oxide Zone was found to exhibit porous media flow characteristics.

Geophysical logs- Geophysical logs have been run in twenty-one monitor wells. Gamma ray and neutron signatures from these logs indicate the presence of fluid-filled porosity in the Oxide Zone consistent with porous media rather than fractured media.

Cores- ADEQ is aware that approximately 686 coreholes have been drilled regionally, of which approximately 208 coreholes have been drilled on the Curis owned property and approximately 127 coreholes were drilled on the State Land parcel. Recovered cores exhibit extensive rubblization, particularly at the top of the Oxide Zone. Cores handled in the field typically crumble into small fragments upon handling. Visual inspection of cores indicates the presence of porous media flow characteristics.

In summary, the EPMA has been utilized for seventeen years when conducting technical studies at the facility, and porous media characteristics of the Oxide Zone have been well documented, confirmed and re-confirmed. Two previous APPs and a UIC permit were technically based upon the EPMA. The permittee has committed to conducting additional aquifer tests to again confirm porous media flow in the Oxide Unit. For these reasons, discussions of fractures and fracture flow in the Oxide Zone are not applicable to this project because the Oxide Zone does not behave as a fractured media.

The loss of hydraulic control would be recognized during the daily monitoring, which if fracturing is the case (one of several possibilities), will show as a volume differential. The injection versus extraction volumes will be metered (see permit Table 4.1-8) at the wellheads, thus providing another mechanism for identifying the loss of hydraulic control. The actions required for an unexpected loss of fluid is covered under Section 2.6.3.4 of the permit.

Although the data are 17 years old, the same approximate fracture gradient is to be expected upon re-testing due to the formation's depth, extent, and consistent characteristics.

4.1.2 BHP's pilot test did not prove that hydraulic control of toxic mining solutions can be safely contained.

BHP conducted pilot test operations on the site from October 1997 to February 1998. This test lasted only 90 days with BHP walking away before completing a final pilot evaluation report. BHP shut down the pilot before it was finished, never completed a final report on the pilot, terminated operations in Florence soon after, and completely abandoned the property in the early 2000s.

The BHP Pilot did not demonstrate that the PTF will comply with AWQS at the POC. Curis's sweeping conclusions and assertions about BHP's pilot do not appear to be based upon a thorough evaluation of detailed data from the previous pilot. Indeed, if the BHP testing were as successful as Curis asserts, it seems that the data would have been presented publicly as proof that ISL is commercially feasible at this site, but that has not occurred. That is not the case. And despite Curis's assertions, groundwater data demonstrates that water quality has indeed been impaired by the BHP pilot test. It is apparent that Curis is cherry-picking the BHP pilot data for findings that promote its position, while ignoring the data that demonstrates serious problems with ISL mining at this site. The latter data, of which there is much to choose from, has never been addressed by Curis in its submissions to ADEQ.

Curis's conclusion that hydraulic control was successfully demonstrated is based solely on the BHP letter report to ADEQ dated April 6, 1998. Curis touts that "[higher water levels and lower electrical conductivities at the observation wells than at the recovery wells were deemed to demonstrate hydraulic control. A detailed review of the April 6, 1998 document reveals serious concerns. The data reveals that over a two to three day period (November 8, 1997 to November 10, 1997), hydraulic control was not adequately maintained between recovery and observation well pair BHP-5 and OWB-4. Gradient differential (flow in the wrong direction) was documented during a 12-hour period that was greater than 48 feet at these wells. Also, it appears that from November 8, 1997 to November 18, 1997, hydraulic control was only marginally maintained at this location with a relatively flat groundwater gradient.

Another concern is the methodology for measuring conductivity values in the BHP observation wells appeared to be different than that used for the BHP recovery wells. This likely resulted in data that could not be compared with the certainty necessary to prove hydraulic control. BHP's recovery and observation well sampling method was described as follows:

The data for electrical conductivity was measured by hand. The samples were taken by two methods. The wells labeled as BHP2, BHP3, BHP4, and BHP5 were continuously running pumping wells. ... Observation wells OWB1, OWB3, OWB4, and OWB5 did not have pumps in them during the test. These wells were sampled using a sample baler *[sic]*

with a small pump attached to guarantee a good sample. The procedure for this sampling was to turn the pump on for five minutes and then let the sample collect for another two minutes before retrieving the baler.

This description suggests that zone specific samples were collected from the observation wells at depths that may have been shallower than for the samples being collected from the recovery wells. If the depth of the bailers used in the observation wells was different, a direct comparison of electrical conductivity data from the observation well and recovery well pairs could not have been made, because conductivity results can vary widely at different depths, even from the same well.

A ground water elevation increase of almost 200 feet occurred in recovery well BHP5 during the start-up of the pilot test on November 8, 1997. No explanation was provided in the BHP report documenting the pilot test. However, it can be assumed that there was either a malfunction in the pumping mechanisms of the recovery well (BHP5), or that significant mounding may have been occurring between the paired injection well (BHP9) and Recovery well BHP5. Curis has never addressed this data and ADEQ has not required Curis to evaluate the data and conduct additional investigation.

Additionally, although Curis states that a final report on the BHP pilot was never performed, a Draft Field Test Report was prepared and revised in October 1999. Despite multiple public records requests to ADEQ ASLD, and EPA, the draft report cannot be located. Nevertheless, we know from other sources that the Draft Field Test Report discusses major disparities between the data that was produced during the field tests and the data used to justify the economic viability of the project during the permitting of the facility in 1996 and 1997. In letters from Merrill Mining, who bought the mine site from BHP, the company expressed serious concerns that the projections upon which the original UIC permit was based were not supported by BHP's 1997 pilot test: Merrill noted that "there were major disparities between the results of field tests and the assumptions regarding the copper recovery mechanisms and recovery rates that were used to justify the permits for, and the economic viability of the Florence Copper Project. The disparities led BHP Copper to conclude that the field test results did not justify building a leach facility at Florence..."

In a Draft Field Test Report prepared by BHP in October 1999, but apparently never publicly disclosed, BHP noted substantial disparities between the recovery rates measured during the 1997-98 field test and the data used to justify the project during permitting, concluding that "If the solution chemistry in the production well BHP-1 is, in fact, a result of water-rock reactions, in-situ leaching at Florence may not be possible."

BHP also concluded in the Draft Field Test Report that much longer leach times might be required to obtain copper at commercially-viable levels, with modeling suggesting leach times of 6 to 8 years. This could, in turn, double the mine life of the project, with the total time between the start of production and closure possibly exceeding 45 years.

BHP recommended that a new field test be conducted for a much longer duration and

employing a multiple-cell test field and expanded water management system. As a precursor to a second field test, BHP recommended an "improved understanding of the geochemical and hydrogeological mechanisms at work before attempting the design of a new field test."

Later investigation by BHP's successor at the site raised additional questions. Merrill Mining expressed concerns that its own groundwater sampling and testing "indicated that a significant decrease in pH could occur if leaching of the deposit proceeds as currently authorized by the permits. The methods discussed in the Report for increasing copper recovery would further exacerbate the low pH problem and could mobilize heavy metals and radiological elements. Merrill does not know how the low pH issue can be successfully addressed."

After conducting the pilot test and analyzing its results, BHP recommended that a new test would-be needed because the results of its pilot test —which Curis trumpets as evidence that ISL mining is safe and feasible — "were not sufficient to justify building an in-situ leach facility at Florence." Apparently, BHP, the very company that operated the pilot test, concluded that in-situ mining at the site was not supported. In fact, BHP's analysis of the pilot test's low copper recovery rates and evidence of geochemical reactions to the mining solution led BHP to conclude that it would take much longer to recover available copper from the site than originally predicted—a conclusion Curis has chosen to ignore.

Dr. Wilson's review of the BHP pilot data also revealed significant concerns, generating recommendations for obtaining reliable and comprehensive test results to answer the many "what if" questions posed by Curis's mining project with "what is" data. The PTF offers Curis a chance to design and implement a test that will get the information needed to more fully evaluate the full-scale project and provide ADEQ the opportunity to get direct observation of real-world impacts of in-situ copper mining at the Florence site. Only with this data and analysis can ADEQ evaluate the full-scale project proposed by Curis.

ADEQ Response –
ADEQ is not aware that BHP abandoned the property. BHP Copper elected to delay construction of commercial operation of the in-situ project due to depressed copper prices. The facility was maintained under care and maintenance until BHP sold all of its Florence holdings to Florence Copper in 2001.

ADEQ determined that the proposed Curis test would be a stand-alone pilot test, independent of assumptions or results obtained by previous test completed by BHP in 1997 through 1998.

4.1.3 Post-pilot groundwater exceedances may be further proof that BHP could not maintain hydraulic control.

Post-pilot monitoring has revealed other concerns. Concentrations of dissolved sulfate and other ions have been measured quarterly since 2000. The results show increasing concentrations of some contaminants between December 2003 and June 2010.

Sulfate levels have been steadily increasing over this period. Consistent with groundwater flows to the west and northwest, the wells in the western portion of the pilot test well field have higher levels of sulfate than those to the east. This indicates that acid mining solutions injected during BHP's pilot are still impacting the aquifer, directly contradicting Curis's claims that there are no lingering impacts from that test.

Data collected from the BHP pilot test shows that arsenic levels increased after the pilot to above 10 ppb. Attachment 5 of Dr. Wilson's analysis depicts arsenic levels for BHP6, BHP7, BHP8, and BHP9. An increasing trend of arsenic exceeding the 0.010 mg/L standard is visible in three of the wells with the fourth well increasing toward the standard. And it appears that these increasing arsenic levels coincide with decreases in pH for several of the wells. In order to understand the true meaning of this data, ADEQ should require detailed pH and arsenic sampling as suggested by Dr. Wilson. BHP pilot data regarding pH data also presents concerns — concerns that have not been explained by Curis. Even today, after BHP's rinsing efforts and years of additional natural rinsing, pH levels within the BHP mine block are less than 5, far below the 6.4 predicted by Curis. This data contradicts claims the BHP pilot was successful, just as is contradicts Curis's geochemical model.

High radiochemical levels in groundwater samples were also an issue for the previous pilot test. After radiochemical exceedances in 1998, the agencies revised the pilot project's permit standards to be more lenient. But even after that, the pilot project continued to exhibit elevated radiochemical concentrations. ADEQ recently alerted Curis to this radiochemical risk to groundwater by requesting additional analysis and groundwater monitoring.

Groundwater exceedances were experienced as recently as December 2011 and January 2012, requiring notification and explanation to both USEPA and ADEQ. Curis's recent water quality monitoring data from P49-O a monitoring well perforated in the oxide bedrock zone into which BHP injected acidic solution, demonstrates significant exceedances of alert levels for sulfate, magnesium, and total dissolved solids. Exceedances of the magnitude reported by Curis in wells expressly designated to monitor groundwater conditions resulting from the previous pilot test create doubt as to the effectiveness of BHP's hydraulic control efforts and subsequent restoration efforts.

ADEQ Response –
Please see response to comment # 24, items (26) and (27) regarding recent alert level exceedances.

4.1.4 The PTF is not designed to prove up the efficacy of the 40-foot exclusion zone as protective of downgradient drinking water.

Curis has proposed to begin injection no less than 40 feet from the top of the oxide ore body. Purportedly, this 40-foot "exclusion zone" will form a buffer between the ore body and the surrounding LBFU to help prevent the migration of acid mining solutions into the drinking water supply. Contrary to Curis's assertions, the 40-foot exclusion zone will not protect groundwater at all times. It is an incomplete solution to an overly simplified model of the geology beneath the mine site.

One of the hydrogeologic peculiarities associated with the PTF well field is its proximity to a steep vertical fall-off of the oxide ore body. On the western portion of the property near where the PTF well field is located, the interface between the ore body and adjoining drinking water aquifer is nearly vertical. In this area, highlighted in Figure 4-4, a 40-foot exclusion zone in the injection well column does absolutely nothing. There is no horizontal barrier between the injection well and the LBFU that will prevent the flow of acid mining solutions into the drinking water aquifer. Curis fails to account for this steep interface anywhere in the proposed BADCT for the PTF well field.

The fact that Curis relies upon a 40-foot exclusion zone to protect downgradient drinking water is another assumption that should be tested in a true proof-of-concept pilot. As explained by Dr. Wilson in Appendix A, the four Westbay wells that Curis proposes to construct for this PTF could each be outfitted with an exclusion port to allow for regular sampling and reporting of that data. This data could in turn be used to support Curis's assumptions that the 40-foot exclusion zone is a protective measure for downgradient drinking water. ADEQ should revise the Permit to require an exclusion zone be constructed within each of the four Westbay wells; that Curis monitor the exclusion zone, conduct Level 1 sampling on a quarterly basis and Level 2 sampling every six months; and that Curis regularly report this data during PTF operations.

ADEQ Response –

The interface between the LBFU and Oxide Unit is depicted on cross sections as a relatively steep geologic interface. One has to take into consideration the scale depicted on the numerous cross sections or Figures in the Application. For example, on Figure 14C-50 of the Application, the nearest LBFU/Oxide interface where the geologic contact starts to slope downward, relative to location of the injection well field, is approximately 200 feet west from the edge of the PTF well field. The scale on this Figure is equal in the vertical and horizontal direction, at approximately one inch is equal to 200 feet vertically or horizontally. This implies there is over 200 feet of subsurface horizontal distance to the nearest LBFU/Oxide contact. In addition to injection and recovery wells being installed with surface seals consisting of cement from the surface to the top 40 feet (i.e. exclusion zone) below the top of the Oxide Unit, over 200 foot subsurface horizontal distance exists between the injection zone and LBFU/ Oxide contact. Extraction wells, observation wells and a monitoring well will be place between the injection wells and the geologic contact to prevent the solution migration into the LBFU.

The 40 foot exclusion zone (injection and recovery wells shall be designed and installed to prevent injection into the top 40 of the oxide zone as described in Section 2.2.4), is one

of the many engineered aspects of the PTF well field design used to protect downgradient drinking water.

The Westbay wells that Curis proposes to construct for this PTF will be outfitted with multiple sampling ports as described in the Application and in the May 23, 2012 Response to Comprehensive Request for Information, Comment 4 prepared by HDICuris. The purpose of the Westbay wells is to monitor flow and geochemical compositions of ISCR solutions between the central recovery well and the four injection wells. Elevated concentrations of sulfate and metals at the Westbay wells are expected, considering the permit is to conduct in-situ leaching, and the Westbay wells are located approximately 35 feet from the center of the well field. The permittee plans to sample for Level 1 and Level 2 type parameters at the Westbay wells, however they are not required to report those concentrations as part of compliance activities under the Temporary APP.

The Discharge Limitations in Section 2.3.1 does state that in-situ solutions shall be injected and contained within the oxide unit.

4.1.5 Curis has not demonstrated that it can maintain hydraulic control to overcome vertical groundwater gradients in the PTF.

A consistent downward vertical gradient exists between the UBFU, LBFU, and Oxide Unit across the PTF area. Curis claims that BHP's pilot test proved that hydraulic control could be maintained so as to overcome this gradient. In fact, BHP's pilot test did not demonstrate hydraulic control. Therefore, Curis is mistaken in assuming that this downward vertical gradient can be ignored.

Vertical groundwater gradients can transmit contaminants from one water- bearing groundwater unit to another. Curis indicates that groundwater gradients at the mine site range from a few inches to as much as twenty feet. These gradients can be exacerbated by offsite irrigation or drinking water pumping; fluctuations in recharge from the Gila River, Northside Canal, and agricultural irrigation; improperly sealed coreholes; preferential pathways such as fractures; and other factors. Curis cannot rely on fifteen-year-old data from BHP as justification to ignore this issue. ADEQ should require Curis to conduct adequate investigations at the PTF site to demonstrate that it can overcome vertical hydraulic gradients as a condition of the Permit and certainly prior to permitting full-scale commercial operations.

ADEQ Response –

The Application Section 14.C.2.2 discusses vertical groundwater gradients. Comparison of groundwater elevations collected at the site has demonstrated a weak but consistent downward vertical gradient between the water bearing units. The proposed pumping rate for the pilot project should be able to overcome the vertical downward gradient and will not affect the ability to maintain hydraulic control in Oxide Unit. Overcoming vertical groundwater gradients would be evident during pumping rates and the ability or inability to maintain an inward hydraulic gradient. Under the Pre-Operational Requirements in Section 2.2.3, the permittee must complete aquifer pump tests and establish an inward hydraulic gradient prior to the injection of in-situ leaching solutions.

4.1.6 Curis's well field design fails to account for known groundwater mounding near the PTF well field.

Evidence exists of groundwater mounding in the LBFU and Bedrock Oxide Unit of the PTF area. Curis theorizes that the mounding may be caused by downward groundwater flow at wells completed across multiple water bearing units. The mounding appears to have contributed to a minor western flow component in the principal groundwater flow direction in the LBFU and Bedrock Oxide Unit.

Unfortunately, despite evidence of groundwater mounding in this area, no subsequent groundwater level data is available to confirm its scope and significance. Although the issue was discovered as early as 1995, it was apparently ignored by BHP and neither USEPA nor ADEQ required additional investigation before issuing UIC and APP permits in 1997. Since the permits were issued, no voluntary investigation has been conducted by Curis or its predecessors. Although Curis acknowledges the issue, it has not proposed to conduct additional investigation before it begins injecting acidic mining solutions into this area, nor does it propose to study this issue as part of its PTF operations. Instead, Curis glibly concludes, based on no evidence whatsoever, that it can maintain hydraulic control in a manner sufficient to offset any mounding issues in the PTF area?

Variations in hydraulic conductivity will impact Curis's ability to maintain hydraulic control. Relevant here, if hydraulic conductivity in an area of injection is low, mounding of injected fluids could occur. Such mounding effects may have been responsible for the loss of hydraulic control noted in BHP's pilot test between Recovery Well BHP5 and Observation Well OWB4. Hydraulic control was lost at that location for a period of at least 48 hours from November 8 to 10, 1997 and was sporadically maintained over the next week. On the other hand, if hydraulic conductivity is high within an extraction area, significant pumping from recovery wells could be required to maintain hydraulic control where mounding has occurred.

This groundwater mounding issue is a clear example of a problem that has been known but conveniently ignored by Curis and its predecessors for nearly twenty years. It also highlights the fact that Curis lacks a clear understanding of hydrogeological conditions in the PTF location, much less across the entire mine site. Elsewhere, to avoid blame for excursions of pollutants, Curis has claimed that declining groundwater levels have caused increased concentrations of various contaminants. Nowhere, however, has Curis attempted to reconcile this purported phenomenon with evidence of groundwater mounding. Such discrepancies indicate that Curis lacks an adequate understanding of a very complex hydrologic system at this site and undercuts any assertion that hydraulic control can be maintained.

ADEQ Response –

While a localized groundwater mound was observed at the site, the overall the groundwater flow direction remains to the north/ northwest. The magnitude of the mounding, approximately 1 to 3 feet, has an insignificant effect to the overall groundwater gradient and/ or flow direction, and will not affect the ability to maintain

hydraulic control at the PTF well field in the Oxide zone. Any mounding observed as part of the injection process at the PTF will be counter balanced by the greater extraction rate from the recovery wells surrounding the injection points. If injection causes a 25 foot artificial mound at the injection site, the extraction wells will create a drawdown of equal to or greater than 25 feet at the extraction locations, essentially negating any observable mound as a result of injection.

Under Section 2.2.4 Operational requirements of the permit an inward hydraulic gradient must be maintained, confirmed through the use of observation wells.

4.2 Curis's PTF Well Field Design Will Not Prove that Curis Can Maintain Hydraulic Control During Commercial Production.

BHP's pilot test was a 90-day test employing a handful of injection and recovery wells that was terminated early. BHP did not even bother to submit a final report on the test to ADEQ or USEPA before abandoning the Florence Copper Project altogether. Although BHP and its successors have touted limited data from the pilot as evidence that hydraulic control was maintained, the test clearly has limited, if any relevance to Curis's proposals and is not sufficient to show that Curis can maintain hydraulic control of acid mining solutions during full scale commercial production.

Curis did not originally propose to demonstrate hydraulic control as a component of PTF operations. As evidenced by its submission to USEPA, Curis believed that no demonstration of hydraulic control is necessary because the "capacity to inject and recover ISCR solutions was demonstrated and documented by BHP Copper in 1998." To their credit, both USEPA and ADEQ have rejected Curis's position and will require a demonstration of hydraulic control as part of the PTF results. But that demonstration also must prove that the well field design used for the PTF produces data that justifies a much different well field design during commercial production. For commercial production, Curis describes the well array in a typical mine block unit as follows: Operational units will be ringed by perimeter wells (designed and constructed the same as Class III wells), the purpose of which is to maintain hydraulic control. The number of perimeter wells will depend on the size and shape of the operational unit. By using perimeter wells to maintain hydraulic control, the flow of PLS pumped from the operational unit can equal the flow of raffinate (lixiviant) injected into the unit.

Thus, hydraulic control during commercial production will purportedly be maintained at the edges of a mine block unit. The resulting well field will be arranged as depicted in BHP did not use perimeter wells in its pilot test and Curis is not using perimeter wells in the PTF well field. Instead, Curis proposes to maintain hydraulic control by pumping more from the PTF recovery wells than it injects.

The difference in designs means that ADEQ will not receive direct data on the hydraulic control methods Curis intends to employ during commercial production. For instance, the PTF will collect no data on the quality of groundwater at perimeter hydraulic control wells, because the PTF has no such wells. ADEQ also will not obtain data on the impacts

of stacking of PLS solutions because Curis cannot recirculate its ISL solutions during the PTF phase without the perimeter wells. Because stacking is a vital component of Curis's plans for commercial copper production, the complete lack of data on the impacts of recirculating ISL solutions is a serious deficiency. Finally, because Curis is not employing the perimeter well configuration, it will not be able to evaluate "alternative technologies for treating and managing" the "hydraulic control solutions" from the perimeter wells. Curis had proposed to evaluate technologies for managing this separate mining waste stream in order to conserve groundwater and reduce treatment costs.

ADEQ Response –
The Temporary Permit (Section 2.5) requires Curis to monitor and collect groundwater data from all monitoring wells. The re-circulation of ISL solution will be completed through the use of injection wells as part of the 5-spot well pattern design. This design was accepted by ADEQ due in part to the small size of the pilot-scale SX/EW plant, which is consistent with the small number of injection and recovery wells within this very limited size PTF well field and the relatively short operating period per the Temporary Permit. The use of a perimeter well configuration for the commercial operation should be an alternative evaluated by Curis once the PTF has been completed.

The lack of perimeter wells in the PTF well field design is not obviated by Curis's proposal to monitor water levels in pairs of PTF recovery and observation wells. During commercial production, injection and recovery wells will not generate a hydraulic gradient because recovery will match injection rates. Perimeter wells will be located hundreds of feet from interior injection and recovery wells within a given mine block. That distance provides numerous possibilities for acid mining solutions to intersect preferential pathways and escape Curis's control before encountering the hydraulic gradient created by the perimeter well field. The same conditions are not replicated by a PTF well field that places observation and recovery wells with 75 to 100 feet of one another.

ADEQ Response –
The Temporary Permit requires recovery rates to be greater than injection rates thus creating a cone of depression or hydraulic gradient. The PTF will not have "Perimeter Wells" as defined in the previous comments above. A down-gradient monitoring well (MW-1) will be installed adjacent to the PTF well field boundary. According to Figure 18-1 of the Curis application document titled Response to Comprehensive Request for Information with Suspension dated May 2, 2012 observation wells will be installed 50-feet or less from recovery wells for the PTF well field.

Curis's PTF proposal will, at best, generate data regarding hydraulic capture from a well field design that will never see commercial production. Curis has made no demonstration that hydraulic control data from PTF operations can be reasonably extrapolated to demonstrate that hydraulic control can be maintained under Curis's proposed commercial well field design. ADEQ should either require Curis to redesign its pilot test to incorporate a hydraulic control system that replicates commercial operations; require Curis to demonstrate that there the PTF well field data can be used to demonstrate

hydraulic control during commercial production; or inform Curis that additional testing will be necessary before commercial production can begin. Curis, *Application to Amend,* Attach. 9 (Design Documents), at 5 (February 2011) ("[P]erimeter wells will be necessary to maintain hydraulic control when the pump rate for recovery wells within the IRZ is set equal to the injection rate within the IRZ. . . . Setting the rates equal also allows 'stacking', a process that re-circulates ISCR solutions to further increase the copper content in PLS eventually delivered to the SX/EW plant.").

ADEQ Response –
Curis will be required to provide the results, evaluation, and data of the pilot testing which through interpolation confirms that hydraulic control can be maintained during commercial operations on the remaining State land property. ADEQ may also request additional information, testing, and study before an Individual Permit application for commercial operation is granted.

4.3 Curis Has Not Demonstrated It Can Maintain Hydraulic Control During the Aquifer Restoration Period.

After PTF mining stops, Curis plans to wait 30 days before it begins rinsing the aquifer in an attempt to remove mining pollutants and restore groundwater to permit standards. During this 30-day period, Curis only plans to pump 60 gallons per minute from a single recovery well in order to maintain hydraulic control. Although the total amount of groundwater pumped from the aquifer during this period is the same as during PTF operations and restoration, it is limited to pumping from a single point, rather than over the entire PTF well field. ADEQ apparently has accepted this proposal, even though Curis has not identified which recovery well will be used or where the well will be located in relation to the rest of the PTF mine block well field. Furthermore, Curis has made absolutely no demonstration that pumping from a single well for 30 days following active mining will be sufficient to maintain hydraulic control over the entire impacted area of the aquifer. ADEQ should require more explanation from Curis on this issue and a reasoned and complete justification for this proposal.

ADEQ Response –
Hydraulic control shall be a maintained over the injected solutions during the operating life of the facility as described in Section 2.3.1.

The PTF Well Field –Generalized Water Balance –Attachment 2 in the May 23, 2012 Response to Comprehensive Request for Information is a basic estimate of inflows and outflows at the PTF using the injection and extraction wells in gallons per minute. While the extraction rates may vary from month to month, ADEQ has required in the In-Situ BADCT Monitoring in Table 4.1-8 during the mining phase to minimally extract 300 gpm. There is no permit limit (extraction rates) established for the rinsing phase. ADEQ did not feel it was not necessarily to assign permit limits to dictate the rising process considering the BADCT requirements in Section 2.2.1.1., the Discharge Limitations in 2.3, the Operational Requirements in Section 2.2.4, and the closure criteria for the mine block in Section 2.9.2.

4.4 Curis Has Not Satisfied Other BADCT Requirements.

4.4.1 Curis has not justified use of a five-spot well pattern.

ADEQ requested that Curis provide the technical basis for the PTF well field design. Specifically, ADEQ requested a discussion of how natural and induced fractures were determined in orienting the PTF wells, as well as a discussion of other design specifications, such as acid solution pressure, flow rates, pump specifications, etc. Curis never answered the question in a manner sufficient to support its well field design and location.

ADEQ Response –
Curis Resources did provide adequate answers to such technical questions as pump specifications, system flow rates, and other design in the document titled Response to Comprehensive Request for Information with Suspension dated May 2, 2012, prepared by HDI-Curis, and received by ADEQ on May 25, 2012.

Curis's answer to ADEQ's request first focused on the purported suitability of its selected five-spot pattern for injection and recovery wells. Curis mentioned several general forms of support for the five-spot well pattern proposed for the PTF. For instance, Curis referenced the purported wealth of scientific study and documentation supporting the five-spot pattern, but never bothered to cite specific reports or documents. Curis cited the five-spot pattern's use in the petroleum industry for secondary recovery of petroleum by water-flood methods, an application that has nothing to do with this project or the geology at this site. Curis mentioned the five-spot pattern's wide application in the in-situ mineral recovery industry, without any indication of why its use in uranium mining and other forms of mining in other states justifies its application to copper ore in Florence. Curis also cited its use in the BHP Pilot Test, a test that USEPA has already rejected for purposes of demonstrating hydraulic control, a test that was terminated early, and a test for which final results have never been publicly disclosed. Such references do nothing to justify why a fivespot pattern is appropriate at this site.

We know from other documents for this project, however, that the five-spot pattern is the *cheapest* well pattern Curis could use. A seven-spot pattern uses six recovery wells instead of just four, but BHP vetoed the seven-spot pattern because "it needs many more perimeter recovery wells than does a five-spot pattern, *resulting in a larger well construction cost.*" Curis also proposes to place the recovery wells one hundred feet apart. Why? Because BHP's calculations, which were based upon injection rates and copper grades, suggest this is the maximum distance to achieve optimal copper recovery rates. Closer spacing does not make economic sense because "[the larger the well spacing, the lower the drilling expenses will be." In the end, "[the spacing that generates profit" —not the spacing that ensures hydraulic control or is most protective of the environment—"will be chosen as the optimal spacing. "Thus, Curis's use of the five-spot pattern has everything to do with profits, and nothing to do with protecting the aquifer at

this site. It may be that a five-spot pattern is appropriate for this site from a scientific and technical basis, but Curis has not demonstrated that this is the case.

ADEQ Response –
The five-spot pattern has been reviewed by ADEQ and determined adequate. BADCT requires that injection and recovery wells be properly designed per BADCT Section 3.4.5. However, specific well field design layout is not covered under BADCT due to such site variables as field size and SX/EW plant location. There are a number of scientific field studies that have been completed over the years which include the use of the five-spot pattern. One in particular is included in the five-volume document titled Generic In-Situ Copper Mine Design Manual, prepared by the US Bureau of Mines, and dated April 1988. As an example, Volume III of the manual discusses a field experiment (Cyprus Casa Grande Mine) which integrated the use of the five-spot pattern, similar to Curis's proposed layout design.

4.4.2 Curis failed to consider alternative discharge control measures.

ADEQ regulations require a description of the "alternative discharge control measures" that Curis considered to prevent acid mining solutions from contaminating the drinking water supply. For an individual BADCT design applicable to the PTF well field, Curis should have followed a process that included: Development of a range of alternative discharge control systems; Screening these alternative systems by estimating the relative degree of discharge control; Selection of the most promising alternative systems for more detailed analysis; Refinement of designs for the selected alternative systems; Comprehensive estimates of discharge control for the selected alternative systems; and, Selection of BADCT design.

Although Curis purported to have performed this analysis, in reality it has not. Curis merely made the conclusory statement that "the reference design for the PTF involves the use of ISCR technologies because neither underground mining nor open pit mining of the Poston Butte copper deposit are commercially feasible." Nothing in Curis's application explains why alternative locations, designs, operating conditions and the like were not explored and analyzed prior to presenting the proposed approach to the PTF well field.

Magma Copper's 1996 application considered a variety of alternative design control technologies, including a comparison of a grout curtain to barrier wells as hydraulic control mechanisms. Magma also evaluated closure-related alternatives, including inherent attenuation and the introduction of cross linking polymers or neutralizing agents. Curis relies entirely on Magma's fifteen-year-old study for its BADCT design and has done no additional work to review or update the design. It is hard to believe that within the last fifteen years there have been no advances in mining technologies and groundwater monitoring developments that Curis could have examined as alternatives to the proposed well field design. There are volumes of publicly-available materials on ISL well field design at uranium mines across the country that Curis could have reviewed for alternative designs, methods of improving capture, and design errors or flaws to be avoided. It is also difficult to fathom why Curis would not examine other alternatives in

light of land uses that have changed drastically since the 1990s around Curis's proposed mine. ADEQ should require Curis to meet this basic individual BADCT requirement of examining alternative designs.

ADEQ Response –
There is no Individual BADCT requirement for in-situ leaching which requires the use of alternatives for discharge control systems. The BADCT Manual (Section 3.4.1) states that "There are numerous variations of in-situ leaching that may be applied to a given site based on the depth and hydrogeologic characteristics of the ore body and other factors. The discharge control system which constitutes BADCT for an in-situ leaching operation may depend upon the type of in-situ leaching operation and will always be a composite of: site characteristics; design construction and operations; and closure/post-closure measures." Curis has provided an adequate site characterization and design for construction and PTF operations.

4.4.3 Curis failed to consider alternative sites and properly evaluate site-specific criteria.

Site selection analysis is the first step in evaluating alternatives. Curis has failed to consider *any* site alternatives. Instead, Curis merely states that the PTF well field "is the only site where injection and recovery wells will be used for in-situ operations in association with this application." There is no discussion or evaluation of the various portions of the State land parcel on which the well field could be located considering ore reserves, preferential pathways, surface features, fracture geometry, and other relevant factors. There is no discussion of why the selected location was chosen when Curis apparently plans to begin commercial mining on the opposite end of the State Land parcel, working its way from the southeast to the northwest.2Nor is there any discussion of whether or how the selected well field location is representative of hydrogeologic conditions on the rest of the mine site.

Thorough analyses of site-specific factors are key to evaluating the individual BADCT demonstration for ISL mining. ADEQ's BADCT selection guidance is less helpful with respect to ISL mining because that guidance "is necessarily more general than for other types of facilities due to the higher degree of dependence on site specific factors" at ISL mines. Curis's application completely fails to evaluate key site-specific factors as required.

For instance, as discussed elsewhere in these comments in detail, key hydrogeologic and geotechnical considerations have not been adequately addressed. According to ADEQ "[s]ince the performance of in-situ leach facilities are extremely dependent on site specific geotechnical and hydrogeologic conditions, a detailed site characterization is critical." Both hydrogeology and structural geology in both the ore body and the surrounding area are "usually of key importance to solution control." Curis's application is not supported by thorough, current-day site characterization evaluating site-specific geotechnical and hydrogeologic conditions as required by ADEQ's own BADCT Manual. Reliance on fifteen-year-old design technologies and data does not satisfy the requirements for a Permit.

ADEQ Response –
There is no requirement that a temporary APP applicant provide alternative sites when a particular location has been identified in the APP application. The site which the applicant has selected is required to undergo an evaluation per BADCT Section 3.4.4 for the conditions at that particular site. To date ADEQ has not received an APP Application for an Individual Permit for an In-Situ commercial-scale operation from Curis. Subsequently, ADEQ has no information on where Curis may plan to start commercial operations, which is partially dependent on the data collected from the PTF. The evaluation of the hydrogeologic conditions for the well field location was submitted and accepted by ADEQ in Curis's APP application.

5.0 Proper ALs, AQLs, & Narrative Standards Should Be Established To Protect the Aquifer for Drinking Water Uses.

Alert Levels (ALs), Aquifer Quality Limits (AQLs), and Narrative Standards are the APP program's tools for setting enforceable standards that will protect groundwater supplies. In the Permit, these standards can only be enforced at POC wells and, in the case of arsenic, at the State Land parcel boundary. These locations are so far removed from Curis's PTF well field that contaminants could escape Curis's control for years before they would be detected. Although ADEQ can be commended for requiring stricter standards that proposed by Curis, improvements can be made to the enforceable groundwater quality standards in the Permit. ADEQ should relocate existing POC wells and require additional POC locations to ensure standards are enforced at points that are actually relevant to Curis's PTF operations.

ADEQ Response –
A.R.S. §49-244 requires that POCs be established no more than 750 feet from the edge of the pollutant management area. The currently designated POCs comply with this requirement. It would be extremely unlikely that contaminants could escape Curis's control for years before they would be detected since there are numerous controls in the permit, particularly in the Operational Requirements that would indicate a loss of hydraulic control at the PTF well field or through chemical concentrations at MW-01.

ADEQ should carefully review the ALs and AQLs it has established at existing POC wells, as the method through which these standards were established does not appear to comply with the Permit.

ADEQ Response –
Not enough information is provided to determine which particular standards the commenter is referring to. See ADEQ Response to Comment 5.3 below.

ADEQ should require validation of Curis's fate and transport models for arsenic, to ensure that this regulated toxin does not impact drinking water supplies.

ADEQ Response –

While not explicitly spelled out in the Closure Plan Section 2.9.1, updated groundwater modeling would include the evaluation and validation of Curis's fate and transport model originally provided in the March 2012 Application.

The Permit should be revised to include enforceable standards for nitrate, a regulated pollutant that likely will be moved into the LBFU by Curis's mining activities.

ADEQ Response –
ADEQ does not concur that nitrate will be moved into the LBFU by the proposed mining activities. In-situ mining will be limited to the Oxide Unit. Formation rinse water will be drawn into the PTF wells from the Bedrock Oxide Unit surrounding the PTF well field and will not come from the LBFU or UBFU aquifers. Nitrate in the Oxide aquifer is generally less than 1.0 mg/l nitrate.

A narrative standard should be established for sulfate, with requirements for Curis to reduce sulfate concentrations to ensure that a plume of this pollutant is not left behind to impact drinking water supplies in the future.

ADEQ Response –
The permit requires Curis to minimally rinse the mine block to 750 mg/L sulfate. Based on the projected groundwater modeling that emplaced a 750 mg/L sulfate concentration (i.e. the required rinsing sulfate standard for mine block closure) indicated that after 5 years (equivalent to the initial post-closure monitoring period), the maximum aerial extent of migration of sulfate migration was approximately 150 feet from the PTF well field in the lower oxide zone. The greatest aerial extent of sulfate migration was defined at a sulfate concentration of 2 mg/L above background. The 750 mg/l sulfate target for mine block closure rinsing requirements was established through fate and transport considerations of when AWQS would most likely be met during the mine block rinsing process. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant.

Ambient groundwater sulfate levels vary across the site and within each water bearing unit. For the 4 POC wells currently assigned sulfate Alert Levels (AL), the ALs for sulfate are as following; 86 mg/l, 126 mg/l, 144 mg/l, and 411 mg/l. For example, if applying a Narrative AWQS at 250 mg/l sulfate at the existing or potential point of groundwater withdrawal location (i.e. Johnson Utilities well), and considering the travel distances, along with advection and dispersion, the AL for sulfate at the POCs could potentially be much greater than those ALs currently established. Additionally, back calculating an AL for sulfate at the POCs from the point of use, may actually establish a lower concentration for sulfate at the POC as compared to ambient water quality for that well. For those reasons, ADEQ considers the use of sulfate as an indicator parameter using actual ambient groundwater quality, rather than applying a concentration based on groundwater modeling, appropriate at this time.

5.1 ADEQ Cannot Rely on Typical APP Requirements to Address Impacts at this Site.

Curis must demonstrate that the PTF facility will not cause or contribute to a violation of an Aquifer Water Quality Standard (AWQS) in groundwater or, if a specific standard is already exceeded, that the facility will not further degrade groundwater quality. ADEQ may prescribe discharge limitations in individual APP permits to prevent contamination of the drinking water supply by Curis's mining activities. A discharge limitation is statutorily defined to mean "any restrictions, prohibition, limitation or criteria established by the director, through a rule, permit or order, on quantities, rates, concentrations, combinations, toxicity and characteristics of pollutants.

ADEQ Response –
The Operational Requirements, Section 2.2.4 state that the injection and recovery of solutions shall be limited to the Oxide Ore body only. Discharge Limitations are specified in Section 2.3, and indicate hydraulic control of the injected solutions shall be maintained for the operating life of the facility and in-situ solutions shall be injected and contained within the Oxide Unit.

Once groundwater contamination occurs, it can be difficult to clean up. The Legislature, therefore, provided a means for ADEQ to require action to prevent or mitigate contamination before AWQSs are violated. ALs are groundwater quality standards established in an individual permit that serve as an early warning of a potential violation of a permit condition related to BADCT or the discharge of a pollutant to groundwater. ADEQ may prescribe ALs for the PTF that, when exceeded, trigger contingency actions or permit changes to prevent further pollution. ALs must be determined based upon site-specific conditions or other relevant information. ALs may be specified at a location appropriate for the discharge activity, considering the discharge's physical, chemical, and biological characteristics, the treatment process, and site-specific conditions. An AQL is a groundwater quality standard measured at a POC for the facility. An AQL is equivalent either to an AWQS or, if the AWQS is already exceeded, the ambient water quality for that pollutant. ADEQ may set AQLs in individual permits to ensure that the facility continues to meet required groundwater standards.

ADEQ Response –
ADEQ believe the ALs and AQLs in the permit are established in accordance with the definitions provided in AAC R18-9-101(2) and (3), and are consistent with other mining permits.

The APP program is designed primarily to address potential impacts to groundwater from *surface* facilities. Surface facilities, such as landfills or wastewater treatment plants, are constructed with liners, pumps, impoundments and numerous other structures to prevent pollution from ever reaching an aquifer. If those protections fail, there is still a layer of soil and rock, sometimes hundreds of feet thick that can help disperse and capture pollutants before they hit groundwater.

In the context of other ISL mines, both within and outside Arizona, the ore body is often physically separated from drinking water supplies. For instance, at the Santa Cruz ISL pilot project outside Casa Grande, the ore field was separated from the local water supply by hundreds of feet of bedrock, as depicted in Figure 5.

At uranium ISL mines, typical hydrogeology involves an ore body separated from local water supplies and other aquifers by aquitards or layers or rock. As an example, confined aquifers in areas of Wyoming where ISL uranium mining occurs can be separated from other aquifers by confining layers of clay, shale, and other relatively impermeable substances that are anywhere from five to 2,700 feet thick. No such protections exist for Curis's injection well field. Curis proposes to inject toxic mining pollutants directly into the oxide zone aquifer. Absent hydraulic control, groundwater will flow through that aquifer and into the LBFU, which constitutes the area's current and future drinking water supply, because there are no barriers of any kind separating the two aquifers. The APP program is not adequately designed to address this situation, and lacks robust engineering, monitoring, and enforcement criteria to ensure groundwater is protected from ISL mining. For that reason alone, ADEQ should carefully review this project and establish reasonable monitoring and compliance points with enforceable standards. Additional monitoring points and indicator parameters also should be employed to address the unique challenges posed by Curis's project.

Furthermore, ADEQ must consider how those standards will be enforced over the long term, not just the short life of the PTF. If Curis is allowed to proceed with commercial ISL mining, the impacts will necessarily be much more significant than the PTF's impacts. As shown in Figure 5-3, Magma Copper predicted that full-scale mining at this site would create a plume of sulfate that would spread well beyond the current boundaries of Curis's property within 30 years. That estimated plume would directly impact land now owned by SWVP and Pulte, land that will be developed for commercial and residential uses in the near future. ADEQ cannot deny that this area will become heavily populated over the next 30 years. If ADEQ does not consider adequate POC locations, ALs, and AQLs now to protect drinking water supplies, those future residents will be dealing with a plume of mining pollutants.

ADEQ Response –
The terms, conditions, and restrictions of the Temporary APP, in conjunction with monitoring and enforcement activities, if needed, by ADEQ, constitute adequate measures to protect water quality.

ADEQ did not evaluate the permit for commercial mining. The Production Test Facility does not include full scale commercial mining operations. The Production Test Facility well field will be limited to conducting tests, on approximately 2.2 acres of land, within the State Trust Land parcel, to provide data which might be used in an application for a permanent individual aquifer protection permit. Following the completion of the Production Test project, Curis will have the option to submit an application to ADEQ for a significant amendment to the existing permanent individual APP to allow mining, and that the amendment would be subject to all of the requirements for public participation

and appeal. Review of this application will include an evaluation of pilot test results. The design to be employed for commercial operation has not yet been approved by ADEQ.

ADEQ reviewed geologic and hydrologic conditions related to a 14 month leaching phase and 9 month rinsing phase for a relatively small pilot test located on Arizona State Land. The DIA in the Application is for the PTF well field, not for commercial operations and was estimated to travel 150 feet from the PTF well field and remain within the property boundary 5 years into post-closure.

Because the PTF will serve as precedent for future ISL mining at this site and other sites, the imposition of enforceable standards now is vitally important. Although ADEQ required more than was proposed by Curis, little in the way of relevant groundwater standards are included in the Permit. The POC wells are located too far from the PTF well field, so the early warning measures that ALs are designed to provide are completely useless. Almost no monitoring is required near or within the PTF well field and no enforceable standards or even indicator parameters are established within the 500-foot radius around the PTF well field. ADEQ must do more to meet the letter and spirit of the APP program.

ADEQ Response –
The APP regulated facilities at Florence Copper Project have been evaluated for conformance with ARS §49-241 through §49-244, and A.A.C. R18-9-A201 through A209. The facilities have been designed to meet BADCT performance requirements and AWQS will be maintained at the Point of Compliance wells or will not contribute to further degradation of the aquifer(s) at the POCs.

5.2 ALs and AQLs Are Meaningless if They Are Not Established at Locations Relevant to PTF Operations.

No matter what groundwater quality standards Curis is held to, the standards are useless if monitoring for those standards is conducted at points that will never see contaminants from the mine during PTF operations. That is exactly what has happened in the Permit. Curis is only required to meet ALs and AQLs at the POC wells that are located hundreds of feet away from areas impacted by PTF operations. The location of these wells has nothing to do with the likely movement of contaminants from the PTF well field, as indicated by Curis's own plume maps. Almost no monitoring is required within or near the PTF well field or in areas that Curis predicts will be impacted. As a result, no data regarding those impacts will be produced, no groundwater standards can be enforced, and no contingency measures will be taken to address the impacts. This is an untenable situation that fails to satisfy the most basic requirements of the APP program. ADEQ should amend the Permit to require POC wells at relevant locations that will enable enforcement of protective standards. If Curis refuses to reposition the POC wells

Please see response to comments SWVP 3.3.2, 3.3.3, and 3.4.

5.3 ADEQ Should Confirm That Its Procedures for Establishing AQLs and ALs at Existing POC Wells Are Consistent with the Permit and Defensible.

Curis proposed using existing AQLs and ALs at the existing POC locations. This would have resulted in permit standards that exceeded AWQSs. The Permit still has standards for antimony, cadmium, and thallium that exceed AWQSs at POC Wells M15-GU, M22-O, and M23-UBF.263.

Those standards, however, are lower than what Curis has proposed, a positive change.

It is not clear, however, how these standards were derived. Internal staff correspondence indicates that these Permit standards were set using six to eight unidentified rounds of sampling data. Some of this appears to have been from newer groundwater samples and some was from older sampling events. It is not clear that proper allowances were made for data that approached laboratory detection limits. Nor is it clear that the calculations used to derive these standards are consistent with the calculations requirement. It is impossible to reproduce the calculations from which these standards were derived on the limited data in the record. ADEQ should explain how these standards were derived and demonstrate that they are consistent with the Permit requirements, generally accepted statistical principles, and available data from the site.

ADEQ Response –
For those POCs that were incorporated from APP P-101704 into the Temporary APP P106360, ADEQ reviewed the Alert Levels (ALs) and Aquifer Quality Limits (AQLs) already established for M14-GL, M15-GU, M22-O and M23-UBF in P-101704. Based on a review of the previous calculated ALs and AQLs for metals and radionuclide's to the current water quality for those wells, ADEQ made the following changes which are incorporated into the Temporary APP and summarized in the following Table:

TABLE 1-Comparison of Previous AQLs/ALs to New AQLs/ALs

	Previous AQL	Previous AL	AWQS	New AQL	New AL
M14-GL LBFU					
Antimony (mg/l)	0.016	None	0.006	0.006	0.0048
Cadmium (mg/l)	0.005	None	0.005	0.005	0.004
Nickel (mg/l)	0.13	None	0.1	0.1	0.08
Thallium (mg/l)	0.002	None	0.002	0.002	0.0016
Adjusted Gross Alpha (pCi/L)	15	None	15	15	12
M15-GU LBFU					
Antimony (mg/l)	0.016	None	0.006	0.006	0.0048
Cadmium (mg/l)	0.04	None	0.005	0.02	Monitor
Nickel (mg/l)	0.13	None	0.1	0.1	0.08
Thallium (mg/l)	0.002	None	0.002	0.002	0.0016
Adjusted Gross Alpha (pCi/L)	15	None	15	15	12
M22-0 OXIDE					

Antimony (mg/l)	0.016	None	0.006	0.0076	Monitor
Cadmium(mg/l)	0.04	None	0.005	0.02	Monitor
Thallium (mg/l)	0.024	None	0.002	0.010	Monitor
Adjusted Gross Alpha (pCi/L)	15	None	15	15	12
M23-UBF UBFU					
Cadmium (mg/l)	0.04	None	0.005	0.005	0.004
Thallium (mg/l)	0.024	None	0.002	0.012	Monitor
Adjusted Gross Alpha (pCi/L)	15	None	15	15	12

The statistical method used to calculate the new ALs and AQLs for POCs M14-GL, M15-GU, M22-O and M23-UBF is described in the Section 2.5.3.2.1 and 2.5.3.2.2. Where the AQL was set at the AWQS, the AL was set at 80% of the AWQS, which is the methodology described in 2.5.3.2.1 and is consistent with other mining APPs. Section 2.5.3.2.2 discusses the scenario when the AQL is above an AWQS based on ambient groundwater data, and the AL is set as "monitor". This methodology is also consistent with other mining permits.

For constituents that previously had an AQL set above an AWQS and the AL was none-ADEQ did the following:

- *Reviewed the data for that constituent. If the constituent was predominantly non-detect and met the detection limit, the AQL was set at the AWQS and the AL was set at 80 % of the AWQS. This method is consistent with other mining permit and is the methodology described in Section 2.5.3.2.1 and Section 2.5.3.2.2.*
- *Reviewed the data for that constituent. If the constituent had detectable concentrations above the detection limit and or above the AWQS, then the value was calculated in accordance with Section 2.5.3.2.2. This was applied for cadmium at M15-GU, antimony, cadmium, and thallium at M22-0, and thallium at M23-UBF. Specifically the following was used:*
    - *For M15-GU cadmium, ADEQ used 8 rounds of data: January 18, 1996, July 18, 1996, July 19, 1999, July 10, 2001, July 8, 2003, August 4, 2005, July 12, 2007, and February 15, 2010. Metals at the site were usually sampled on a biennial basis under P-101704. Non-detects were taken at half value for the calculation. The February, March, April, May and June 1996 sampling data was not used because the detection limit was set too high to quantify (above the AWQS).*
    - *For M22-O antimony ADEQ used 8 rounds of data: May 28, 1996, June 17, 1996, July 18, 1996, August 7, 1996, September 10, 1996, October 8, 1996, November 12, 1996, and December 17, 1996. Non-detects were taken at half value for the calculation.*

- *M22-O cadmium, ADEQ used 8 rounds of data: July 18, 1996, February 10, 1997, March 24, 1997, April 14, 1997, July 19, 1999, July 10, 2001, July 8, 2003, August 4, 2005. Metals at the site were usually sampled on a biennial basis under P-101704. Non-detects were taken at half value for the calculation. The, August, September, October, November, and December 1996, sampling data was not used because the detection limit was set too high to quantify (above the AWQS).*

- *M22-O thallium, ADEQ used 8 rounds of data; October 8, 1996, December 17, 1996, January 21, 1997, February 10, 1997, July 19, 1999, July 10, 2001, July 8, 2003, and August 4, 2005. Metals at the site were usually sampled on a biennial basis under P-101704. Non-detects were taken at half value for the calculation. The May 28, 1996, June 17, 1996, July 18, 1996, August 7, 1996, September 10 1996, November 12, 1996 March 24, 1997, and April 14, 1997 sampling data was not used because the detection limit was set too high to quantify (above the AWQS).*

- *For M23-UBF thallium, ADEQ used 8 rounds of data; October 8, 1996, December 17, 1996, July 19, 1999, July 10, 2001, July 8, 2003, August 4, 2005, July 12, 2007, and February 15, 2010. Metals at the site were usually sampled on a biennial basis under P-101704. Non-detects were taken at half value for the calculation. The, May, June, July, August, September, November 1996, January 1997, February 1997, March 1997and April 1997 sampling data was not used because the detection limit was set too high to quantify (above the AWQS).*

As can be observed from the Table, most of the constituents were set to a lower concentration in the Temporary APP. A lower concentration means a more restrictive permit standard. ADEQ believes this change to a more restrictive groundwater monitoring standard in the Temporary APP is a constructive modification to the permit and ultimately is more protective of the aquifer(s).

5.4 ADEQ Must Establish AQLs and ALs for Nitrate.

Nitrates are nitrogen-oxygen chemical units that are commonly used in fertilizer. Once ingested, nitrates are converted into nitrites through a process that can interfere with the oxygen-carrying capacity of the blood. As a result, high levels of nitrates in drinking water can cause serious illness, especially in infants (blue baby syndrome). Nitrates in drinking water also have been linked to birth defects, gastric problems and abdominal pain, internal bleeding, and respiratory problems.

The Permit currently contains no AQLs or ALs for nitrate. Nitrate concentrations are regulated in drinking water supplies and Arizona has an enforceable AWQS of 10 mg/L for nitrate. AQLs and ALs for nitrate are therefore mandated at all POC locations under Arizona law.

The record does not indicate why ADEQ has not established enforceable standards for nitrate in the Permit. If Curis is asserting that nitrate limits already exceed the AWQS at existing POC wells, then it still must propose an AQL for each POC well based upon an Ambient Groundwater Monitoring Report.

Nor can ADEQ ignore nitrate standards based upon an argument that nitrate contamination in groundwater is a result of agricultural fertilizers, an argument both Curis and its predecessors have made in the past. Nitrate contamination from agriculture would be located in shallow groundwater, such as the UBFU. If nitrates are present at lower levels, such as in the LBFU and oxide zone, it could very well be because mining activities are drawing nitrates into these areas of the aquifer. This could continue to occur through Curis's use of an on-site production well to supply makeup and rinse water during PTF operations. At a minimum, Curis should be required to explain why it is not responsible for nitrate contamination in the aquifer, why AQLs and ALs should not be set at its POC wells, and why it should be allowed to leave behind nitrate contamination that is many times higher than applicable drinking water and aquifer quality standards.

ADEQ Response –
No ISCR activities or other mining related historical site activities have included the use of nitrate bearing compounds in any form. Nitrate contamination in the UBFU occurs on a regional basis and is assumed to be the result of agricultural practices. Water from the UBFU will not be used as rinse water in the Oxide Unit for the PTF.

Nitrate concentrations in the Oxide Unit proposed to be used as rinse water for the PTF, as observed from water quality at M22-O, are generally less than 1.0 mg/L.

5.5 Curis Should Be Required to Properly Validate its Fate and Transport Model for Arsenic.

Curis proposed that it be held to an arsenic standard of 50 ppb, five times the current Maximum Contaminant Limit (MCL) under the Safe Drinking Water Act, at four existing POC wells.270 This is not because of background concentrations— groundwater in the area has nothing near these concentrations of arsenic. Rather, Curis's request likely was based upon the fact that ADEQ has never revised the AWQS for arsenic to make it consistent with the federal MCL, despite a statutory requirement to do so. By proposing to keep the old BHP ALs and AQLs at these four POC wells, Curis was hoping to avoid the new, more stringent standard for arsenic and reduce groundwater cleanup costs for the PTF.

Fortunately, ADEQ has required Curis to meet the MCL of 10 ppb. But that standard is to be met at the property boundary of the State Land parcel, based upon fate and transport modeling. Although that approach is allowed by law, it requires the fate and transport model be validated against real-world data. For that reason, Curis should be required to test its model against existing data from the BHP pilot and subsequent monitoring. Dr. Wilson has addressed some aspects of that comparison in Attachment 5 to Appendix A. The model should also be audited against monitoring data collected during and after PTF

operations. The failure to adequately model arsenic movement could directly impact downgradient drinking water users, such that Curis's compliance with the Permit requirements should be closely scrutinized.

ADEQ Response –
While not explicitly spelled out in the Closure Plan Section 2.9.1, updated groundwater modeling would include the evaluation and validation of Curis's fate and transport model originally provided in the March 2012 Application.

5.6 Curis's Sulfate Proposal Is Inconsistent With the Safe Drinking Water Act's Secondary MCL for Sulfate and the Concomitant Public Health Risks of Nearby Sensitive Populations.

Water's smell, taste, and color are affected at 250 mg/L sulfate, one third the level allowed under BHP's old APP permit. Sulfate in water at levels above 250 mg/L, especially combined with high Total Dissolved Solids, also can cause gastronomic problems in sensitive populations, such as infants, transient populations, and new residents.271 Based on these considerations, USEPA has set the Secondary Maximum Contaminant Level (SMCL) for sulfate in drinking water at 250 mg/L. In at least one case, the Arizona Department of Health Services has recommended that water from wells containing concentrations of sulfate above 250 mg/L but less than 900 mg/L not be used for drinking water or preparing beverages, including infant formula.

APP P-101704 used a sulfate concentration of 750 mg/L as an indicator that the aquifer had been restored to permit standards after BHP's mining was complete. This effectively allowed BHP to create a plume of sulfate in the groundwater beneath this mine site that would have rendered that water unusable for drinking water purposes. Once hydraulic control was stopped, that plume would have begun to move downgradient. Sulfate dissipates very little as it moves through an aquifer, is persistent in groundwater for decades, is difficult and expensive to remove from drinking water sources, and can interfere with treatment for other contaminants, such as arsenic.

Given that BHP owned all of the property two to three miles downgradient from the mine and that no drinking water wells existed in the area, it may have been acceptable in 1997 to allow creation of a sulfate plume in this aquifer. But it is not acceptable today. Residential development now surrounds the mine area, drinking water wells have been installed downgradient, and more wells will be needed in the foreseeable future. Pulte Del Webb's Anthem Community directly downgradient of the Mine consists of two populations—a retirement community and a family community, both of which are encompassed within the sulfate sensitive populations recognized by USEPA in the secondary MCL. And this is just the beginning, with many more homes planned for the downgradient area. Whatever value there may be in mining copper at this site, it does not justify pollution of the area's groundwater with a sulfate plume that will endanger downgradient drinking water supplies for decades to come.

Nevertheless, Curis proposed and ADEQ accepted carrying over the same 750 mg[L sulfate, standard into the Temporary Permit. Although we appreciate ADEQ's foresight in adding a pH condition to the mine block closure requirements, the sulfate standard remains set at three times the SMCL.

Nothing about this proposal makes sense under today's conditions in the Town of Florence.' Other mines in Arizona, such as the Sierrita and Bisbee copper mines, are required to provide replacement water supplies when sulfate in groundwater exceeds 250 mg/L. The Town of Florence and its residents deserve no less protection. Permitting Curis to endanger drinking water supplies through the creation of a plume of sulfate is contrary to the purposes of the APP program and the Safe Drinking Water Act. Sulfate should not be a trigger for the measurement of other contaminants in the aquifer, it should be treated as a significant drinking water contaminant that must be reduced below 250 parts per million before rinsing and hydraulic control in a mine block can cease.

As ADEQ knows, the agency can include narrative standards in Curis's APP to protect "all current and reasonably foreseeable future uses of the aquifer" with respect to non-hazardous substances, such as sulfate. ADEQ already has used a narrative standard in the Permit for arsenic. Given the growth that the Florence area is experiencing, it is reasonably foreseeable that water providers will need to drill additional wells in the area surrounding the mine in the coming years to keep up with ever-increasing demand. The APP should establish narrative standards and conditions for sulfate that will protect not just current groundwater uses at existing wells, but future uses and future points of groundwater withdrawal.

ADEQ's own policy supports a 250 mg/L narrative standard for sulfate. ADEQ has set forth factors to consider in establishing narrative standards, which include the following: 1. Present or reasonably foreseeable uses of water in the aquifer; 2. Knowledge of human health-based guidance levels or some other risk-based or use-based level for the pollutant; 3. Concentration of the pollutant in the discharge and ambient groundwater; 4. Volume of the discharge; 5. Hydrogeologic conditions; and 6. Potential fate of the pollutant in the aquifer

A thorough consideration of each of these factors indicates that the AL for sulfate should be lowered. In regard to the first factor, water providers downstream of Curis currently serve drinking water to customers that will be affected by the rising sulfate concentration levels emanating from Curis's mine. As Florence grows, drinking water demands will increase substantially. This use of groundwater for drinking and other potable uses is a reasonably foreseeable use that must be protected in a permit.

Second, as described previously, high sulfate levels in drinking water have known aesthetic and health impacts that warrant a lower standard. While the secondary MCL is not legally enforceable, it does represent a guidance level that ADEQ must consider in setting groundwater standards applicable at Curis's POC wells.

With regard to the third factor, there is an enormous discrepancy between the concentration of sulfate in ambient groundwater and the levels of sulfate that would be permitted under Curis's proposal. Sulfate concentrations in the area are generally well below 200 mg/L and in many areas are well below 100 mg/L. To allow Curis to generate a plume of sulfate with concentrations several times ambient levels is, simply put, to legalize pollution of the drinking water supply.

Next, because Curis proposes to inject sulfuric acid into the aquifer, Curis's mining will generate enormous volumes of sulfate. Curis ultimately plans to continue operations for at least 20 years, although it is readily foreseeable that mining could last much longer. Therefore, the volume of sulfate that is placed into the aquifer will steadily increase over the next several decades, warranting increased protections in the APP.

The fifth factor is especially significant. Curis is proposing to mine this property because it contains sulfide ore. That ore necessarily generates large quantities of sulfate. The migration of sulfate plumes into Florence's drinking water supply could be devastating. A narrative standard for sulfate must be set with ALs low enough to give early warning of future migration and provide time to resolve the problem or find alternative supplies of water before drinking water wells are impacted.

As to the final factor, sulfate does not naturally degrade in the aquifer. Given that technological solutions to treat sulfate contamination are limited and expensive, dispersion of the plume likely is the only way that sulfate levels will decrease. Dispersion generally is a slow process, but it is likely impossible while Curis continues to operate and generate contaminants that will be released into the aquifer. Because Curis plans to continue operating for at least twenty years and dispersion may take centuries, Florence and its residents cannot count on natural dispersion to reduce sulfate levels in the aquifer.

Each of these factors argues for lower narrative standards in Curis's APP. The potential health and aesthetic impacts of sulfate, along with the impacts of sulfate and TDS on arsenic treatment, also require consideration of protective narrative standards. ADEQ should set a narrative standard for sulfate no higher than 250 mg/L to protect Florence's drinking water supply from Curis's sulfate pollution.

ADEQ Response –

Please see response to comments SWVP 5.0

5.7 Indicator Parameters Should Be Established at Relevant Monitoring Points for Other Pollutants Without AWQSs.

ADEQ has noted that Curis needed to calculate and propose ALs for constituents without an AWQS, to serve as indicators of a loss of hydraulic control or a potential violation of water quality standards. Pollutants mentioned by ADEQ included sulfate, discussed previously and TDS. Especially in the context of a proof-of-concept "pilot project" such as this, indicator parameters would be useful in validating Curis's models, calculations,

and assumptions and would serve as added protection from the potential impacts of this untried form of copper mining. ADEQ should use its existing authority to require indicator parameters for relevant contaminants, not as enforceable limits, but as triggers for further investigation or additional permit requirements.

One such indicator parameter should be pH. ADEQ already has employed pH as an indicator parameter during aquifer restoration, and should expand its use to require reporting during PTF operations from the PTF well field, monitoring wells, and POC wells. Acid levels are a key indicator that groundwater may have been impacted by mining solutions, so pH can be used to detect such important factors as loss of hydraulic control and movement of contaminants between wells and within fractures. Monitoring of pH as an indicator parameter also is needed because monitoring data indicates that pH levels have remained low in the area of BHP's pilot test wells, indicating that restoration of pH levels after mining may be more difficult than Curis suggests.

ADEQ Response –
ADEQ does not believe that pH would serve as an appropriate indicator parameter at the POCs due to the buffering capacity of the surrounding groundwater. ADEQ feels that sulfate is the best and most useful indicator parameter at the POC wells for the pilot test.

ALs should also be required as indicator parameters for magnesium, sodium, and aluminum. These constituents usually build up in solution and are highly soluble when exposed to Curis's acid mining solutions. Monitoring of these contaminants will help determine the success of Curis's hydraulic control efforts and provide better data on geochemical changes in the aquifer arising from Curis's injection of acid mining solutions.

ADEQ Response –
The permit does establish ALs for magnesium and aluminum. See Table 4.1-7. ADEQ believes there is reasonable number of indicator parameters for groundwater monitoring to determine geochemical changes in the aquifer.

Although the Permit includes AQLs and ALs for gross alpha, adjusted alpha, and radium, monitoring at the POC wells alone will not determine if Curis's mining is mobilizing these contaminants in groundwater. Indicator parameters should be established at the PTF well field and in monitoring wells to better track the concentrations and movements of these contaminants. As ADEQ knows, uranium, radium, radon and other radiochemicals are frequently found in association with copper ore deposits throughout Arizona. Copper mining, particularly the leaching of copper with acid solutions, is known to mobilize and concentrate radiochemicals in groundwater, process solutions, and mining waste streams. Based on data collected from the Curis site, USEPA has concluded that radiochemicals at this site are leachable and that process and waste streams will concentrate radiochemicals. USEPA's conclusion is borne out by historical evidence and data from the Curis site, but to date Curis and its predecessors have chosen to ignore those risks. Including additional indicator parameters for radiochemicals in the Permit will enable ADEQ to better determine the real risk of radiochemical mobilization at this site and

facilitate validation of Curis's geochemical modeling with regard to these contaminants. Furthermore, Curis should be required to explain how it will handle, control, store arid dispose of radiochemical-contaminated groundwater, mining solutions, waste streams, and impoundment pond sediment during mining activities.

ADEQ Response –
ADEQ does require ambient groundwater concentrations for parameters with AWQS to be determined at the PTF wells in Section 2.2.3. ADEQ requires that the mine block concentrations after rinsing meet AWQS or predetermined groundwater concentrations in accordance with Section 2.9.2. This includes radionuclides such as gross alpha and radium 226+ radium 228.

The radiochemical concentrations will be analyzed in the discharge at the PLS Tank, Raffinate Tank, Process Water Impoundment, Runoff Pond and at the Underground Workings in accordance with Section 2.5.1. Radiochemical concentrations will be measured at the PTF wells prior to the pilot test in accordance with Section 2.2.3, at the PTF wells after the pilot test and at the PTF wells into post-closure in accordance with Section 2.9.2. The POCs will be sampled for radionuclides prior to, during and after the pilot test and into post-closure in accordance with Table 4.1-7. Radiochemical concentrations may be analyzed in soil when the impoundments are closed.

6.0 The Permit Lacks the Necessary Requirements & Standards to Demonstrate that the Aquifer Has Been Restored to Pre-Mining Conditions After PTF Operations Cease.

ADEQ has an obligation to ensure that Curis can restore groundwater to permit standards once PTF operations cease. With regard to Curis's groundwater rinsing and restoration efforts, the Permit lacks adequate requirements and protections to provide certainty that groundwater is restored to permit standards and that rebound will not occur. If the Permit is not significantly amended to address the issues described below, it must be revoked because:
Curis's application did not justify the nine-month restoration period as adequate or likely, in light of ample data from similar mines that were unable to restore groundwater in such a short span;

Curis did not explain how it will be able to restore groundwater in nine months when its predecessor failed to do so even after years of restoration efforts;

ADEQ Response –
In the May 23, 2012 Response-Comment 3, the Applicant indicated that the chemical reactions associated with rinsing occur at a rate that is significantly faster than fluid flow through the Bedrock Oxide Unit. The rate of rinsing is controlled by fluid velocity rather than the rate of the associated chemical reactions. Rinsing can be accomplished within the proposed 9 months by adjusting the pump rate to draw water through the formation at a rate necessary to exchange the planned number of pore volumes (6 pore volumes) with the proposed time period.

restoration monitoring is inadequate to demonstrate the aquifer has been returned to permit standards;

ADEQ Response –
ADEQ will re-evaluate the frequency for mine block confirmation sampling under the Closure Plan 2.9.1, required to be submitted as part of the Compliance Schedule, Section 3.0. ADEQ does not expect the restoration monitoring to cease after one year based on the permit requirements to propose additional mine block confirmation samples as described in Section 2.9.1, and the permit language to incorporate the require mine block closure confirmation sampling into P-101704.

• the PTF cannot be completed within the maximum two-year life of the Permit if Curis fails to meet the nine-month deadline;

• the Permit fails to provide adequate monitoring requirements for rebound of mining pollutants; and

• the Permit fails to require adequate contingency actions that Curis will be required to take if it cannot restore groundwater to permit conditions within nine months.

ADEQ Response –
Any required mine block sampling, mine block rinsing, mine block restoration efforts or contingency actions not addressed under the Temporary APP, will be amended into P-101704.

ISL mining purposefully injects contaminants, such as sulfuric acid, into groundwater to recover target minerals, such as copper. The process mobilizes many other pollutants, such as heavy metals, sulfate, and radiochemicals into groundwater. Thus, while conventional copper mines are now designed to prevent groundwater contamination to the extent feasible, Curis's mining activities will necessarily and purposefully generate a plume of toxic contaminants in the aquifer. As USEPA has aptly put it, once Curis's mining activities stop, Curis will be facing a "corrective action" similar to remediation projects under the Federal Superfund statutes or the Resource Conservation and Recovery Act.

Curis hopes that it can clean up this plume of pollutants by flushing the groundwater system with fresh water. This hope is based primarily on the assumption that the rising pH will cause the toxic materials to precipitate out of the groundwater. Thus, the Permit requires Curis to inject clean groundwater into the mine block area while simultaneously pumping groundwater from the same area. Neutralizing agents may also be injected to hasten restoration.

Even a cursory review of the data from this site and other ISL mines around the country reveals that it is unlikely Curis will restore groundwater to Permit standards in just nine months. In ignoring this information and relying on unrealistic assumptions regarding cleanup, ADEQ has issued a type of APP permit that is inappropriate for this project.

Furthermore, ADEQ has not required adequate monitoring and data reporting in regard to groundwater restoration to determine with any level of certainty that groundwater has been restored to Permit standards.

ADEQ Response –
See previous ADEQ Responses in Section 6.0.

6.1 ADEQ Ignored Site-specific Data Demonstrating that Curis's Cleanup Schedule was Overly Optimistic.

In its application, Curis asserted that groundwater contaminated by acid injection during PTF operations could be completely restored to pre-mining conditions within just seven to nine months. Curis' support for this assertion was sorely lacking. Nevertheless, ADEQ accepted this premise and assumed a nine-month restoration period in the Permit. In doing so, ADEQ ignored the fact the BHP already attempted this same cleanup process at this same site and failed miserably. If ADEQ does not revoke the Permit, it should at a minimum significantly amend the Permit to provide detailed criteria for Curis's demonstration of restoration, thereby ensuring that the demonstration is based on adequate data and analysis, and not Curis's desire to finish the PTF and get on with commercial mining.

Real-world data from the BHP pilot test demonstrates that Curis's projections are unreasonable and unjustified. BHP began its restoration program in February 1998, after just three months of acid injection. Injection and recovery of formation groundwater to rinse the pilot test well field continued until September 2004—six *and a half years—at* rates of 30,000 to 40,000. gallons per day. At that point, the mine operator requested and received permission to cease hydraulic control for 90 days and resample the wells to determine if groundwater had stabilized at the sulfate indicator level of 750 mg/L. Subsequent sampling indicated that sulfate levels still exceeded the indicator standard in at least two wells and that sulfate in those two wells actually was increasing over levels of several years before. In addition, one well exceeded the AWQS for Total Radium, and radiochemical concentrations generally concerned USEPA. Ultimately, the mine operator was allowed to stop groundwater rinsing and discontinue hydraulic control in 2005. ADEQ has not allowed closure and abandonment of the BHP pilot test wells to this day, due to concerns about continuing acid and sulfate contamination in those wells.

So after six and a half years of groundwater rinsing, the BHP pilot test wells still demonstrated high concentrations of sulfate and radiochemicals, and the groundwater remained acidic. Monitoring since 2005 has continued to reveal contamination in the BHP well field, even fourteen years after the pilot test ended.

BHP's own evaluation of its pilot test led it to conclude that remediation could take twice as long as projected, resulting in a life-of-mine exceeding 45 years. And ADEQ's own analysis led agency staff to point out the shortcomings of Curis's proposals in light of the BHP pilot. Curis will now inject acid mining solutions for nearly five times longer than did BHP, but somehow thinks it can restore groundwater to pre-mining conditions in

months, rather than years. Nothing in the history of the BHP pilot test indicates that restoration of groundwater can be successfully completed in such a short span.

ADEQ Response –
Portions of the comment can not be answered as stated. Commenter does not provide well identification numbers when referring to groundwater sampling results or contamination.

ADEQ is reviewing the Curis pilot test independent of the previous test completed in 1997 and 1998.

ADEQ reviewed and accepted the Curis groundwater modeling assumptions, including the time estimated for rinsing.

Sulfate standards in the BHP tests wells for sampling periods conducted after the BHP pilot test and between the years of 2000 to 2010, indicated that sulfate remained below 750 mg/l. BHP Copper did inject groundwater from a well outside the IRZ and used water from the impoundment to rinse the IRZ. Curis proposes to use rinse water from the Oxide Unit.

6.2 Curis's Geochemical Model Does Not Support the Assumption that a Nine-Month Rinse Phase Will be Adequate.

Curis will argue that a nine-month rinse phase is supported by its geochemical model, a model that is largely unchanged from the one produced by BHP in 1996. The simple answer to that assertion is that the geochemical model has not been tested or calibrated against the real-world data available from the BHP test. Curis should have calibrated its geochemical modeling against that data to prove up its hypothesis that rinsing can be successfully completed in nine months. Curis has never done so and unfortunately ADEQ did not require it to do so in the Permit. Absent such a comparison to real-world results, Curis's model is an insufficient basis to conclude that rinsing can be completed in nine months.

To its credit, ADEQ has previously recognized the importance of calibrating the geochemical model to real-world data:

Pursuant to A.A.C. R18-9-A202(A)(11), the Significant Amendment Application shall compare the actual chemical concentrations (including any AWQS exceedances) for the mine block wells and POCs (prior to and after the 1997 pilot test/rinsing), as compared to the Estimated Composition of the Florence ISCR Process Solutions Forecast Groundwater Quality After Block Rinsing (Table 3.1-Tab 1OA) constituents as projected by the groundwater modeling. This shall also include a comparison of the gross alpha groundwater concentrations, as well as a discussion of any major differences between actual groundwater concentrations at the former mine block wells and POCs, relative to the concentrations projected by groundwater modeling in Table 3.1. The nitrate values for the Forecast Groundwater Quality After Block Rinsing (column 8) shall be explained.

This modeling, work could have been performed at any time, as it is based on existing data. Yet in the 16 months since the request was made, Curis has failed to validate its assumptions and calculations by verifying its model with real-world data. There is no reasonable excuse for ADEQ not to have required this work before issuing the Permit.

ADEQ also has noted the significant discrepancies between Curis's model and the data from BHP's pilot test:

The Application indicates that based on previous pilot testing completed in 1997 and the recent groundwater modeling completed by the current Applicant it will take approximately 12 months for Phase 1 and 24 months for Phase 2 to meet the indicator sulfate concentration in the mine block wells. The Estimated Composition of the Florence ISCR Process Solutions Forecast Groundwater Quality After Block Rinsing (column 8, Table 3.1- Table 1OA) groundwater modeling exercise projected a pH concentration of 6.4. It appears the previous applicant rinsed the mine block for approximately twenty two months (until December 1999) and pumped the mine block for approximately six years (until September 2004), and eight of the mine block wells had a pH value of less than 6.5 (the lowest being 3.92 in injection well BHP-6 for the latest sampling round in December 2004 and as low as 3.78 in injection well BHP-9 in June 2001) and numerous wells had constituents that did not meet the secondary Maximum Contaminant Levels (MCLs) for TDS, sulfate, aluminum, copper and manganese.

Thus, ADEQ clearly recognized in September 2011 that the BHP pilot test data directly contradicted Curis's projections of groundwater quality based upon its model. But just one year later, ADEQ glossed over the issue and issued a permit based upon that same unvalidated groundwater model.

Internal ADEQ correspondence suggests that the agency deliberately chose not to press Curis to explain the discrepancies between their model and the BHP Pilot data. Instead, it appears that ADEQ staff believed that the PTF would result in data that would address concerns about the BHP Pilot. Such an approach is unreasonable for two reasons. First, Curis's model should be validated against real-world data as part of the application process, to help validate the assumptions it puts forth as a basis for the requested permit. By not requiring such validation, ADEQ has issued a permit with insufficient support. Second, as discussed throughout these comments, ADEQ is not going to get the data it needs to validate Curis's modeling because the Permit does not require the monitoring needed to provide that data.

The discrepancies are not limited to those already noted by ADEQ. Data from the sediment in the BHP pilot test impoundment pond demonstrates concentrations of numerous pollutants that were much higher than Curis's projections. For instance, a January 2004 sample contained: aluminum at 5,800 mg/Kg, fifty percent more than Curis's projection of 3,030 mg/Kg; barium at 28 mg/Kg, compared to Curis's projection of less than 0.001 mg/Kg; and chromium at 3.4 mg/Kg, more than twice Curis's projection.

Other contaminants in the January 2004 sample were an order of magnitude lower than Curis's projections. Some of these discrepancies may be explained by the longer injection period for Curis's PTF, but the problem is that the discrepancies have neither been analyzed nor explained. This issue is highlighted in Attachment 6 of Exhibit A, in which Dr. Wilson discusses problems with Curis's geochemical modeling. He specifically notes that the modeling which resulted in process solution predictions fails to account for rebound effects demonstrated by the BHP pilot. Indeed, the BHP pilot demonstrated that rebound impacts can be seen more than a decade after rinsing. If ADEQ intends for this PTF to act as a proof-of-concept "pilot project," then the agency must require more robust monitoring to determine if rebound is occurring.

ADEQ Response –
In the May 23, 2012 Response-Comment 3, the Applicant indicated that the chemical reactions associated with rinsing occur at a rate that is significantly faster than fluid flow through the Bedrock Oxide Unit. The rate of rinsing is controlled by fluid velocity rather than the rate of the associated chemical reactions. Rinsing can be accomplished within the proposed 9 months by adjusting the pump rate to draw water through the formation at a rate necessary to exchange the planned number of pore volumes (6 pore volumes) within the proposed time period. ADEQ required additional closure costs for rinsing to be provided as part of the financial mechanism.

ADEQ does not expect the restoration monitoring to cease after one year based on the permit requirements to propose additional mine block confirmation samples as described in Section 2.9.1, and the permit language to incorporate the required mine block closure confirmation sampling into APP P-101704 as described in the Section 2.9.2 and within the Compliance Schedule Section 3.0.

While the estimated composition of numerous types of process solutions was reviewed as part of the groundwater modeling, one can assume that concentrations used in the modeling and projected by the modeling may not be the same in every case. ADEQ would expect to see the Applicant's modeling projections to fall within a range of values, some higher that what BHP results indicated, some equal to the BHP results, and some lower that BHP results. The differences should not be cause for concern, considering the modeling is just that, estimated concentrations. The purpose of the modeling was not to replicate BHP results.

The commenter references sampling data from the sediment in the BHP pilot test impoundment as compared to the Applicant projections. Typically, sediment in impoundments is excavated and removed off-site as part of APP closure.

Portions of the comment can not be answered as stated. Commenter does not provide the specific rebound effects demonstrated by the BHP pilot test.

6.3 Other ISL Mine Projects Around the Country Have Failed to Restore Groundwater in the Short Timeframe Envisioned by Curis.

Data from other ISL sites also supports revocation of, or significant amendments to, the Permit. ADEQ asked Curis to provide an example of another ISL facility where the mine operator was able to restore groundwater in the manner proposed by Curis. Curis responded that it knew of no "fully suitable analogs" of the PTF. Actually, there are plenty of analogous sites throughout the western United States in the form of uranium ISL mines.

Existing data from uranium ISL mines indicates that groundwater rinsing takes much longer than Curis projects. The Nuclear Regulatory Commission, which regulates uranium ISL mines, generally requires groundwater restoration to be completed in 24 months. But most of these mines have had to continue rinsing for much longer than 24 months, with many mines having to request amended groundwater quality goals because they could not reach the original goals of their permits. Examples of restoration periods at domestic uranium ISL mines include the following: El Mesquite Mine, TX: 10 years. Holiday Mine, TX: 8.5 years. Mt. Lucas, TX: 7 years. 0-Hem Mine, TX: 7 years. West Cole Mine, TX: 8 years. Zamzow Mine, TX: 8 years.303 Smith Ranch-Highland Mine, WY: Projected 2.8 to 12 years.304 Crow Butte Mine, NE: Requesting 9 years instead of 24 months required by permit. A discussion of the information from other ISL mines around the country is included in Appendix D. Comparisons to uranium ISL mines are relevant because they use similar technology and because Curis itself has compared its operations to those mines. The comparison clearly reveals that Curis's projections are overly optimistic and should not have been relied upon to issue a short-term Temporary APP.

ADEQ Response –
The use of engineering best available demonstrated control technologies (BADCT), along with the protection of aquifer water quality standards at the points of compliance are the legal foundation of the APP Program. In-situ mining is allowed under that Program, as long as the Program requirements are satisfied. ADEQ believes the conditions set forth in the permit constitute adequate measures to restore the mine block and to protect water quality at the POCs.

6.4 Pollutant Rebound Can Take Months or Years to Detect and Address.

Other mines also have demonstrated that ISL mine operators have had difficulty stabilizing the background for improved groundwater models in this regard. The USGS found that elevated concentrations of arsenic, selenium, radium, uranium, molybdenum and vanadium remained in aquifers after "extensive groundwater restoration activities." As a result, "a long period (5 years) for the groundwater stabilization phase may sometimes be needed" and "long-term monitoring (13 years) may be required" to ensure that contaminants have stabilized in the aquifer. The USGS concluded that rebound may be due to "mixing and diffusion of water from lower permeability zones into regions with higher permeability," or due to increasing oxidation within the aquifer.

The Permit requires Curis to monitor the mine block wells one month after rinsing and hydraulic control end permanently, and again at six months and one year. Nothing in the

record indicates how or why ADEQ used this schedule to demonstrate whether rebound is occurring, especially in light of site-specific data and information from other ISL mines. At a minimum, and consistent with practices at other ISL mines, Curis should be required to monitor for rebound on a quarterly basis for at least one to two years after groundwater rinsing stops and then periodically for at least ten years thereafter. This will, of course, require that Curis maintain the mine block wells and surrounding monitoring wells system during this period.

Equally troubling is that the Permit is silent as to what, if anything, Curis must do if rebound is detected. Many ISL mines are never able to meet restoration requirements and must seek permit amendments to loosen groundwater standards.309 ADEQ has not addressed that possibility or many issues that could arise with reasonable foreseeability. The Permit should contain specific contingency actions that Curis must take if rebound is detected, such as restoring hydraulic control and additional remediation measures.

ADEQ Response –
ADEQ will re-evaluate the frequencies of rebound sampling under the Closure Plan, Section 2.9.1. Any rebound sampling outside the scope of the Temporary APP will be amended into P-101704. ADEQ foresees rebound sampling at the mine block wells to extend past the one year time frame as stated in the Temporary APP and will be adequately addressed in the Closure Plan. Additionally, as described in Closure Plan Requirements Section 2.9.1., additional rinsing would fall under this Closure Plan, as would be required if the Mine Block Closure requirements are not meet or rebound samples indicate any other concentrations than predetermined groundwater quality. Contingency Actions would be addressed in amended P-101704.

6.5 Continuing Rinsing Beyond Nine Months Does not Solve the Problems Arising Out of the Permit With Regard to Groundwater Cleanup.

It is not enough to require that if its predictions for groundwater restoration are overly optimistic, Curis will have to continue restoration activities beyond nine months and will not be excused from meeting the permit requirements for restoration and closure of the PTF. There are other significant ramifications if Curis's projections are wrong.

First, Curis has indicated it will continue to seek its commercial mining permits even before PTF operations are complete. Without the data from Curis's attempts to restore groundwater after PTF operations, a full-scale APP permit likely will have inadequate or incorrect standards and requirements in regard to groundwater cleanup. This could lead to the need for revisions to the full-scale permit, revisions that could be negotiated after the permit is issued and without public input. The requirements for cleanup of Florence's groundwater supply should be determined through a transparent and public process and one that is developed with the best available data.

Second, if Curis cannot restore groundwater within nine months, it will violate the Permit, which cannot be extended to allow additional restoration activities. This would leave ADEQ without a permit containing standards and requirements for additional work

applicable to PTF operations that could be enforced against Curis. It is not inconceivable that Curis or its successors could just walk away when the Permit terminates, leaving ADEQ without adequate recourse.

Finally, Curis's predictions significantly impact its cost estimates for closure and reclamation. Not surprisingly, groundwater restoration is commonly the most expensive part of closure activities at an ISL mine. In Curis's closure cost estimate, groundwater restoration makes up approximately half of the $3.3 million total cost. Therefore, unrealistic and overly optimistic predictions of restoration requirements will understate the cost of restoring groundwater at the site. This, in turn, will result in an inadequate financial assurance mechanism, creating a greater risk that Arizona taxpayers will be forced to pay for cleanup of this site.

ADEQ Response –
The subject of the temporary APP is the Production Test Facility. The Production Test Facility does not include full scale commercial mining operations. The Production Test Facility well field will be limited to conducting tests, on approximately 2.2 acres of land, within the State Trust Land parcel, to provide data which might be used in an application for a permanent individual aquifer protection permit. Following the completion of the Production Test project, Curis will have the option to submit an application to ADEQ for a significant amendment to the existing permanent individual APP to allow mining, and that the amendment would be subject to all of the requirements for public participation and appeal. Review of this application will include an evaluation of pilot test results. The design to be employed for commercial operation has not yet been approved by ADEQ.

Any closure or post-closure activities associated with the Temporary APP will be amended into P-101704.

6.6 Background Sampling of the PTF Mine Block Wells is Inadequate.

The Permit does require additional cleanup activities if groundwater is not restored within the first nine months. But the Permit's requirements for pre- and post-mining monitoring are not designed to capture the data needed to appraise Curis's cleanup. Therefore, it will be difficult to determine whether contaminants have been cleaned up or if rebound is occurring. By not requiring a more rigorous sampling and monitoring program, ADEQ has undermined its ability to evaluate the success of Curis's groundwater restoration activities. As a result, ADEQ's reservation of the right to require continued cleanup provides little comfort that aquifer restoration will be completed with certainty. The paucity of available data will also give Curis ample opportunity to explain away unfavorable results in its rush to proceed with approval of a commercial permit.

ADEQ Response –

Please see response to comments SWVP 3.5.2.

7.0 ADEQ Has Not Adequately Addressed Man-Made Preferential Pathways for the Escape of Acid Mining Solutions.

The mine site and State Land parcel are riddled with coreholes, mine shafts, monitoring and test wells, and production wells that have been installed over the last 50 years. Dozens of these structures are located near or directly under proposed PTF facilities. Unless these structures are located and properly plugged and abandoned, they can and likely will serve as conduits for acid mining solutions to escape Curis's control. For this reason, ADEQ's BADCT guidance requires closure of coreholes and wells in accordance with Department of Water Resources standards. ADEQ should have required Curis to locate and properly abandon these structures on and near the State Land parcel before a permit was issued. Instead, the Permit only requires closure of underground structures within 500 feet of the PTF well field. No justification has been provided for the 500-foot radius and ADEQ has ignored the risks these conduits pose at or near other PTF facilities outside of that line. Nor has ADEQ specified what steps Curis will have to take to address manmade conduits that cannot be located or that were improperly abandoned. At worst, coreholes and old test wells will remain open to serve as conduits for pollutants to escape Curis's control. At best, ADEQ's failure to eliminate coreholes and wells as• a factor in contaminant movement has left Curis a ready excuse for future violations of permit and water quality standards. The Permit's requirements regarding coreholes, wells, and mine shafts on or near the PTF facilities are inadequate to reasonably reduce or eliminate the risks associated with these structures. ADEQ should revise the Permit to require the following: Disclosure of all documentation in Curis's possession regarding the location, construction, use, and abandonment of all coreholes, wells, and mine shafts on the State Land parcel or within 500 feet of the parcel. Submission of a report on the location of all coreholes, wells, and mine shafts. The report should clearly indicate which structures could not be located and include a proposed work plan for further investigation and the installation of appropriate monitoring facilities in the area of "lost" structures to ensure detection of escaping mining solutions through these conduits. ADEQ approval of the work plan. Completion of work under the approved work plan before PTF operations begin. Amendment of the Permit to include any monitoring locations required under the work plan. Proper abandonment of all other underground structures and a report documenting proper closure before PTF operations begin.

ADEQ Response –
Please see response to comments SWVP 3.2.3.

7.1 The Permit Does Not Require Adequate Investigation and Documentation Regarding the Status of Coreholes and Wells.

After 50 years of mining investigations and failed mining projects, interspersed with long periods of farming, locating four to six inch diameter coreholes is undeniably difficult. Curis and its predecessors have indicated that many of these underground pathways cannot be found. Other of these structures purportedly have been abandoned. But Curis has provided no evidence that it has located or can locate all of these structures. Nor has Curis provided evidence that purportedly abandoned structures were abandoned consistent with modern regulatory and technical standards.

Curis provided information in Figures 8-1 and Table 9-1 of its Temporary APP application on the "record *location"—not the known location—of* coreholes within this area. Curis further admitted that previous practice was to backfill coreholes with soil and grout only the top 20 feet, meaning the coreholes are not visible today. Curis also admitted that some coreholes may have collapsed at the surface. But the only commitment to finding these coreholes that Curls made was to excavate at the "record locations." Even that commitment was qualified to save Curis money, as Curis proposed to look for changes in soil texture and vegetation or surface elevation to "avoid unnecessary excavation." It is absurd to think that Curis can locate these coreholes and old wells through such visual clues. Curis also proposed to "evaluate" alternative geophysical techniques for finding coreholes. Such an evaluation would be rudimentary at best. Curis only has two years to finish PTF activities under the Permit, and needs 23 months of that time for ISL mining and groundwater restoration. That leaves little time for "evaluation" of geophysical locating techniques, much less implementation of such techniques. In reviewing Curis's application to amend APP P-101704, ADEQ originally requested additional information on coreholes that is necessary to a complete understanding of this issue. The requested information included: a schedule for closure of all coreholes; a discussion of the "probability that additional boreholes may be present" that Curis had not previously identified; and a description of the method Curis would use to locate and identify coreholes. Curis never responded to that request. In reviewing Curis's Permit application, ADEQ failed to renew this important request for the additional information on coreholes and wells at the site. ADEQ did not request any additional information on coreholes, other than to request a map depicting "the locations of coreholes that will be plugged and abandoned ."' The map provided by Curis in response merely provides location information already available from Magma and BHP records already in ADEQ's file. ADEQ completely ignored the probability that numerous coreholes exist on the State Land parcel that are not depicted on this—or any other—map. No reasonable explanation exists in the record to explain why ADEQ did not require Curis to provide information similar to what it had previously requested in September 2011 in regard to coreholes.

USEPA did ask Curis to provide historic records regarding well and corehole construction and abandonment. Curis's response listed approximately 38 coreholes and wells, 16 of which were located within 500 feet of the PTF well field that had been purportedly abandoned. Curis also provided documentation for those coreholes and wells, but abandonment documentation was missing for many wells and clearly inadequate for others. Even where the information included an indication that the corehole was filled with cement, information regarding what methods were used to place that cement and the calculated volume of the corehole to be filled were not provided. Curis's response also lacked required Notices of Intent to Abandon a Well, Well Abandonment Reports, USEPA Plugging and Abandonment Forms, diagrams depicting "as abandoned conditions", and descriptions of placement methods and volumes. Furthermore, Curis's own summary indicates that Geophysical Borings B-5 and B-6 were filled with "native material," and that abandonment details for Well DMB were not known. Finally, if Curis was asserting that these wells and coreholes have been properly abandoned, it is directing contradicting its previous admission that these coreholes "have not been sealed in

accordance with ADWR or Class III well construction standards, and are not considered to be properly sealed." In light of these issues, USEPA has noted that annular cementing records are missing for 28 of the 38 wells listed; additional investigation of corehole conditions will be needed at many locations; additional documentation is required; coreholes may need to be replugged due to inadequate abandonment procedures; coreholes may need remedial cementing; and bentonite grout will have to be replaced.

Despite these issues, the Permit merely requires that Curis plug and abandon coreholes and wells within 500 feet of the PTF well field boundary and submit documentation of closure at least 30 days before PTF operations begin.326 The Permit does not require Curis to document that its list of "record" corehole locations is exhaustive and complete, or even to document how it came up with the list. The Permit contains no contingency plans if all of the "record" coreholes cannot be found. Nothing in the Permit provides for additional monitoring or other remedies if coreholes cannot be found. The Permit requires no further action as to coreholes and wells that were purportedly abandoned in the past, regardless of the inadequacies of the abandonment procedures used. The failure to recognize that coreholes are a serious problem at this site and are deserving of additional investigation, documentation, and mitigation has resulted in an APP permit with inadequate BADCT requirements.

ADEQ Response –
Curis has provided information requested by ADEQ on the abandonment of wells/coreholes within and 500-feet around the PTF well field. The information is presented in the document titled Response to Comprehensive Request for Information with Suspension dated May 2, 2012, Attachment 3, prepared by HDI-Curis, and received by ADEQ on May 25, 2012. Curis is required to properly abandon those identified wells and exploration coreholes per Figure 18-1 of the above referenced document. The documentation for wells/coreholes abandonment must be submitted to ADEQ 30 days prior to the start-up of the PTF operations per Temporary Permit Section 2.2.3.a. The plugging and abandonment of the wells/coreholes must be in accordance with BADCT Section 3.4.5.3.1 requirements (ADWR/EPA-UIC). The Temporary Permit requires that all "boreholes or wells" must be plugged and abandoned per the regulations, and this is irrespective of when a newly discovered borehole or well is made within the PTF well field boundary. It is Curis responsibility, under the requirements of the Temporary Permit, to identify (geophysical methods, etc.), document, and properly abandon all boreholes or wells within 500-feet of the PTF well field boundary.

7.2 ADEQ Should Require Curis to Close All Coreholes on Near the State Land Parcel.

ADEQ previously requested that Curis provide a justification for its proposal to plug and abandon only those coreholes and wells located within 500 feet of an ISL mine block. Curis never responded to that request and has never justified this proposal in the Permit record. Curis has never demonstrated that injection pressures will not push acid mining solutions farther than 500 feet from a given well. Curis has not demonstrated that contaminants will not flow faster and farther along preferential pathways, such as known

faulting in the PTF area, to find open coreholes and wells more than 500 feet from an injection well. Curis should be required to explain why it is reasonable to limit closure to a 500-foot radius, based upon a thorough evaluation of hydrogeologic data and models within the PTF area. It should then be required to verify its predictions that a 500-foot radius is safe through monitoring during PTF operations. USEPA appears to agree that there is a lack of foundation for the 500 foot radius and that Curis's approach to this area has been inconsistent at best.

By accepting without question Curis's proposal to close only those coreholes and wells within 500 feet of the PTF well field, ADEQ has unreasonably permitted dozens of other coreholes and wells to remain open as conduits for toxic mining solutions. Curis's site map indicates that there are about 140 recorded corehole and well locations on the State Land parcel. Curis has not identified — and ADEQ has not asked—how many of these have actually been located. Other coreholes may exist on the State Land parcel that Curis has not identified, including an unknown number of coreholes in the area of the underground mine shafts. In addition, dozens of other coreholes and wells exist within 500 feet of the State Land boundary.

To minimize the risk of contaminants escaping through these conduits to the drinking water supply, ADEQ should require Curis to locate, plug and abandon every corehole and well on the State Land parcel and within 500 feet of the parcel that is not needed for PTF operations. This work should entail several steps to ensure that the universe of relevant structures is properly addressed and that the work is performed according to industry and regulatory standards. First, ADEQ should require Curis to immediately disclose all documentation regarding the location, construction, depth, arid use of coreholes at this site. Curis clearly has such documentation, because it has discussed its ability to locate coreholes based upon "available survey coordinates" and has disclosed limited documentation to USEPA. If Curis's predecessors possess some or all of the documentation, ADEQ should obtain the documents from the relevant companies under its existing subpoena authority. The information should be provided in a report summarizing the current status of these structures.

Second, ADEQ should require Curis to prepare a work plan that includes a thorough investigation for other coreholes in the area and procedures for properly plugging and abandoning coreholes and wells. The report should clearly indicate which known structures could not be physically located. For coreholes and wells that could not be located, the work plan should provide for the installation of appropriate monitoring facilities in the area of "lost" structures to ensure detection of escaping mining solutions through these conduits. The work plan should also explain what actions Curis will take if it cannot properly plug a corehole or well because the casing has collapsed or for other reasons.

After ADEQ approval of the work plan, Curis should be required to complete all work under the plan and submit a report to ADEQ documenting its efforts before PTF operations begin. ADEQ should also require a permit amendment to incorporate any new

monitoring locations or activities that prove necessary in areas where coreholes could not be located or properly plugged and abandoned.

ADEQ should require more than Curis's existing proposal to USEPA on corehole abandonment. Apparently, Curis plans to use the Balance Method to abandon the wells and coreholes. This method requires that the corehole be completely open along its entire depth and diameter to allow a small diameter pipe to be installed for injection of cement slurry to plug the corehole. The likelihood of these old coreholes being completely open; especially in upper alluvial materials, is remote. And the chances that Curis will be able to re-open these coreholes are slim. Furthermore, Curis plans to inject a volume of cement equal to approximately 100 percent of the calculated corehole or well. We question adequacy of this plan, especially given the fact that USEPA Region V requires injection of a volume of concrete equal to 120 percent of the calculated corehole volume to account for formation losses. Although the Balance Method may be sufficient where coreholes are open and obstruction free, that is clearly not the case here.

Curis's proposal to abandon coreholes and wells on or near the State Land parcel is appallingly inadequate. Given the small size of this parcel, the amount and size of facilities that Curis proposes to squeeze onto it, and the activities that Curis plans to conduct, Curis should be required to properly abandon all coreholes on or within 500 feet of the State Land parcel before PTF operations begin. At the very least, ADEQ should require proper closure of the dozens of coreholes and wells located in, under or near key mining facilities arid structures. By limiting closure requirements to the immediate area around the PTF well field, ADEQ ignored numerous other coreholes and wells that present a significant risk to area drinking water supplies.

ADEQ Response –
See response to commenter #24(16).

7.3 Open Coreholes and Wells Near POC Wells Threaten the Quality and Reliability of Data Obtained from Those Wells.

Numerous coreholes and wells are located near existing and proposed POC wells. For instance, there are at least nine such conduits within approximately 400 feet of the POC well cluster that includes POC wells M14-GL, M15-GU, M22-O, and M23- TJBF. Five coreholes or wells exist within 400 feet of the proposed location of POC Well M52-TJBF. And there are at least 6 coreholes and 3 wells within approximately 400 feet of the proposed location of POC Wells M54-LBF and M54-O that Curis is not required to close. The Permit does not address most of these structures.

This summary is taken from Curis's Revised Figure 8-1, which was provided in the company's September 21, 2012 response to ADEQ; Attachment C, Table C-3 to Curis's UIC Application; and Figure 1 of Magma Copper's April 28, 1995 response to ADEQ.

If these coreholes are not closed, the quality and reliability of groundwater sample results from the POC wells will be subject to question. Curis's predecessor already has cited

coreholes near one of the POC wells as the basis for a past exceedance. When exceedances were detected in two POC wells in 1999, BHP Copper concluded that the exceedances were due to "[c]ommunication between aquifers" that was due, in part, to open coreholes near the wells. One of these wells was M14-GL, which is a POC well under the Permit. Given this, logic dictates that all coreholes near the PTF's POC wells should be closed to prevent possible cross-contamination that could interfere with accurate monitoring related to Curis's mining activities.

ADEQ Response –
The maintenance of hydraulic control at the PTF well field is the main component used to prevent excursions from the mine block wells. ADEQ believes the 500 foot radius from the PTF well field is an adequate distance to abandon corehole/wells, considering the Area of Review (AOR), as required by the UIC Application. ADEQ assumes that EPA intends to maintain this radius from the PTF well field, for the plugging and abandonment of boreholes and wells. ADEQ adopted the EPA directive for the 500 foot abandonment requirement. The area located outside the 500 foot buffer zone is unlikely to be effected by the PTF operations. Additionally, the distance from the PTF well field and the dynamics of groundwater flow in an area far removed from pressurized injection (such as at the POCs), suggests the probability of groundwater flowing upwards in an unabandoned borehole for potentially hundreds of feet from the Oxide Unit into the LBFU and UBFU is minimal considering the Oxide Unit does not exhibit artesian aquifer conditions.

ADEQ does not believe there is sufficient information to confirm or deny whether exceedances detected in two POC wells in 1999, were due to "communication between aquifers" that was due, in part, to presumed open coreholes near the wells.

7.4 ADEQ Should Have Required Curis to Close Coreholes Within Surface Impoundments.

As depicted in Figure 7-3, at least two coreholes — 53S and 338S — are located within the proposed surface impoundment in the northwest corner of the State Land parcel. Two wells—PD-1 and PP-7—also appear to be located within or near the impoundment. The impoundment will contain high levels of contaminants, including arsenic, heavy metals, and radiochemicals. Yet the Permit does not require Curis to plug and abandon the coreholes or demonstrate that the two wells were properly abandoned, as Curis appears to assert. It does not take an expert to know that leaks from the impoundment could flow into these coreholes and then into groundwater. ADEQ's failure to require closure of these coreholes is inexcusable and should be immediately rectified through relevant Permit amendments.

ADEQ Response –
The PTF Process Water Impoundment (PWI) will be constructed with a double liner system complete with a Leak Collection and Removal System (LCRS) and the Runoff Pond will have a single liner. The PSI is designed as a temporary structure that will be decommissioned and removed at the completion of the PTF operation. The re-grading of

the facility sites will allow for repair, plugging, and abandonment of coreholes uncovered at the time of impoundment construction. ADEQ has added language to Section 2.2.3 of the permit to include that all boreholes or wells located within 150 feet of the Process Water Impoundment and Runoff Pond shall be plugged and abandoned per ADWR rules.

7.5 ADEQ Should Have Required Curis To Abandon Coreholes and a Well in the SX/EW Area.

At least two coreholes appear to be located next to the SX/EW plant area, including one adjacent to proposed chemical storage tanks.335 Additionally, a POC well installed by BHP Copper, M32-UBF, is located in this area. ADEQ should have required closure of these structures in the Permit, but again failed to do so. In addition to these structures, there are several additional coreholes in the general area of the SX/EW plant that should be plugged and abandoned to prevent contamination from spills and releases during copper processing.

ADEQ Response –
The SX/EW plant is not a discharging facility and therefore not subject to APP requirements.

7.6 ADEQ Should Have Required Curis To Abandon Coreholes Located Under or Near Pipelines and Chemical Tanks.

More than a dozen coreholes appear to be located directly under or adjacent to the pipelines that will carry toxic mining solutions from one side of the State Land parcel to the other. Other coreholes likely are located under or near the future locations of chemical tanks, but it is not clear where many of those tanks will be located. The Permit does not require Curis to plug and abandon any of these coreholes outside of the 500-foot well field radius. As with coreholes under the impoundment pond, coreholes under these pipelines and tanks generate a serious risk of contamination should a pipeline leak or rupture. ADEQ should require these coreholes to be closed, with proper documentation, before PTF operations begin.

ADEQ Response –
The pipeline is not a discharging facility and therefore not subject to APP requirements.

7.7 ADEQ Has Not Required Curis to Adequately Address Test Well DM-B, Which Curis Could Not Find Before.

Within 500 feet of the PTF well field to the northeast is Test Well DM-B. It is 700 feet deep and located near several coreholes and monitoring wells. The well has a five inch steel casing that extends to 611 feet. It was completed in August 1974, presumably by Conoco. Curis has provided no information regarding how or where this well is screened. If this well has not been properly abandoned, it could serve as a conduit for mining solutions to enter the drinking water supply.

According to ADWR records, Curis transferred this well into the company's name in May 2010. There is nothing in the ADWR file to indicate that this well was abandoned by Curis or its predecessors.339 In its January 2011 APP application, Curis provided geographical coordinates for the well but reported that it could not physically locate the well.34° In its Permit application, Curis identified Test Well DM-B on a site map but included no information on the well in its list of wells and coreholes located near the PTF well field. ADEQ correctly requested more information on this well. In response to that request, Curis indicated that the well had been abandoned, but did not explain if it had actually located the well or provide detail in support of the contention that the well was abandoned? In a more recent submittal to USEPA, Curis has again asserted that Well DM-B has been abandoned, but Curis provided no documentation in support of that conclusion, nor did it explain if this well has now been located?

A lost or improperly abandoned well in this location creates a significant conduit for PTF mining solutions to escape Curis's control. This concern is heightened by information about other wells in the area. Drawdown data from Observation Well MCC523 has been described as "characteristic of fracture-dominated flow" that may be related to the Sidewinder Fault? Observation Well MCC523 is 690 feet deep and is approximately 250 feet northeast of Test Well DM-B, indicating that the latter well likely is located in the Sidewinder Fault zone also? The location of a lost or improperly abandoned well in in an area of known fracturing should be of serious concern to ADEQ?

Also, Observation Well OB-6, located 250 feet from Test Well DM-B, was used in a 1994 aquifer pump test conducted by Magma Copper. This well did not respond to the pump test, but no explanation could be found because nothing was known about the installation, construction, depth or screening of the well? A partial explanation might be found in a lost or improperly abandoned Test Well DM-B, which could have acted as a conduit for groundwater in a manner that impacted the response in Observation Well OB-6. In the Permit, ADEQ has required Curis to submit documentation records for the plugging and abandonment of all wells and coreholes within 500 feet of the PTF well field boundary. But ADEQ has allowed Curis to wait until 30 days before PTF operations begin to provide that information. As a result, the public will have no access to those records until months after public comment is closed and the permit is finalized. Furthermore, if Test Well DM-B has not been located or Curis cannot document proper abandonment, ADEQ will not know that until just before PTF operations begin. Nothing about the APP process to date gives the public any assurance that ADEQ will require Curis to properly address an improperly abandoned or lost test well so late in the process when Curis will certainly be pressuring ADEQ to allow the start of PTF operations. Moreover, there is nothing in the Permit that addresses the steps that will be taken (if any) if Curis cannot locate the well or properly document abandonment. Therefore, ADEQ should revise the Permit to include the following requirements:

1. If Curis cannot locate Test Well DM-B, Curis should install additional monitor wells in the immediate area and along relevant fractures before PTF operations begin. Because proper placement and construction of additional monitoring wells is key to protecting

drinking water supplies, additional monitoring wells should trigger a major permit amendment subject to public comment.

2. If Curis locates Test Well DM-B but cannot demonstrate that it was properly abandoned along its entire depth, Curis should properly abandon the well and provide documentation to ADWR and ADEQ before PTF operations begin.

ADEQ Response –
According to information provided to ADEQ in the May 23, 2012 Response to Comprehensive Request to Information, DM-B has been abandoned. It is Curis's responsibility, under the requirements of the Temporary Permit, to identify (geophysical methods, etc.), document, and properly abandon all boreholes or wells within 500-feet of the PTF well field boundary.

7.8 Underground Mine Workings Have Not Been Adequately Considered.

The Permit should be revised to require additional investigation and monitoring of underground mine workings on the State Land parcel. In the early 1970s, Conoco dug underground workings on the property with shafts on the northern end of Curis's planned operations. Two mine shafts, nearly five feet in diameter and 700 feet deep, are connected by an eleven by nine foot horizontal shaft. Branching off from these main shafts are over a mile of horizontal drift and crosscut shafts located 800 feet below the surface. These underground shafts are flooded with groundwater, with the average flow of groundwater into the shafts estimated at 530 gallons per minute. Curis has no plans to close these shafts during mining operations, despite its intention to inject acid mining solutions into wells around and directly above these workings as depicted in Figure 7-6. Curis has dismissed the risk of these underground shafts with respect to the PTF, arguing that the PTF well field is too far from the underground workings to have any impact. This argument, however, ignores the fact that ADEQ apparently plans to issue a commercial mining permit to Curis even before PTF operations are completed. Because Curis apparently plans to install injection wells throughout the area of underground mine shafts on State Land, the impact of injecting acid mining solutions through these mine shafts should be investigated and evaluated as part of the PTF. Such a proof of concept is necessary to understand potential issues and impacts and to develop methods of addressing them. Ignoring these impacts, when ADEQ intends to permit ISL mining directly over the underground mine workings, is unreasonable and irresponsible.

ADEQ Response –
To date ADEQ has not approved an amendment to APP 101704 for commercial scale mining at the Florence Copper Project. ADEQ requested that Curis provide a current status, historical documents (maps, etc.), and discussion on the underground Conoco Mine. This information was provided by Curis per several meetings with ADEQ; the Curis response document dated May 23, 2012 (Engineering Item 11); and a recent video of the underground mine vertical shafts. ADEQ is not aware that Curis plans to install injection wells over, or inject directly into the vertical mine shafts, when and if they apply for an Individual APP. Curis has completed water quality testing of the underground

mine workings. The APP Temporary Permit (Section 2.5.1) also requires Curis to take depth specific samples in the underground workings prior to the injection, during PTF operations, after the completion of rinsing, and into the closure and post-closure monitoring period. Comparison water quality testing is required at various stages throughout the PTF.

7.8.1 ADEQ has recognized the dangers posed by the underground mine workings, but has not forced Curis to address them.

ADEQ has repeatedly recognized the dangers of allowing ISL mining directly over and through the underground mine workings. ADEQ has previously recognized Curis's failure to provide sufficient evaluation and information on the underground workings, features which ADEQ characterized as a "subsurface reservoir" and "potential long-term discharging facility." ADEQ noted that "an experienced individual familiar with this type of site condition" should evaluate the underground mine workings and that the evaluation should include a discussion of engineered controls (grouting, etc.) or other containment methods. And even more recently with respect to Curis's PTF proposals, ADEQ staff was apparently concerned with the stability of structures built over old underground adits and tunnels. Other internal ADEQ correspondence referenced pump test data suggesting a hydrologic connection with the underground workings.

ADEQ also has asked Curis to analyze the potential risks presented by historic coreholes and wells, underground mine workings, and geologic contacts.357 Among other things, ADEQ identified the potential for contaminated mining solutions to travel up to the ground surface through the mine workings. As explained by ADEQ "[tjhe mine apparently has several entrances (vertical shafts) that could, under the right hydrologic event, provide leach solution to the surface." The information provided by Curis regarding this other risks associated with the mine workings was simply "not adequate."

Curis never responded to these comments with regard to commercial operations. Curis also dismissed ADEQ's concerns as irrelevant in the Temporary APP application, offering only the possibility of future study of the underground workings. Adding insult to injury, Curis then proposed to provide the agency with a plan to address the underground workings after the commercial operation permit is issued, completely bypassing public review and comment.

In May 2012, ADEQ once again explained to Curis that underground workings can hold process solutions for long periods of time before discharging to groundwater. ADEQ indicated that water within the workings should meet AWQS or pre-operational water quality before in situ operations begin. In response, Curis claimed that the water in the underground workings would not be impacted by injection during PTF operations because the well field was cross-gradient or down-gradient from the mine shafts and more than 500 feet away. Along with this statement, Curis enclosed a video log of the primary shaft devoid of any discussion or analysis. Water quality data from an

unidentified onsite shaft sample was provided along with a promise to collect two additional samples prior to beginning operations.

ADEQ also requested updated closure and post-closure costs and compliance measures. In response, Curis merely referred the agency to the reclamation plan it submitted to the State Land Department, not even giving the agency (and the public) the courtesy of enclosing the report. In actuality, Curis has not submitted a formal reclamation to State Land. To date, it has submitted only a draft reclamation plan that provides little information on this subject.

Permit has no requirement that Curis address these issues. Given the known risks of underground mine workings recognized by ADEQ and the almost complete absence of any meaningful analysis, it is imperative that ADEQ require Curis to conduct detailed investigation into the status of the workings along with thorough analysis by a qualified expert and then follow-up on this information by imposing conditions designed to protect the soils, subsurface and groundwater from potential environmental degradation.

ADEQ Response –
ADEQ has discussed with Curis the potential impacts to PTF surface structures (process pipeline, roads, etc.) from the underground workings. ADEQ was satisfied with the information provided to ADEQ regarding the underground workings and PTF associated facilities.

7.8.2 Curis's proposal to monitor for subsidence is inadequate.

Another concern expressed early on by ADEQ was the risk of subsidence posed by the underground mine workings, a risk that Curis has failed to adequately analyze. In its initial submittal, Curls didn't even provide ADEQ with an underground map of the actual workings.363 In the Permit application, Curis provided mere lip service to the issue claiming that the underground workings "represent very little risk of subsidence at ground surface."3M Little support is provided for this conclusion other than a brief description of previous subsidence studies at the Casa Grande Santa Cruz Joint Venture Site.

Underground mine workings pose dangers of subsidence and earth fissuring that can adversely affect surface structures such as pipelines. Their existence can also create preferential pathways for migration of sulfuric solution into area groundwater. In its BADCT Manual, ADEQ has recognized that "[groundwater declines of as much as 300 feet in the alluvial basins in central and southeastern Arizona are known to have caused subsidence of as much as 20 feet ... [Solution extraction of salt[,]. . .hard rock mining and other underground excavations . . . also can produce large amounts of subsidence. In situ leaching may result in subsidence through dissolution of underlying rock. ... If subsidence is not uniform beneath the facility, different rates or amounts of subsidence can result in horizontal or vertical strains that can impair the integrity or functioning of facility components such as wells, piping systems, and embankments. It can also cause

earth fissuring that can provide preferred pathways for seepage migration to the water table."

As can be seen in Figure 7-7 above, Curis's PTF design includes a long pipeline (in black) connecting the well field to the beneficiation facilities designed to carry acid- and chemical-laden pregnant leach solution and lixiviant for reinjection right across multiple historic underground mining shafts (depicted in brown). And as recognized by ADEQ itself, underground mine workings pose a significant subsidence risk that can lead to pipeline system failures. If Curis's proposed pipeline settles and cracks or breaks or otherwise fails, chemical-laden pregnant leach solution and lixiviant could spill out to the surface soils, potentially leach into the subsurface, and contaminate area groundwater.

An April 2012 draft of ADEQ's request for additional information noted the problems inherent in Curis's pipeline design, in that it traversed several underground mine workings. ADEQ's draft also noted that subsidence is an "inevitable consequence of underground mining", that the effected surface is generally larger than the extracted area, that faults generally increase the risk of subsidence, that water reduces the strength of the underground rock and that effects to the surface may not be visible for some time. As a result of these concerns, ADEQ requested a subsidence study for the State Land parcel. ADEQ also requested a separate schedule to monitor for subsidence during PTF operations.

In the final request for additional information issued to Curis, ADEQ eliminated almost all of the discussion of subsidence, such that its request regarding subsidence information was limited to the following comment: Please provide a subsidence study as requested above along with a PTF site monitoring schedule appropriate for the short duration of the testing (one-year or more). The proposed annual survey of control points should at least be quarterly. The proposed fixed control points should be appropriately located, documented, and identified on a map.

Because ADEQ eliminated the more thorough discussion of subsidence in the final request for additional information, the reference in this comment to "the subsidence study as referenced above" makes no sense in the context of the final request. Perhaps for this reason, Curis ignored the request and has never submitted the subsidence study. Nor did ADEQ ever follow up to require submission of the study before approving the Permit or include the study as a permit requirement. In light of ADEQ's apparent concern about this issue, this omission should be rectified and Curis should be required to submit the study for ADEQ analysis before any permit becomes effective.

The monitoring schedule requested by ADEQ also is of concern. Curis responded to the request with a proposal that was apparently discussed in an April 26, 2012 meeting with ADEQ. The proposal was for quarterly monitoring at ten points on the State Land parcel. The monitoring data was to be kept at the site and would not be reported to ADEQ until after closure of the PTF facility, which could be years after PTF mining is complete.

The Permit provides no requirements for further investigation or monitoring of subsidence, other than a cryptic requirement in Table 4.1-3 that Curis must "initiate subsidence/fissure monitoring program" and that inspections are required quarterly.371 No detail is given regarding the requirements of the monitoring program. No indication is given that a monitoring program has been previously approved by ADEQ. Furthermore, the program is listed in relation to the PTF well field only, creating confusion as to whether Curis must monitor at the underground mine workings, along the pipeline corridor, and at other relevant locations. Such a sloppy approach to this issue leaves the door wide open for Curis to minimize this reporting requirement, as there is nothing in the Permit that requires anything specific of Curis. ADEQ also should specify that subsidence data from the monitoring program be provided as it is collected, not after closure of the PTF facility. There is no justification for delaying reporting for years, when Curis can include the information with quarterly and annual reporting that is already required under the permit.

ADEQ staff has acknowledged that subsidence is a real concern, but ADEQ's approach to this issue in the Permit is completely inadequate. Thorough characterization and preventive measures related to the historic underground workings are imperative, not irrelevant. The risk of subsidence and uncontrolled groundwater leaching inherent in this design poses a significant risk to Florence's drinking water supply. Instead of requiring Curis to merely monitor subsidence conditions during PTF operations, ADEQ should require Curis to hire a qualified expert to thoroughly study and analyze subsidence risks associated with the site and Curis's operations *before* the permit becomes effective and Curis begins operations. Furthermore, a monitoring program and schedule should be approved before the permit is effective to ensure that impacts from Curis's operations are documented.

ADEQ Response –
ADEQ did receive and reviewed a series of underground mine workings maps prior to issuance of the APP temporary permit. Permit Section 2.7.4.4 does require Curis to submit quarterly reports, within 30-days of the calendar quarter, on subsidence monitoring. The PTF process pipeline will cross-over the underground workings at three specific locations. Due to the depth from the surface to the underground mine workings; the age/size of the mine working drifts; the current surface condition; the potential for subsidence is considered minimal.

7.8.3 An Unknown Number of Coreholes Around the Underground Mine Workings Have Never Been Located.

According to Magma Copper: Conoco (1976) reports that exploratory coreholes in the vicinity of the underground workings were abandoned by grouting prior to the pilot mining activities. The objective of the abandonment activity was to prevent basin-fill groundwater from migrating through the coreholes into the underground workings. No indication of the number or exact locations of the abandoned coreholes was located in project files.373

Thus, there are an unknown number of coreholes around the underground mine shafts that have never been located. Although these coreholes may have been abandoned according to 1970s standards, no details regarding how Conoco's grouting has been presented. It is highly unlikely that Conoco's attempts to plug these coreholes would satisfy modern regulatory requirements. If Conoco was concerned that the coreholes would serve as conduits for groundwater to enter the mine shafts, then those same coreholes can act as conduits today for contaminants to move through the area.

ADEQ Response –
The PTF area, which includes a 500-foot buffer zone, has been reviewed by Curis to determine if there are any unplugged coreholes. This information was provided to ADEQ within the document titled Response to Comprehensive Request for Information with Suspension dated May 2, 2012, Attachment 3, prepared by HDI-Curis, and received by ADEQ on May 25, 2012.

8.0 Curis's Financial Assurance Mechanism Fails to Meet Legal Requirements or Provide Certainty **that Project Costs Are Covered.**

Prior to permit issuance, Curis must demonstrate financial capability or competence for facility construction, operation, maintenance, closure and post- closure. The amount for which financial assurance is provided must be supported by technically sound cost estimates. The surety bond provided by Curis does not meet regulatory standards and is based on inadequate cost estimates. Because Curis has not met the requirements for financial assurance, ADEQ should revoke the Permit or require a new financial assurance mechanism that meets applicable standards.

In its Permit application, Curis indicated an "intention" to provide financial assurance in the form of a letter of credit. Curis did not provide an actual letter of credit or any correspondence from a bank indicating that Curis had actually secured or begun to secure a letter of credit. Instead, the application only contained a letter from Curis's Chief Financial Officer stating that the company planned to submit a letter of credit. Curis never did provide a letter of credit.

Apparently, as of September 26th only two days prior to permit issuance—Curis still had not provided evidence of financial assurance, leading ADEQ to request an internal expedited review of whatever mechanism would be provided. The day before ADEQ issued the Permit, Curis finally submitted a performance bond certificate to ADEQ.378 ADEQ staff reviewed the bond and drafted a memo approving the bond that same day. ADEQ's eleventh hour review of this key application requirement was obviously rushed in order to issue the Permit quickly, after SWVP and others filed suit against the agency. In its rush to review the financial assurance materials, ADEQ failed to recognize that Curis's financial assurance fails to meet the statutory and regulatory criteria. Ariz. Admin. Code § R18-9-A201(B)(5), R18-9-A203; Ariz. Rev. Stat. § 49-243(N). Ariz. Admin. Code § R18-9-A201(B)(5)

ADEQ Response –

The Performance Surety Bond submitted by Curis satisfies the financial assurance requirements of R18-9-A203(C)(2).

8.1 The Performance Bond is Based on Inadequate Cost Estimates.

ADEQ requires permit applicants to demonstrate financial capability to construct, operate, close, and ensure proper post-closure care.379 Despite this requirement, the Permit states that Curis provided financial assurance for only $3,487,743 — an estimate that appears to cover only closure and post-closure costs. The failure to include construction, operation and maintenance costs in the estimates upon which financial assurance was based is a violation of ADEQ requirements that merits revocation of the Permit.

Although ADEQ attempted to get Curis to include additional pertinent figures into the cost estimates, Curis used the agency's request as an opportunity to decrease its costs, thereby decreasing its financial assurance obligations. A comparison of Curis's Table 5-2 as revised on Sept. 21, 2012 with the earlier revision of May 21, 2012, reveals that Curis decreased its total closure costs by $88,878 and its total post-closure costs by $520,391. This is the case even though ADEQ instructed Curis to include costs for all PTF POCs because the agency did not agree that closure and post-closure estimates for remaining PTF POCs were adequately covered under another permit. It appears that Curis accounted for some of the decrease based on a formula. Although that formulary decrease may be defensible for per unit sampling and analysis costs, it is nonsensical when applied to the cost of writing a single report, which will have many of the same elements and requirements, regardless of the number of wells.

Despite the fact that Curis estimated total closure and post-closure costs at $3,503,819,381 the Permit states that financial assurance was provided for only $3,487,743382 and the performance bond certificate states that the sum is $3,487,076.383 Without any explanation for these discrepancies, the basis for Curis's financial assurance amount is unclear and unsupported in the record. A.A.C. § R18-9-A203(B). The bond also is based on estimates that underestimate closure costs. Curis has included only minimal monitoring cost factors in its estimates, with inadequate contingencies to address additional monitoring if problems are encountered. Curis also has underestimated costs associated with groundwater restoration due to Curis's overly optimistic estimate of restoration needs.

Additionally, the cost estimates and work upon which the performance bond is based fail to include key components. Because Curis's submitted cost estimates do not match the figure for which the performance bond was issued, it is difficult to determine exactly what is and is not included within the total. Some of the post-closure work may be missing. The Permit hints at this in the financial capability section where it references the performance surety bond amount - $3,487,743 — as the "estimated closure cost," implying that post-closure costs including necessary monitoring were not included. Throughout the Permit, there is reference to the need to amend the other permit to include closure and post-closure activities that continue beyond the date of the Permit. If the

Permit contemplates PTF activities that are to be covered by another APP permit, we question whether those activities were included within the cost estimate total supporting the performance bond.

As pointed out earlier in these comments, the Permit fails to address what will be required in the event Curis abandons any further mining after the PTF or fails to complete the PTF. Not only should there be permit conditions to cover these scenarios but the costs of those activities should be built into the Permit's cost estimates and covered by a proper financial assurance mechanism. Although it appears that at least one ADEQ staff person considered these issues, they remain unaddressed in the issued Permit.

ADEQ Response –
Section 3.0 of the Temporary APP requires Curis to submit an amendment application within 180 days of effective the date, to incorporate closure and post-closure costs and activities into the existing Florence Copper area wide APP (P-101704). This amendment shall reassess the total overall closure and post-closure costs for the entire Florence Copper Project site.

8.2 The Performance Bond's Coverage Is Inadequate.

A review of the performance bond submitted by Curis to ADEQ reveals a plethora of internal inconsistencies, conflicting requirements, and excess verbiage that overall create serious deficiencies in coverage. The bond appears to have been drafted hurriedly and may have been based in part on Canadian requirements that have no application in Arizona. If left unaddressed, the bond as issued could leave ADEQ exposed with little to no coverage. At best, the bond's language creates factual and legal issues regarding coverage that could expose ADEQ to the increased risk of litigation over the bond's coverage.

First, and especially troubling, is the fact that the bond includes several cancellation provisions which sharply expose ADEQ to the loss of all financial assurance. In one cancellation provision, Curis reserves the right to cancel the bond contingent only on authorization by ADEQ Director — an authorization that appears nowhere in ADEQ's regulations. Such a reservation is highly unusual in performance bonds. In another provision, the surety has the right to cancel the bond with 90-days written notice. Cancellation provisions also appear in the bond's conditions. All of these opportunities for cancelling the bond's performance are contrary to ADEQ's regulatory requirements and leave ADEQ completely exposed.

Second, the bond fails to cover the scope of activities required by ADEQ's regulation. Even though ADEQ's regulation requires financial assurance to cover the costs for facility construction, operation, maintenance, closure and post-closure, the coverage of Curis's proffered performance bond is severely limited by the bond's language. The bond sets forth two different conditions that create internal ambiguity in the bond's coverage. Both conditions focus on closure, post closure care and post closure care monitoring, leaving construction, operation and maintenance completely unaddressed. But even the

conditions regarding closure and post-closure are severely limited by vague, unclear and often contradictory language.

Third, the bond contains artless language that casts uncertainty on whether the bond is actually a forfeiture bond as required. Just one example is the reference to a "guaranty sum" or "guaranteed sum" instead of the "penal sum" associated with this bond. ADEQ regulations specifically require that performance through payment into a standby trust fund be of the penal amount. Finally, the bond imposes notice requirements upon ADEQ not contained in the regulations or statutes. In several places, the bond requires the Director to provide the surety with default notification before performance is required. Similarly, the bond imposes a burdensome and troublesome "notice of default" requirement upon ADEQ after which Curis is afforded a 30-day grace period before any further action. None of this is authorized in the financial assurance regulations or statute. In sum, the performance bond submitted by Curis to ADEQ as the financial assurance mechanism to support the PTF fails to comply with the relevant regulatory and statutory requirements, leaving ADEQ and Arizona taxpayers exposed to bearing the costs for this project in the event Curis fails to perform. Curis has failed to meet the financial demonstration requirements for an APP permit. For this reason alone, ADEQ should revoke the Permit.

Curis's inadequate provision of financial assurance is not merely a failure to properly describe an application component but should be a serious "red flag" for the agency. Curis Resources (Arizona) Inc. is a stand-alone company whose only asset is the Florence Copper Project. Although Curis has continually touted its association with HDI, HDI is not legally responsible for Curis's operations or failures. Should Curis incur financial hardships or cause damage to the environment or water supply, it may very well be that ADEQ and the Arizona taxpayers will have to look to whatever financial assurance Curis provides.

ADEQ Response –
The surety bond submitted by Curis was reviewed for its conformity with the established ADEQ template for the surety bond financial assurance mechanism. The review also included steps to determine that the bonding company was listed as an acceptable surety on federal bonds in Circular 570 of the U.S. Department of Treasury.

8.3 The Permit Should Require Curis to Regularly Update and Re-evaluate Costs Covered by Financial Assurance.

Curis should be required to provide updated cost information annually for the PTF. Many of the PTF's key details, standards and requirements will not be known until after the Permit's issuance. For instance: Many ALs and AQLs will be set through the Permit's Compliance Schedule; Wells and coreholes will be abandoned after the UIC and APP permits are issued; and Details regarding closure and reclamation will not be produced until the PTF operations are underway.

If ADEQ affirms the Permit, the costs associated with the PTF could change dramatically, based on how these and other issues are addressed. This warrants annual review of cost estimates and adjustments to the financial assurance mechanism as necessary to ensure closure and reclamation costs are addressed.

ADEQ Response –
See response to commenter's Section 8.1 regarding cost estimates. A thorough reassessment of closure and post-closure cost estimates for the entire Florence Copper Project site is required in Section 3.0 of the permit.

8.4 Curis Should Provide Up-Front Financial Assurance Mechanisms & Contingencies to Address Off-Site Contamination.

Nothing in Curis's financial assurance proposals will address off-site contamination, injury to neighboring landowners' property rights and property values, or impacts to human health and the environment. We assume that Curis will argue ADEQ has no authority to include such considerations in determining costs to be covered by financial assurance. We believe ADEQ has ample authority and discretion to address these issues through the financial assurance requirements. At the very least, ADEQ should require Curis to develop a mitigation plan for addressing offsite impacts from ISL mining. If ADEQ affirms its issued Permit, Curis will be effectively permitted to pollute Florence's drinking water supply. At a minimum, Curis should be required to address the risks posed to Florence's drinking water now, not after contaminants have escaped Curis's control and done their damage

ADEQ Response –
See Response to Comment # 24(12).

9.0 ADEQ Should Consider the Experiences at Other ISL Mines & ADEQ's Own Previous Permitting Decisions.

In assessing Curis's proposals, both ADEQ and the public have repeatedly asked Curis for information on mining at other sites that are comparable to this ISL mine. Curis's answer has always been that there are no comparable sites. That simply is not the case.

Mines across this country, especially uranium mines, have used ISL processes for decades, either alone or in tandem with other forms of mining. The impacts of these mines on surface water and groundwater resources is well documented and readily available to ADEQ. Furthermore, copper mines across the country and in this State have a long history of environmental damage. Because of this, ADEQ has a virtual roadmap of the risks associated with Curis's operation; key issues that should be addressed; and precedent for the protective measures that should be built into a permit. Although the agency has been made aware of these resources, it is apparent that ADEQ has largely ignored the experiences at these other mines in drafting the Permit. Provided in Appendix D is a summary of just some of the in-situ mining experiences across the U.S.

ADEQ is not required by law to demonstrate that it has addressed every issue raised at other ISL mines across the country. But in reconsidering the terms and conditions of the Permit, a reasonable agency would and should assess the information from those other sites and take measures aimed at preventing similar problems in Arizona.

ADEQ Response –
ARS 49-243(B) part 1 states "The facility shall be so designed, constructed and operated as to ensure the greatest degree of discharge reduction achievable through the application of BADCT..." The applicant has successfully demonstrated that the facility will meet the requirement not to degrade groundwater quality. The applicant has proposed liners, storm water controls, operational practices, maintenance and facility monitoring that will greatly limit the pollutants potentially released from the facilities. The applicant has evaluated the potential migration of pollutants from the facilities and estimated a discharge impact area (extent of impact on the aquifer) based on hydrogeologic conditions at the site. Through this evaluation, the applicant has shown that the methods used to limit the impacts to the groundwater will be effective and constituent adequate measures to protect groundwater.

9.1 ADEQ Should Carefully Scrutinize Curis's Predictions of Environmental Safety Because Mines Necessarily Result in Significant Environmental Impacts that Are Often Downplayed by the Mine Operator.

As ADEQ is well aware, Arizona is riddled with abandoned, closed, and still- operating mine sites that have contaminated surface waters, groundwater, and soils. Many sites continue to pollute today, despite modern environmental standards and permit requirements. Curis's rosy predictions that nothing can or will go wrong and that Florence's drinking water supply will not be impacted by this mine ignore the fact that most, if not all mines in this State have and will create pollution that must be dealt with. Indeed, the very process of ISL mining purposefully pollutes groundwater in order to extract copper.

In 2006, environmental experts issued two reports on the mining industry's ability to predict impacts to surface water and groundwater. The first, *Predicting Water Quality at Hardrock Mines,* examined modern methods for modeling and predicting impacts based on geochemical characterization techniques. The second, *Comparison of Predicted and Actual Water Quality at Hardrock Mines,* surveyed data from 25 mines around the country to determine the reliability of predictions made by mining companies concerning the impacts of their operations. These reports reviewed copper mines and other types of hardrock mines in ten western states, including Arizona. These first-of-their-kind reports were peer reviewed by experts in the private sector, as well as by the United States Geological Survey and USEPA.

These studies bring to light a decades-long failure by Government regulators and industry consultants to recognize and correct deficient procedures and methods for predicting contamination of water at hardrock mines. As a result of this failure, faulty analysis continues to support predictions of water quality impacts that are painting a false picture

for the public. The reports provide numerous findings that should be considered in evaluating Curis's claims regarding the impacts of this mine.

The studies conclude that, despite predictive modeling, the problems at the vast majority of mines were worse than predicted. Fourteen of fifteen studied mines that were near groundwater and had elevated potential for acid drainage or contaminant leaching had mining-related impacts to groundwater, seeps or adit water that included exceedances of water quality standards. Eleven of the thirteen studied mines near surface water with similar potential exceeded water quality standards. Yet almost half of the mines that had impacted groundwater or surface water had underestimated or completely ignored the potential for these impacts in their environmental studies.

The impacts were not negligible either. All of the mining companies that were studied predicted that their mines would operate in full compliance with water quality standards. Operating data, however, indicated that 76% of the mines exceeded water quality standards due to mining activity. Of the mines studied, 52% produced groundwater contamination that exceeded water quality standards. Toxic heavy metals (lead, mercury, cadmium, copper, zinc and others) exceeded standards at 63% of the mines studied. Arsenic and sulfate exceeded standards at 58% of the mines. Cyanide exceeded standards at 53% of the mines.

The mining companies' rosy predictions failed because, among other things, mining companies failed to adequately characterize site conditions; water quality predictions were biased to minimize predicted impacts; and there is little or no field information describing the impacts of hydrogeologic conditions, weather and other factors on contaminant movement in the environment. Many of the issues cited in the reports as forming the basis for inaccurate predictions of mining impacts have been discussed in relation to this Permit. Every mine carries risks, but Curis adamantly fails to recognize or address them. Worse yet, ADEQ has failed to address them in the Permit.

The only measure proposed by Curis to prevent contaminated copper leaching solutions from flowing in drinking water aquifers is hydraulic control through recovery wells and aquifer rinsing at mine closure. Similar efforts have failed at every other in- situ leach mine in the United States. Nothing in the history of mining in Arizona or the history of ISL mining in the United States suggests that Curis's project can or will avoid impacts to Florence's drinking water supply. ADEQ should bear this in mind as it reviews the Permit in light of public comment.

ADEQ Response –
See ADEQ Response to Comment item 9.0.

9.2 This Permit Likely Will Set the Precedent for Numerous Other ISL Mines Currently Being Proposed.

In-situ mining has seen an uptick across the country and is expected to be a more utilized technology due to its lower costs and ability to reach lower grade ores. Several other in-

situ mines are currently being proposed in Arizona: In southern Arizona the Excelsior Mining Company is proposing to use ISL methods to mine copper at the Gunnison Mine near Benson. Liberty Star Uranium and Metals Corporation—the same company that has proposed uranium mining in the Arizona Strip north of the Grand Canyon—has lease rights in the Ironwood National Monument northwest of Tucson, for which it has proposed ISL copper mining.

Acid and alkaline ISL mining have been mentioned as possible components of a uranium mine outside of Wickenburg.

And as you know, older mines have used in-situ methods to extract minerals from previously mined areas. Although each project has its own eccentricities in terms of geology and hydrology, in-situ mining methods similar to the ones proposed for Curis's PTF are bound to recur and continue to arise before ADEQ for permitting decisions.

ADEQ has an opportunity now to develop a process and a permit that addresses the unique challenges of in-situ mining in a way that is protective of the environment. Because ADEQ can count on continuing requests for in-situ mine permits, the agency should use this opportunity to develop a sound permit that protects the area's drinking water, local residents, and the environment as a whole.

ADEQ Response –
Comment noted.

9.3 ADEQ Should Have Waited to Issue the Permit Until USEPA Issued the Class III UIC Permit.

ADEQ has in the past, required a similar project to first obtain its UIC permit from the USEPA before proceeding with the project's temporary permit application. According to the public records associated with the El Paso Natural Gas Copper Eagle Gas Storage Project, the project proponent first argued that a UIC permit was unnecessary, an argument that ADEQ did not buy into. Not only did ADEQ require the project proponent to seek a UIC permit, but the agency went a step further, issuing a deficiency letter and requiring the project to first obtain its UIC permit before the temporary permit application would be reviewed any further. We question how Curis's proposed project is any different and why ADEQ would choose to treat Curis any differently than the project proponent in El Paso Natural Gas. ADEQ should have treated Curis's failure to obtain a UIC permit as a deficiency and deemed Curis's application incomplete until it secured the necessary UIC permit from the USEPA.

It also makes more sense from a permitting perspective for the UIC permit to be issued before the APP permit. The UIC Class III permit for which Curis has applied covers the injection and recovery wells included in Curis's proposed PTF. By contrast, ADEQ's APP authority covers not only the injection and recovery wells but also other surface features such as the impoundment and runoff ponds. Because the EPA's UIC permit covers only one component of ADEQ's APP permit, it seems only logical that ADEQ

would want to include reference to EPA's injection/recovery well requirements within the Permit. And indeed, it must make sense to ADEQ as well because there are already references to EPA's permit and permitting authority within the Permit. The quizzical nature of it though is that EPA has not yet issued a UIC permit, and for that reason, the Permit's references are vague and somewhat unclear. ADEQ's past and current practices and logic support the notion that the Permit should not have been issued before EPA's UIC permit.

By not waiting on the UIC permit and coordinating permitting activities with USEPA, ADEQ has produced a situation where it is likely that Curis will be held to different requirements in the different permits. For instance, USEPA has recently indicated that Curis likely will have to address coreholes and wells outside of the 500- foot boundary described in the Permit. Different UIC permit conditions may require amendments to the APP that would have not been necessary had ADEQ better coordinated with USEPA. Furthermore, those differing requirements may lead to higher project costs that will not be covered by Curis's existing financial assurance mechanism. Such disparities could lead to inadequate resources to cover closure of the PTF should Curis default, or could require additional unnecessary work to update the financial assurance mechanism, placing additional demands on ADEQ's already limited resources. This is just one very simple example of the problems that likely will arise from ADEQ's rush to issue the Permit, in contradiction of past practice and a reasoned approach to the permitting process.

ADEQ Response –
ADEQ's review of this application is subject to the requirements of the licensing time frames ("LTF") statute under Arizona Revised Statutes ("A.R.S.") §41-1072 through §41-1079 and the LTF rules under Arizona Administrative Code ("A.A.C.") R18-1-501 through R18-1-525. The APP application process is independent of the federal process. Any modifications to the mine operations that may be required due to decisions made by federal agencies may require amendments to the issued APP.

ADEQ acknowledges that there may be similarities to the APP permit and the EPA UIC permit, however ADEQ also concurs with the commenter that Curis will be held to different requirements in the separate permits due to different laws governing each permitting process.

10.0 Additional Changes Are Necessary to Further Refine the Permit. 10.1 ADEQ Should Require Formation of a Community Advisory Group and **Make All PTF Data, Reports** and **Correspondence Available in a Local Public Repository.**

Curis plans to purposefully inject contaminants into an aquifer that provides vital groundwater to the Town of Florence and its residents. This mine faces significant opposition from the Town of Florence, local residents, water providers, and landowners. ADEQ's review of the permit, future applications, and mining activities will continue to invite intense scrutiny and interest. For these reasons alone, the process should be as transparent and open as possible.

At other mines, ADEQ has required the mine operator to post all correspondence and documents related to the mine's APP in a public repository. This facilitates the public's access to information so that individual members of the public do not have to file repeated records requests with the agency. ADEQ has also required formation of a community advisory group that meets on a regular basis to review activities conducted under a mining APP. Given the importance of Curis's pilot testing to the future of this project, ADEQ should require Curis to facilitate formation of a community advisory group. After all, once pilot testing is complete, Curis will be essentially conducting a groundwater remediation project. Community advisory groups are commonly, required for remediation projects under other state and federal statutes and it is reasonable to require one here. Furthermore, ADEQ should require Curis to provide public access to all future correspondence and documentation related to this project, either at a local library or community center, or through online access.

ADEQ Response –
ADEQ maintains all public records for this permit at ADEQ Records Center. The public file can be reviewed by appointment with ADEQ Records Center. The number to call is (602) 771-4380.

10.2 ADEQ Should Establish the Record Used to Render its Decision on the Permit.

It is clear from repeated records requests to ADEQ that the agency has no system for maintaining an accurate and reliable record of the information, data, and documentation it relied upon in making the decision to issue the Permit. ADEQ should immediately establish an index of this information, including all correspondence, internal agency documents and correspondence, and correspondence with the permittee, other agencies, and other interested parties. ADEQ should also create a privilege log of documents relevant to this matter that it believes are not subject to the public records laws. ADEQ should make a copy of these records available to the public in its record center.

ADEQ Response –
All records of communication are available for review at the Records Center.

10.3 The Legal Description of the State Land Parcel Must be Corrected.

The Permit states that Curis is authorized to operate the PTF in Sections 26, 27, 28, 33, 34, and 35 of Range 9E, Township 4S. All of the PTF facilities are located on the State Land parcel, which is located entirely with Section 28. Although Curis may own land in the other Sections listed, mining is illegal on Curis's private lands outside of the State Land parcel. ADEQ should amend Section 1.0 and 1.1 to correct this error. 10.4 Numerous Errors in the Permit Must be Corrected. The Permit contains numerous errors in internal references, numbering, and wording that should be corrected. These include the following:

ADEQ Response –
ADEQ has corrected the legal description of the State Land Parcel.

- Numerous deadlines and requirements are based on the issuance date or the effective date of the Permit. It appears that ADEQ has not enforced many of these deadlines. ADEQ should clarify all deadlines and the Compliance Schedule of Section 3.0 consistent with relevant comments contained herein and an open and transparent permitting process.

ADEQ Response –
ADEQ has corrected and changed most of the instances were deadlines or permit requirements were premised on language that referenced the permit "issuance date". ADEQ has changed the language to read "effective date" of the permit.

- Section 2.2.4: This section discusses injection pressures that will be amended under the Compliance Schedule of Section 3.0. The Compliance Schedule contains no requirements in regard to injection pressures.

ADEQ Response –
ADEQ has removed this language from the permit in Section 2.2.4 that indicates that injection pressures that will be amended under the Compliance Schedule, because the injection pressures have been established in the permit and are identified in Table 4.1-8.

- Section 2.6.4(B)(1): This section contains an internal reference to "Section 2.7.3(A)", which does not exist.

ADEQ Response –
ADEQ has removed to reference to subsection (A) when referring Section 2.7.3. in Section 2.6.4(B)(1).

- Table 4.1-2: On page 31 of the permit, three different tables are numbered 4.1-2, creating confusion throughout the Permit as to which of these tables is being referenced.

ADEQ Response –
ADEQ has clarified the table reference 4.1-2 to include Table 4.1-2A, Table 4.1-2B and Table 4.1-2C.

- Table 4.1-5 should be amended to include sampling for gross alpha and the anion/cation balance, consistent with other sampling requirements in the Permit.

ADEQ Response –
Table 4.1-5 includes sampling for gross alpha. The anion/cation balance is not specifically included as a parameter to be analyzed for discharge monitoring. ADEQ does not believe that the cation/anion balance should be added to the discharge monitoring table. The permit language will remain the same.

- Table 4.1-7 should be amended to include sampling for molybdenum.

ADEQ Response –
ADEQ does not concur that molybdenum should be added to the sampling table. Typically, other copper mining permits do not include the analysis of molybdenum, unless the facility is mining molybdenum. The permit language will remain the same.

- Table 4.1-7 contains numerous footnotes references in the table itself that have no corresponding footnote text below the table.

ADEQ Response –
ADEQ has corrected the footnotes in Table 4.1-7.

- Table 4.1-8 should be amended to better describe the ALs related to "recovery rate of well field" and "inward hydrologic gradient." The ALs currently are vague and subject to interpretation.

ADEQ Response –
ADEQ has replaced the symbols in Table 4.1-8 with language for clarity.

#182, Town of Florence –

The commenter submitted written comments in opposition to the Florence Copper Project.

Comment 1.
The Fact Sheet and Aquifer Protection Permit No. P-106360 that was issued on September 28, 2012 specifically states that the injection wells are classified as Class III Injection wells by the United States Environmental protection Agency (EPA) and permitted by the UIC Program when in fact our recent documentation from the EPA Region 9 indicates that the UIC Permit #AZ396000001 is only being considered for the Florence Copper In-Situ Injection Project(s) and has not been issued. Pursuant to 40 CFR Section 124.5(c) (2) the permit must be reissued to ensure that the proposed in-situ copper mining is protective of underground sources of drinking water. Likewise 40 CFR 124 also requires a public notice and opportunity for public comment for the aforementioned UIC Permit. As a result any study or permits issued in 1997 to another firm for a related projected is not acceptable to BADCT and thus not valid per EPA as permit compliance was not maintained thus the need to verify issuance of a UIC Permit for the Project at this time.

ADEQ Response –
Please see response to comment 181, SWVP 9.3.

Comment 2.

The waste material generated as Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM) at the Florence Copper Project was addressed in an EPA Report (EPA 402-R- 99-002 entitled Technical Report on TENORM in the

Southwestern Copper Belt of Arizona) in which it was stated that based upon data from the Florence Copper Project; the PLS produced will contain very high levels of radionuclide and that they are leachable based upon data presented in 1996. Since NORM waste may occur in on-site disposal of the waste can lead to airborne releases of radioactive particles, what provisions are made to address this scenario?

ADEQ Responses -
Aquifer Protection Permits do not regulate airborne particles.

Comment 3.

There have been changes in the levels of MCLs' that warrant revisiting the Alert Levels and AQL Levels for water and these should be updated to the current Safe Drinking Water Act rather than relying on outdated MCLs'. This aspect is more important in the use of the EPA's requirements for radionuclides rather than relying on the state standards which are not as comprehensive as the EPA requirements. The applicant has stated that a review of existing MCLs' would be included in response to our questions and that a report with recommendations for modifying the alert levels and aquifer quality limits in the permit would be provided. The Town of Florence would like a copy of such a report. Re: "Questions under consideration regarding Florence (AZ) Copper Project Relative to the General Plan Amendment and Land Use".

Pursuant to this item, the current baseline water quality data should be established for the aquifer in support of the AWQS in order not to degrade the aquifer relative to any pollutant. The levels should-meet the current groundwater within the IRZ irrespective of any previous effects from prior test facilities and thus meet the preoperational concentrations of the existing aquifer. It was documented by the Florence Copper Project that the basis for the establishment of the alert levels and aquifer water quality limits was incorporated in a previous 2001 APP Amendments; it is noted that several MCLs' may have changed their limits since this 2001 Amendment.

ADEQ Response –
ADEQ enforces Aquifer Water Quality Standards (AWQS) listed in AAC R18-11-406 (B). Most Aquifer Quality Limits in the Temporary APP are set at the AWQLs, except in instances where ambient groundwater quality indicated background water quality in excess of an AWQS. For constituents of concern generally seen at copper mines, there are two differences between Arizona AWQS and Federal MCLs:

(1) EPA has a MCL for uranium set a 30 microgram per liter (ug/L). Currently, there is no AQWS for uranium. The discharge characterization and groundwater sampling in the Temporary APP requires the analysis of uranium, with no permit limits established. The permit has and will establish alert levels and/or aquifer quality limits for other radionuclide's in the groundwater sampling for adjusted gross alpha, and radium 226 + radium 228.

(2): The MCL for arsenic is 0.01 milligram per liter (mg/L), and the Arizona AWQS for arsenic is set at 0.05 mg/L. For purposes of this permit, ADEQ has

established a use protection level (UPL) for arsenic of 0.01 milligrams per liter (mg/L), which is consistent with EPA's primary drinking water standard for arsenic. The UPL will be applied at the northwest corner of the State Mineral Lease Land. Alert levels for arsenic shall be established for each of the relevant POC wells through consideration of fate and transport of arsenic in groundwater to ensure that the UPL is not exceeded at the northwest corner of the State Mineral Lease Land.

ADEQ has no knowledge of reports to be prepared by Curis outside of those required by the APP. All reports submitted by Curis under the APP are public record and can be reviewed at ADEQ Record Center.

Data from eight or more rounds of ambient groundwater quality at the new POCs is required in the Temporary APP to establish baseline groundwater concentrations in accordance with Section 2.5.3.2. Alert Levels and Aquifer Quality Limits will be established at the POCs based on the ambient groundwater data. In accordance with Section 2.2.3 the applicants is required to establish ambient mine block groundwater concentrations using an ADEQ approved statistical method. ADEQ believes that current baseline water quality data will be sufficiently established by the permit.

Groundwater monitoring permit levels where amended in 2001 for APP P-101704 when BHP Copper Company was the permittee, however that information was not reviewed as part of the Temporary APP Application.

See response to commenter #181-5.3

Comment 4.

The State Land Lease expires in December, 2013 yet the APP grants a "license" to operate past the expiration date of the lease.

ADEQ Responses -
The State Land Lease process is independent from the APP permitting process. Both are required in order for Curis to operate the PTF.

Comment 5.

The ISCR Operations Plan addresses Emergency Response/Contingency Plan Requirements which affect the Town of Florence as a water provider and an emergency responder any proper notification requirements or Emergency Action Plan (EAP) is in the best interest of the Town of Florence. Prudent notification and assessment of the ramifications of the operational monitoring necessitating Town action should be recognized and more importantly addressed in the interest of public health, safety, and welfare. The Florence Copper Project agreed to discuss the operations, emergency preparedness and response required for emergency services for both the ISCR production test and full commercial 15CR operations; this item has not yet been completed. Re:

"Questions under consideration regarding Florence (AZ) Copper Project Relative to the General Plan Amendment and Land Use".

ADEQ Responses -
The Temporary APP contains Contingency Plan requirements in Section 2.6 and Emergency Response and Contingency Requirements for an Unauthorized Discharge as described in Section 2.6.5, as it relates to specific APP permit requirements. Groundwater Monitoring Section 2.6.2.4.3 for exceeding an Alert Level for a Narrative AWQS and Section 2.6.4 Aquifer Quality Limit Violation does require the notification of downgradient groundwater users of the aquifer who may be directly affected discharge. ADEQ believes the contingency requirements set forth in Section 2.6.2.4.3 and 2.6.4 meet APP regulatory requirements.

ADEQ can not comment on agreements made to discuss operations, emergency preparedness and response required for emergency services between the Florence Copper Project and the Town of Florence.

Comment 6.

Involvement by the water providers in the area would be beneficial to on-site inspections, review of monitoring/compliance data stated in the APP and involvement with the Contingency Plan is critical through a delegation agreement with ADEQ and/or Florence Copper Project. By rule Arizona Administrative Code R-18-9-110 and Arizona Revised Statute 41-1009 requires an agency inspector for this effort and can mean any local delegation of the state authority to have a right to enter premises for inspection per ARS 49-144 notwithstanding the requirements as stated in Appendix D of the Arizona Mining Guidance Manual BADCT. We can only assume that quality monitoring/compliance data is essential to each of the water quality programs at ADEQ and the resultant Quality Assurance Program Plan (QAPP) assures the quality at each step in the monitoring compliance process. In the Florence Copper APP it is imperative that a) data of known and documented quality is based on sound scientific principles especially in a prescriptive BADCT, b) that only the correct type, amount, and quality of data will be collected for use in this Temporary APP as it is a predecessor that establishes a basis for a future APP, c) proper oversight of monitoring/compliance activities be achieved which allows errors to be identified and reduced, and d) provided reliable and defensible decisions for a better future decision. A qualitative QAPP data management plan needs to address the proper QA/QC topics which are applicable, relevant, and related to the PTF for groundwater, soil, surface water data for data validation consistent with ADEQ/EPA level requirements.

ADEQ Responses –
ADEQ has delegated state authorities to Counties for APP permits for Onsite Wastewater Treatment Systems. However, ADEQ has retained sole authority to conduct inspections for Individual Aquifer Protection Permits, including Temporary APPs. Third parties such as water companies can request copies of monitoring/compliance data as part of a file review request through ADEQ Records Center at (602) 771-4380.

In accordance with A.R.S. §§ 41-1009 and 49-203(B) and described in Section 6.8, the permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to enter and inspect the facility as reasonably necessary to ensure compliance with Title 49, Chapter 2, Article 3 of the Arizona Revised Statutes, and Title 18, Chapter 9, Articles 1 through 4 of the Arizona Administrative Code and the terms and conditions of the permit. ADEQ has qualified personnel in the Water Quality Compliance Section to conduct inspections.

The APP regulated facilities at Florence Copper Project have been evaluated for conformance with ARS §49-241 through §49-244, and A.A.C. R18-9-A201 through A209. The facilities have been designed on sound scientific principles and meet the BADCT performance requirements.

Comment 7.

A recently created ADWR GWSI map suggest a scarcity of post-2003 water level measurements in the project area as well as current mapping by the ADWR of the entire Pinal AMA identifies the project area as date deficient with regards to data used to assess the three (3) geologic units therein. Recently submittal of groundwater flow maps created from the ADWR GWSI data as part of Hydrologic Study of the area indicates that these maps were considered inadequate by APP reviewers; one can then conclude that current water elevation data needs to be collected in the area to ascertain the groundwater flow direction rather than relying on data that is pre2003. Exhibit "A" provides ADWR reference for these GWSI maps.

ADEQ Responses –
Attachment 14C of the Application provides potentiometric surface maps depicting groundwater conditions at POCs wells associated with APP Permit P-101704 in each of the water bearing beneath the site. Active monitoring at the site was conducted between the years of 1996 to 2011, excluding 2009. Groundwater flow directions based on the potentiometric surface maps is predominantly toward the north-northwest direction during the entire period of monitoring with some variations in the UBFU and LBFU. The variations in the UBFU and LBFU are mostly likely due to off-site pumping. Based on figures provided in the Application there is no significant groundwater flow shift within the Bedrock Oxide Unit. No significant changes in groundwater flow in the Oxide Unit is mostly likely due to less recharge impulses from the Gila River due to its greater depth below ground surface, reduced hydraulic conductivity as compared to the UBFU and LBFU, and due the geologic unit being less susceptible to off site pumping. The groundwater flow with the Oxide Unit has remained consistently to the north-northwest throughout the monitoring period with little variation. The data compiled at the site since the inception of groundwater monitoring in 1996 is consistent with the regional groundwater flow direction provided on the ADWR GWSI Maps provided in the Application.

ADEQ believes there is an adequate number of groundwater monitoring locations (POCs and other monitoring wells already on-site) in each of the water bearing units, to provide accurate information to determine groundwater flow direction specific to the site. For the purposes of the Temporary APP, quarterly groundwater measurements and groundwater contour maps for POC wells are required to be submitted in accordance with Section 2.7.4.4

Appendix B – Balmorhea Geoscience Services:

Comment 1. Section 2.1 Facility/Site Description;

a. The application and supporting documentation has been established that the oxide zone is fractured, and that groundwater flow was primarily along fractures and faults. This should have been stated in the site description. This was a major oversight in the facility description as shown in this permit.

ADEQ Responses –
The Facility/ Site Description typically found in Section 2.1 of most APP permits may provide a general description of where the facility is located, the purpose of the facility, a description of the facility including process-related discussions; a description of the APP regulated facilities, and other pertinent facility information. This Section within the APP framework typically does not discuss aspects of the project hydrology, nor is there a regulatory requirement to do so.

Comment 2 (Section 2.2.1.1) In-Situ Area Injection and Recovery Well Block; a. Mechanical integrity of the wells is questioned; the proposed Portland sulfate resistant cement should not be used (see Attachment 3 with e-mail from cement expert and associated references).

ADEQ Response –
The use of Type V Portland cement is acceptable considering that cement use (well/surface casing, etc.) will be protected by the containment of solutions within the injection/extraction piping, sub-surface geology, and the use of small amounts of additives (latex, bentonite, alumina, etc.) to the cement.

Comment 2 (Section 2.2.1.1) b.
The applicability of the fracture gradient of 0.65 psi/ft for existing fractures is questioned. An analysis of hydraulic properties of critically stressed existing fractures similar to that of Hennings (2012)(see Attachment 4) was not completed, including a complete analysis of in situ stress orientations, magnitudes, and variation across the project. Individual BADCT does require a similar demonstration for existing fractures.

ADEQ Response –
The geologic formations, into which solution will be injected (oxide zone), was tested in 1995 by BHP Copper to determine a minimum fracture gradient. A fracture gradient of

approximately 0.71 psi/ft was determined from the testing. However, Curis Resources has set a more conservative number of 0.65 psi/ft in order to ensure that injection pressures will not induce additional fracturing of the oxide zone for each injection interval. Individual BADCT requirement found in Section 3.4.4.2 only states that fractures are of concern, without specifying evaluation criteria.

Comment 2 (Section 2.2.1.1) c.
Hydraulic control was evaluated based on FlowDim, which is an invalid demonstration (Attachments 1 and 2); analysis of groundwater low in fractured aquifers using current day technology needs to be used (see Attachment 2 with references that are summarized below). In fractured systems flow can bypass recovery, observation, and POC wells, in which case hydraulic control cannot be demonstrated, further reason to revoke the Temp APP and not issue the EPA UIC permit.

i. The EPA (ie. Recommended analysis of clean up of contaminants in fractured rock), Science Advisory Board, British Columbia, Canada (Report on Fractured Bedrock Field Method and Tools, 2010), and Golder's FracMan group describe the modern approaches of analysis of fractured bedrock aquifers.
ii. The FracMan group specifically offers the following applicable services for In Situ Mining (as noted on their website): Optimization of well placement by pathways analysis through fracture networks recovery; Design of monitoring systems based on pathways analysis; and Prediction of leachate loss (in fractured groundwater system).
iii. Bill Dershowitz, 2011 (principle with FracMan Group) specifically addresses with environmental and hydraulic issues with In Situ mining in fractured bedrock and current day technology used to address the issues; these approaches were not used. At this point in time the permit should be revoked

ADEQ Response –
The commenter is asked to provide the reference to where in the APP Application that the 'FlowDim' software was discussed. The 3-D groundwater modeling software 'MODFLOW' was used for the analysis of site groundwater flow.

Comment 3 (Section 2.2.1.2) Process Water Impoundment; a.
The sizing of the impoundment is dependent on the water balance. Due to the fact the recovery wells will be extracting discharges from injection in a fractured system and that a large portion of the radial flow extraction will come from native groundwater opposite the injection direction, the water balance proposed needs further evaluation. Furthermore, no detailed analysis of injection losses in this fractured system has been conducted (see Attachment 2 and FracMan Group website). Hence the sizing of the impoundment needs further analysis. Since the permit is issued, ADEQ must revoke the APP.

ADEQ Response –
An acceptable water balance, discussion, and summary were provided by Curis Resources for the production test facility (PTF). The most recent document submittal

concerning the PTF water balance is dated May 23, 2012. A water balance model (GoldSim®) was used to size the Process Water Impoundment (PWI) using all applicable inflows, storage, and outflows. The PWI was designed per BADCT requirements for a Process Solution Pond (BADCT Section 2.3). Injection losses or excessive recovery will have little to no impact on the overall storage capacity of the PWI due to process monitoring/control per the PTF Contingency Plan (APP Application Volume 2 of 4, Attachment 13, January 2011). The PWI design details and water balance evaluation can be found in the report titled PTF Process Solution Impoundment Design Report by Knight Piesold Consulting and dated March 1, 2012.

Comment 3 (Section 2.2.1.2); b. *Any secondary containment structures using the proposed cement is considered inappropriate (see Attachment 3), further justifying revocation.*

ADEQ Response –
ADEQ is not sure what secondary containment structures the comment is referring to. The APP Program does not regulate tanks, sumps, piping, or secondary containment for these structures/facilities.

Comment 3 (Section 2.2.1.2); c.
The geochemical narrative and model evaluated with Petrel (Application, Vol. 10, Exhibit 10C) states the ore occurs along fractures and assumes a homogeneous distribution of fractures. Justification of this distribution assumption appears to be related to the results from FlowDim, which is known now not to be valid. The geochemical model should be based on updated fracture system analyses and assumptions that follow from that study (Attachment 2). Such a geochemical analysis will be a more complex and a more time consuming evaluation. Such an analysis, as stated in the submittal, would impact the entire proposed facility design. This further justification of the need for permit revocation in light of the potential environmental impacts on nearby communities and people.

ADEQ Response –
ADEQ believes that the correct document is APP Application Volume 2 (March 1, 2012), Attachment 10, Exhibit 10C, which deals with the geochemical evaluation of process solutions for the PTF. This Technical Memorandum states on page 2 that "The primary ore mineral in the oxide zone is chrysocolla and its occurrence is more or less evenly distributed between the fractures and the rock matrix". This is not saying that there is "homogeneous distribution of fractures". The Petrel software was used for geo-statistical evaluation but there is no reference or inference in the memorandum about the use of FlowDim software. ADEQ evaluated the geochemical information provided and found it acceptable based on current geochemical groundwater modeling.

Comment 4 (Section 2.2.1.3) Run-off Pond; a.
If the rest of the facility is inadequately sized, due to the reasons noted above (Attachments 1 and 2), then the sizing of the pond for "temporary" storage issues may be

inadequate. The sizing of this pond should be re-evaluated along with the rest of the facility in light of the topics noted above.

ADEQ Response –
The Run-off Pond was designed per BADCT requirements for a Non-Stormwater Pond (BADCT Section 2.2) and included sizing the pond in order to contain the volume for a 100-year 24-hour storm event, direct precipitation, discharges from process facility pads/roofs/sumps, and spills from these areas. As required by BADCT the Run-off Pond is designed with 2-feet of freeboard. The Run-off Pond will normally be empty in order to maintain maximum available storage volume for stormwater run-off. There will also be pond-level detection, controlled by a pump installed within the Run-off pond sump. Whenever fluid is detected above the pond level set-point, the sump-pump will turn-on and transfer fluid out of the Run-off pond to the PWI via pipeline. The sump pump will have an emergency generator for power backup to ensure that the Run-off pond can be emptied during a power failure. The Run-off Pond design details can be found in the report titled Runoff Pond Design Report Production Test Facility M3-PN110129 by M3 Engineering and dated February, 2012.

Comment 4 (Section 2.2.1.3); b.
The epoxy coated concrete foundation for the PLS tank and Raffinate Tank should not be used (Attachment 3).

ADEQ Response –
The APP Program does not regulate tanks or secondary containment (sumps, pads, etc.) for tanks.

Comment 5 Section 2.2.2 Site-specific Characteristics; a.

Had this permit application included a more exhaustive analysis of fracturing, site specific stipulations would most likely have been included.

ADEQ Response –
ADEQ can not respond to the comment as stated. The commenter did not describe what site specific stipulations means relative to a more exhaustive fracture analysis.

Comment 6. Section 2.2.3. a: Pre-operational Requirements;

Comment: had a more exhaustive fracture analysis been completed and re-evaluated, the borehole data and current-day FMI logs in these holes would have played a more important role in the application in order to address the topics noted above (Attachment 2).

ADEQ Response –
See Response to Comments 181 SWVP 4.1.

Comment 7. Section 2.2.3. c: Pre-operational Requirements;

Current day fracture analysis recommends discrete fracture network analysis completion before integrating with pump test data (Attachment 2). There is a fundamental disagreement with the protocol noted in this permit with protocol with current day fractured systems analysis.

ADEQ Response –
See Response to Comment 6, Section 2.2.3. a: Pre-operational Requirements.

Comment 8. Section 2.2.3. d: Pre-operational Requirements;

Comment: if contaminant bypass occurs along a compartmentalized, hydraulically active, fracture system, hydraulic control will not occur unless the recovery well is placed in that system. A more detailed fracture system analysis should have been completed to ensure such bypass would not occur. Even if such a fracture analysis were conducted, there is uncertainty. No one quantified that uncertainty, which is a measurement for environmental compliance with this permit.

ADEQ Response –
See Response to Comment 6, Section 2.2.3. a: Pre-operational Requirements.

Comment 9. Section 2.4: Points of Compliance a.

A detailed fracture system analysis would dictate where the POC wells should be located (Attachment 2). This was not done. Therefore the demonstration of AWQS at the POCs is invalid. The permit should be revoked.

ADEQ Response –
See Response to Comment 6, Section 2.2.3. a: Pre-operational Requirements.

Comment 9. Section 2.4: Points of Compliance b.

A high hydraulic conductivity fault extends under the proposed well field as shown in the model. There was not an attempt to ensure avoidance of contaminant bypass and hydraulic control along this fault by further fracture associated analysis, coupled with additional POC wells.

ADEQ Response –
See Response to Comment 6, Section 2.2.3. a: Pre-operational Requirements for the discussion related to fracture analysis and the demonstrations made by the permittee and previous Applicants.

Both EPA and ADEQ have expressed concern about groundwater movement along faults underneath the facility. The permittee modeled a worst-case scenario of extremely high porosity within the fault zone. Under these modeling conditions, groundwater simply did

not move significantly but instead remained in one location. When porosities were decreased and hydraulic conductivity increased in the model while injection was continued and extraction was discontinued, groundwater moved only 130 feet in 30 days. In practice, if extraction stops injection would also stop, so it is apparent from the model that groundwater would not move significantly under worst-case conditions of both high porosities and high hydraulic conductivity.

ADEQ believes that the downgradient fault plane projection from the PTF well field is adequately monitored by proposed MW-01 and POC M54-O, both in the Oxide Unit. Monitoring well MW-01 is proposed to be installed in the downgradient groundwater direction at or near the PTF well field boundary. MW-01 will be a nested well screened equivalent to the proposed injection intervals and to the same depth of injection. MW-01 may intercept up to three of the projected fault planes; Rattlesnake, Thrasher, and Sidewinder Faults, depending on placement of the well. POC well M54-O is proposed to be installed to the same depth of injection, and is screened across the projected fault planes of the Rattlesnake and Thrasher Faults further downgradient from the PTF. Any "theoretical" solution migration (i.e. contaminant bypass) along those faults under the proposed PTF well field would be evident by downgradient groundwater quality changes observed in MW-01 and M54-O.

THE FOLLOWING ORAL COMMENTS WERE RECEIVED AT THE PUBLIC HEARING, DECEMBER 5, 2012-

#183, Tom Rankin –
The temporary permit that you're looking at has an abundance of monitoring and compliance requirements. The site-specific qualify assurance project, the QAPP program, should have an independent third party allocated to meet the data and quality objectives of the permit and allow vested interest to be protected. This type of individual permit in accordance with the BADCT, the best available demonstrated control technology, guidance manual requires such an oversight. Thus, providing assurance functions are established and effectively executed and correctly performed. Evidence of activities affecting quality is critical to those affected by safety-related activities and for the good of the public safety.

ADEQ Response –
The samples will be analyzed by Arizona licensed laboratories.

The use protection level, UPL, should be expanded for both the primary and secondary MCLs, maximum contaminant levels, of the EPA requirements of the Safe Water Drinking Act, primarily sulfates, aluminum, copper, fluorides, manganese, total dissolved solids, as well as other radiochemical analyses. It is imperative that AWQS, the aquifer water quality standards, not be violated at the points of compliance and, thus, no degradation of the existing aquifer relative to the pollutant takes place.

ADEQ Response –

The use protection level for arsenic has been established to due to the difference between the Arizona AWQS for arsenic, and the federal MCL for arsenic in drinking water. Aquifer quality limits and alert levels are established at the POCs for constituents for which a numeric AWQS are established, including fluoride and adjusted gross alpha, and radium 226+ radium 228. The other constituents mentioned above, sulfates, aluminum, copper, manganese, and total dissolved solids for which numeric AWQS are not established, have ALs established and are required to be monitored at the points of compliance.

Provide verification that the injection wells, Class III, have been permitted by the EPA UIC program, as stated in the permit. This temporary APP permit should be a stand-alone permit and not place reliance on a previous APP permit that is approximately 15 years old, as the basis and technology has certainly changed, as evident by various comments made and to be reiterated and you'll get that by written comments.

ADEQ Response –
The Temporary APP injection wells cannot be operated without the EPA UIC Permit. This Temporary Permit is intended to be a stand-alone permit for the purposes of the pilot test.

Hydraulic control has not been adequately identified through the existing underground workings conducted previously on the site, nor have all the bore holes previously drilled been located and, thus, cannot be abandoned. The underground workings have not been isolated and they contain water.

ADEQ Response –
See response to commenter #24(10) and #24(16).

The underground workings do contain water and the depth to groundwater in the shafts is similar to the depth to water across the site, at approximately 220 ft bgs. The underground workings will be monitored for water level elevations and will be required to be depth specific sampled throughout the duration of the pilot test and into closure and post-closure.

And lastly, I'll ask you, I've got 30 seconds, when you get ready to do the permit just ask yourself, would you put your family and wife and kids down here to have the possibility of drinking contaminated water.

ADEQ Response –
The modeling has demonstrated that the pilot test will not cause a violation of an AWQS at a POC well. The quality of groundwater being supplied as drinking water by your service provider is monitored for water quality in accordance with Federal law.

#184, Tom Smith -

I don't have any notes. But I've been standing on this project from the time it started. And I -- the question I have for you people is, first of all, what do you not understand about the word "No" from this town council? We actually voted three times. Now, let me ask you another question: You have a small piece of property, but you're allowing them to go ahead and do a test well. They cannot economically make money if they went ahead and started trying to reduce aquifer from that piece of property. The rest of the acreage is under town control and we will never let it go.

Aren't you wasting time and money on this? I wrote three letters to ADEQ. The first one, after three months, I received an answer, which was foolish. I still have that letter if you would like to see it. The other two, I never received an answer back from ADEQ. My point is, don't you people even think "What's happening?" Do you not believe the town has any rights? Do you only believe what you, the state, are being told to do. This is not right for the town of Florence.

ADEQ Response –
With regard to Town Council votes, please see response to comment 148, item (2).

The APP Program cannot deny a permit if the application meets the requirements of the APP statutes and rules. ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and to conform with the Arizona Mining BADCT Guidance Manual. Therefore a permit was issued.

The focus of the APP Program is on the protection of groundwater quality at the points of compliance. The risk associated with the production of economical quantities of copper is not a consideration in the APP process.

#185, Tom Celaya -
I'm going to do this off the cuff, I don't have any notes. I'm a fifth generation, both sides of my family is from Florence. I'm an elected official. Part of my activity as an elected official is to protect the safety, both the financial and health, of the community. And I think that's the responsibility of anybody that's elected into a position that has the ability to move these types of projects.

I think that by allowing a potentially dangerous chemical, in your conscience you need to recognize and accept the possibility of anything that could go wrong in this and you need to take that into consideration when you make your decisions.

ADEQ Response –
ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence

Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and to conform with the Arizona Mining BADCT Guidance Manual. Therefore a permit was issued.

#186, Bill Hawkins -

My name is a Bill Hawkins, Florence Town Council. My family has also been here three generations. We care very much about Florence and Arizona as a whole. But during this whole process with the mine coming in, the townspeople have spoken, and I think very clearly, mostly in the last election, we had council election, council, the candidates that were against the mine were elected.

The candidates that were for the mine were defeated. So that tells me, and from every meeting I've been to, the vast majority of the people have been against the mine.

I don't understand how you would issue a permit before you have your hearings. You had one hearing and you didn't take any questions. Now you're having another hearing after the fact. It's a waste of taxpayers' money for you to be here tonight at this point. You've already made up your mind.

So following my fellow councilmen, I think it's a travesty that you would make that decision. Not only that, the amount -- you know, it's going to hurt -- and it's not on the edge of Florence. Every time you read about it in the paper or on the news, they always refer to it as "on the edge of Florence" -- it is in the middle of our city limits, of our town limits. It's not on the edge.

You'll kill our future development with the mine alone. Not counting the fact that it could and I -- I mean, there's thousands of holes, bore holes that we can't even identify. It's going to transfer to the water, so -- and I don't know if most people realize, but a mine is not limited on the amount of water they use. And for them to dilute the billions of gallons of acid down to the point they say they're going to dilute it to, it's going to take trillions of gallons of water, so without the contamination, we could go dry in our wells around here. .

ADEQ Response –
The department followed public participation requirements found at A.A.C. R18-9-A210.D.

The APP Program is focused on the protection of groundwater quality. Groundwater quantities used during the pilot test are not subject to consideration during review of the APP application.

See response to commenter #24(10) and #24(16).

#187, Michelle Whitman –

Good evening. My name is Michelle Whitman and I've been a resident of Florence for the past five years. My husband and I are raising our young family and we work in the community. We moved up to the Anthem area because we believed it was a great place to raise a family, knowing the area would eventually grow and would bring opportunities that would attract other young families like ourselves. The last thing I would do is put my family's health and safety at risk, and I'm here to say that after listening to all the evidence and researching it and talking to people on the community, that I'm confident and comfortable with the issuance of this permit

The main things I realize is it's only a temporary permit that will allow the company to show that it can mine copper safely with (inaudible). I'm confident that the permitting agency will not do anything that's not (inaudible) and hold the company responsible. I realize that my comments are not going to directly benefit from the jobs, but the community will. And other than -- we support this process and your decision and we hope that you'll oversee it not based on other people's opinions, but the facts. .

ADEQ Response –
The comment is noted.

#188, Gerald Mahone –
My name is Gerald Mahone. I moved out to San Tan Valley six years ago to retire and live out my life. I have a bachelor's degree in horticulture. I've taken a lot of courses, read a lot about environmental protection. Injecting this sulfuric acid down into our ground out here, and it will affect our groundwater. I don't care what they say, it will. And that is important. There's a lot of people out here, our groundwater gets tainted, there will be a lot of people who lose a lot of money and will have to move out. Because who wants to live -- anybody ever been around sulfuric acid in use? It smells. That's just one thing. The water will have a funny taste to it.

Plus it's leakage of all the heavy metals can leak into our groundwater. That's another consideration that you have to take into account. People say, well, it will increase our economy. For that much, it's not worth it. It's just not worth us spending that, and taking a risk and contaminating the water table in this valley. And this valley goes for a long time -- a ways, and that groundwater supplies a lot of people and lot of farms with water.

And hopefully you'll really think about your decision and hopefully it will be in favor of not allowing this permit.

ADEQ Response –
ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and conformance with the Arizona Mining BADCT Guidance Manual, in order to obtain the necessary permit required to discharge.

The permit protects groundwater by requiring that AQLs are met at the POC wells located on the downgradient edge of the pollutant management area.

#189, Armand Young-

There are so many things wrong with this PTF that I'm beginning to think that ADEQ is the Bureau of Mines rather than our environmental agency. Curis has rigged this PTF to give favorable results and ADEQ has agreed to this sham. This is not a PTF, but the beginning of a commercial mining project. The pilot well field differs substantially from the commercial production field and would not provide the required information. Multiple monitoring wells should be placed around the pilot production field and tested by an independent agency every two weeks. These monitoring wells should be placed at a distance that would detect excursions from the PTF during the actual test period. Not 50 years later, okay?

ADEQ Response –

The subject of the temporary APP is the Production Test Facility. The Production Test Facility does not include full scale commercial mining operations. The Production Test Facility well field will be limited to conducting tests, on approximately 2.2 acres of land, within the State Trust Land parcel, to provide data which might be used in an application for a permanent individual aquifer protection permit. Following the completion of the Production Test project, Curis will have the option to submit an application to ADEQ for a significant amendment to the existing permanent individual APP to allow mining, and that the amendment would be subject to all of the requirements for public participation and appeal. Review of this application will include an evaluation of pilot test results. The design to be employed for commercial operation has not yet been approved by ADEQ.

A.R.S. §49-244 requires that POCs be established no more than 750 feet from the edge of the pollutant management area. The currently designated POCs comply with this requirement.

Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS.

No work should be approved before all coreholes, bore holes, and wells have been closed and verified by ADEQ. They have a map of all these holes. And they need to be located and closed and you need to verify all of this.

ADEQ Response

See response to commenter #24(10) and #24(16).

Curis should be required to leave water at acceptable state drinking water standards. Curis should be required to place a $40 million bond to protect water providers and users in the Florence community. With your plan, we are not protected. You all know as well as I that in situ mining is not a closed system. Hydraulic control of a sulfuric acid mixture is impossible, and the rinsing technique to cleanse contaminated aquifers and groundwater is a farce, and that has been proven scientifically. BHP tests, Casa Grande tests, and in situ mining all over the world demonstrates these conclusions.
Show us the evidence that this is not true. You are putting our water at risk for thousands of people that live a few miles downstream from the proposed PTF.

ADEQ Response
Please see Response to Comment 24(12).

#190, Brad Glass –
Thank you for the opportunity to speak on behalf of Curis and the Florence Copper Project. My name is Brad Glass. I am an attorney with the law firm of Gallagher & Kennedy.

Although it's been suggested that the temporary permit was issued to Curis by ADEQ without the opportunity for public comment, that simply isn't true for several reasons. First, ADEQ held an open house in the Town of Florence on June 13, 2012, nearly four months prior to the permit's issuance, to give the public the opportunity to express their concerns directly to ADEQ.

Second, the rule establishing ADEQ's temporary permit process clearly provides that ADEQ will hold public hearings and consider public comments and can amend and revoke the temporary individual permit made based on such public input.

Third, throughout the permit process, ADEQ received extensive written and oral comments on the project from the public and many members(inaudible). It's clear from the terms and conditions in the permit that ADEQ considered and incorporated many of these comments, making this temporary individual permit being issued to Curis one of the most stringent of its kind. And Curis accepted the conditions of this stringent permit willingly and willfully comply with them. For example, groundwater beyond the site's boundaries will be protected to the same federal drinking water health standard that applies to municipal water providers. Curis voluntarily agreed to the more stringent standard because they are confident that they can meet the standard

Similarly, sulfate levels which are a result of historic farming and naturally occurring mineralization in the aquifer and soils in the area will be carefully monitored and controlled to ensure maximum protection of the community.

Curis has invested substantial time and energy in developing the comprehensive application and other submittals to ADEQ that support the design and environmental protections that will be implemented as part of the pilot facility. The application contained detailed and site-specific hydrogeological and engineering information that

formed the technical basis for the permit and the well field design. This information, coupled with ADEQ's thorough review and consideration of the permit application, ensure that the project will not create any public or environmental harm, and it will not adversely impact groundwater or public health.

Specifically, the information submitted by Curis and then carefully considered by ADEQ has resulted in an extraordinarily stringent and protective permit that, among other things, contains technically sound methods to measure and document hydraulic control and groundwater monitoring to ensure solutions and contaminants will not escape the project's boundaries. It establishes six separate points of compliance locations, very conservative alert levels and aquifer quality limits. And contains proper financial assurance estimates of operation, of maintenance, closure, remediation and reclamation costs.

Mining is one of the most highly regulated industries. Curis, in order to operate this project, will have to get 19 different governmental permits and approvals from local, state, and federal agencies. These approvals will ensure that the project will be operated safely and the agency will make sure that it's operated safely.

ADEQ Response –
The comment is noted.

#191, Steve Hildebrand -
My name is Steve Hildebrand. I've been an Arizona resident for 41 years. I've been a mining engineering for 21 years I've built and run in situ mines all over the world: Australia, Zambia, Chile, all over the U.S. We have them in the U.S. and interesting problem here, because uranium mines are in situ mines. 95 percent of uranium mines are in situ; they do have the technology to control the solutions.

Now, concerning this APP that Curis has applied for, basically, the question is can the water get from one aquifer to another aquifer, a pumping aquifer, a groundwater aquifer. Maybe I'm mistaken about the Florence site, but I understood that there was high nitrite level in that upper aquifer that precluded them from even being for human consumption, but I might be wrong about that; that may be related to some agriculture problems.

Now, Curis has come up with a plan in their pilot test that's going to go ahead. And this is a reality and you can do this because of the different permeability surrounding the test area. The underground, the sulfite that lies underneath the aquifer is basically impervious; the question is can you get leakage on the sides or can you get leakage up.

So how do you control those? There's hydrostatic kits that holds the solution down, you have to somehow have it go through an impervious aquitard, and get up into the upper aquifers, and it's probably has the likelihood of this happening is astronomical as far as I can see.

Now, can you get it out of the sides and prevent leakage from the sides? Basically, they have a center production well, and there's four injection wells around them, so 73 feet, I think, is the average feet between these wells, and then they have eight other protection wells around it. They're going to protect all the sides. If you consider, that's only six sides, as far as I know. They're going to control it and this is what they're asking for can they control the solution

Now, is copper a valuable product? We've live for, what, four years in the recession? Is copper important to us? It sure is. We import over 50 percent of our copper in this country. Curis can help relieve that problem. We can mine copper this way. I've done that. I know how the water balances and metal balances, all that is done. Curis has a good plan, and they should be given a chance to prove it.

ADEQ Response –
The comment is noted.

#192, Dan Johnson –
Thank you for the opportunity to speak here this evening. My name is Dan Johnson; I'm vice president and general manager for Curis' Florence Copper Project. I have been studying hydrogeochemistry and engineering for over 30 years now.

We will hear some people opposed to this project say a lot of scary-sounding things this evening, but the truth is that sound science and engineering and your own expert evaluation support the fact that this project can be done in a safe manner.

This in situ process has more in common with a municipal water treatment facility than it does with traditional mining around the state. It's a proven technology, verified by independent experts who have testified to the veracity and safety of conducting in situ copper recovery here at Florence Copper.

A solution of approximately 99.5 percent water and one-half of 1 percent acid will be delivered to limited sections of the identified copper mineral deposit deep below the ground surface. This mildly acidic solution will slowly dissolve the copper as it's continually recycled, extracted, and controlled for processing. When the soluble copper is fully recovered, the minor amount of acid used in the process stops being delivered, and water from the same aquifer will be recycled to flush the mineralized bedrock for several months until we and you are assured that the area underground is restored in accordance with applicable standards established in the permit.

Although it's a hydraulically closed-loop process and more solution is always withdrawn than pumped into the copper mineral deposit, seven point-of-compliance wells are also being placed to ensure that acidic water does not escape the immediate area.

Although the law arguably would require only one monitoring well, this project contains seven wells at various steps for added safety, all for a pilot test that is only two acres in size.

Our operational well casings have three redundant layers of cement and well casing protection to ensure that our water solution doesn't somehow escape on its way down or back up the well casing. Yet, these wells are to be continually monitored and tested for safety. And in the highly unlikely event of a breach and all safety measures fail, (inaudible) the well would be shut down immediately.

Well-understood geotechnical principles strongly suggest that acidic water will be neutralized within feet from the project area, and will still take over half a century to migrate to the inner sanctum of the water. Wells and bore holes within 500 feet of our project have all been identified and will be sealed with cement to ensure that water from one part of the aquifer cannot migrate and affect another part of the aquifer.

Again, it's required by you and overseen by you. ADEQ has considered numerous safeguards in the project to ensure environmental safety.

ADEQ Response –
The comment is noted.

#193, Dan Hodges –
My name is Dan Hodges; I am vice president of (inaudible). First, I'd like to start off by saying that we don't believe ADEQ even has the statutory authority to issue this permit that (inaudible), but I guess that's for the courts to decide that.

First, I'd like to start by saying, as far as when Curis has come to the community and talked to (inaudible) and the rest of us, they have made misstatements to us and we've looked into them stating that there is -- all drinking water is from the upper aquifer and not the lower aquifer where our wells are actually dropped. And they're trying to tell us that they're protected (inaudible) here. And Mr. Johnson just spoke about that as well, however, our wells are throughout the upper aquifer and the lower aquifer, so we're still not clear as day that they're somehow protected, the wells themselves, that the -- (inaudible). So I don't know how they can say they keep hydraulic control. And even in our application, they are not even proposing that they demonstrate hydraulic control, so we're confused by that as well.

The test pilot, we have issues with the monitoring wells. They're set up 700 feet from their injection wells, and this is somehow supposed to tell us that our wash is supposed to be safe by the time it migrates 700 feet from the well fields.

ADEQ Response –
ADEQ is aware that drinking water may be extracted from the UBFU and LBFU aquifers.

ADEQ has determined that the number and location of monitoring points is protective of those aquifers likely to be impacted, and are similar to the number and locations of monitoring points required in other mining APP permits. Collection of water samples at

the residential drinking water sources is too distant from the site to provide useful information regarding the protection of AWQS at the POCs. These sources are already regulated and monitored under federal drinking water regulations.

The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in ARS §49-244, such that all POCs are within 750 feet of the Pollutant Management Area (PMA) and are in the downgradient groundwater direction. Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP.

In accordance with the Temporary APP, hydrologic control is required to be maintained during the operating life of the facility in accordance with Section 2.3.1.

One -- or two last issues, we have not been able to find anywhere where this type of in situ mining activities has ever returned the groundwater to safe drinking water conditions, and that being said, if they were to do this test facility, how come ADEQ is not requiring financial insurance for off-site contamination.

ADEQ Response –
See response to Commenter #64(1).

Please see Response to Comment 24(12).

#194, Alvin Wilson –
My name is Al Wilson; I'm from Florence, Arizona. It just really saddens me to hear so much negativity about this project. I've spent 30-some years in mining and construction. Been around mines and was involved in construction, started in this very same type of mine in Colorado; however, it wasn't copper. It's been operating since 1990, doing very well. At least one major expansion provides great economic help to the community there in central Colorado. And I just -- I just urge us to please give these people a chance. I've been on these jobs and I know that it's going to be monitored enough. Nothing serious is going to happen. And I just ask you to please give them a chance.

ADEQ Response –
The comment is noted.

#195, Kevin McCormick –
Good evening. Kevin McCormick. I've been a resident for nine years. I'm not a scientist, not a geologist, don't understand a lot of this, but I do know that, you know, being one of the younger people in this room, growing up in farming, knowing that my grandpa used to put acid on the ground to be a farmer, that helps the ground a lot; that's on top of the ground, leaching downward. We also grew up with having a septic tank, and we used to put acid down that thing, in the leach fields, seeping downward again, and

that's just one household. We're talking this stuff is going to go down 6-, 7-, 800 feet and it's supposed to leach upward?

Last time I checked, I'm on this earth because of gravity, and it's pushing everything downward. I don't see how things are going to go up, when everything is supposed to be go down. But I'd love to see this thing happen, because this town and county and state needs these jobs. And if a permit was given 15 years ago, I'm sure the technology has gotten better from then to now. And the way we do things have gotten faster and easier from what they were back then. And from my understanding these things have been there since the '60s.

That's a long time for them to do things. And it's had different owners in that time, and have had no failures? Then why are we concerned now? I mean, it's a no-brainer in my eyes, when all I see is the opposition saying it's going to contaminate our groundwater, but we have no evidence of it being done here. You know, I just don't see why we have to worry about something that's never happened.

And the steps that ADEQ is making for the mine to make sure it has the different well sites to protect us if it does get leached out, there's ways to bring it back in with the hydraulic system pushing water, and it's pumping straight water, and(inaudible) I mean, again, it's kind of elementary mining. We're not having dirt trucks and haul trucks and (inaudible) like Miami or Superior; I mean, this is, when they're done with it, fill it up with cement, cut it off, and you're done. And it looks like it was before they even got there.

So last thing is, if it was good enough 40 years ago, why isn't it good enough now?

ADEQ Response –
The comment is noted.

#196, Denise Kollert –
Good evening. My name is Denise Kollert, and I am a resident of Florence. I have chosen to speak tonight, as I have in the past, in support of the Curis project. I have taken their tour, and my husband and I both asked lots to questions and had them answered to our satisfaction. We also did some exploring online on our own.

I believe a lot of the misinformation has been presented by those against this project about our water supply being in danger. The town had a well-known hydrologist do a study and they determined there was no danger to our water supply, as long as all the safety measures that are required are in place.

It has also been said that everyone in Florence is against this project. Nothing could be further from the truth. In 2011, the Town of Florence did a citizen survey, one of the questions asked was "Should the Curis project be allowed to open and operate?" The results were as follows: Downtown area, 45 percent yes, 19 percent no. Florence Gardens area, 46 percent yes, 30 percent no. Anthem, 28 percent yes -- I'm sorry, yes,

and 48 percent no. As you can see, there are more of the town residents that answered this survey in favor of this project than not.

In conclusion, I would like to thank ADEQ for listening to all of us. I have complete confidence in ADEQ to safeguard the people's interest as this project goes forward.

ADEQ Response –
The comment is noted.

#197, Richard Connally –
Good evening. Thank you for the opportunity to speak before you. I am a seventh-generation native of the State of Arizona. My children are eighth generation; my grandbabies are ninth generation. I am also -- I work in the wastewater industry. I work with you and with you. And I'm also a certified first responder in the events there's a disaster of any sorts.

My concern is, and I'd like to read it to you, is from the Emergency Response Guidebook, dealing with sulfuric acid. These are the effects -- these are the hazards of sulfuric acid: (Inaudible) and toxic on inhalation, injection, on contact with skin, eyes, vapors, dust, or substances that may cause severe injury, burns, or death. Fire will reduce, irritate (inaudible) and/or toxic gases. Reaction with water may generate much heat that will increase the concentration of fumes in the air(inaudible). Contact with molten substance will cause severe burns to the skin and to the eyes. Runoff (inaudible), runoff from the control or dilution of water may cause pollution. These are the fire hazards, "May ignite combustibles, i.e., paper, wood, clothing. Substance will react with water, some violently." In other words, if you put water directly on sulfuric acid, it will explode (inaudible). "Contact with metals," and we're talking about three layers of steel, "Contact with metals evokes flammable hydrogen gas."

When we're dealing with this on an emergency level, the very first thing that you need to do is it make sure everyone is 1,000 feet away from the acid. In the event that a spill does occur during the day, depending upon the winds -- and we all know the winds here are not always in one direction. We have prevailing winds that go in numerous different directions. If it's during the day, contamination ranges are 1.8 miles, at night it's 3.8 miles.

My problem with this is I have grandbabies that live in this town; I have youngsters that live in this town. Suppose (inaudible), I know they're talking about little droplets of sulfuric acid here, but they're going to be in large containers, suppose one of them spills. How are we going to deal with that and who is going to pay for it?

ADEQ Response –
Please see Response to comment #39.

#198, Yvette Stack –

Hello, I am Yvette Stack, and I am representing myself and my mother Rita Stack. We live at 6566 North Mockingbird Court in Florence, Arizona. My home is within five miles straight line of the Florence Copper Project. The Florence Copper Project, the well, for Johnson Utilities, is 1.2 miles from the project. The water flow goes from southeast to southwest and that is where all the Johnson Utility wells that we get our water are.

If this water, this water gets contaminated in any fashion, we will be have contaminated water. Our house values will drop. Who wants to buy a house that lives in an area where there is contaminated water? (Inaudible) for washing clothes, for washing and showering, and for cooking. This is our major concern for the contaminated water. I have a paper that I have written. I would like to give to you.

ADEQ Response –
ADEQ acknowledges that the general groundwater flow direction is to the northwest. ADEQ is aware that the Johnson Utilities well located 1.2 miles northwest of the PTF is not currently connected to the drinking water supply.

The APP is designed to protect the aquifer water quality standards at the points of compliance, and includes aquifer quality limits, alert levels, and a use protection level for arsenic.

ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and conformance with the Arizona Mining BADCT Guidance Manual, in order to obtain the necessary permit required to discharge.

#199, Barbara Manning –
Good evening. First, the residents of Arizona have had a concern for decades about the quantity of our groundwater and the quality. And that concern caused the legislature to create ADEQ back in 1986. People of Arizona look at ADEQ as a custodian of our groundwater.

When I review the Curis permit, I don't see much that you have done to protect that groundwater. In fact, it seems that you have made a detection of the contaminants even more difficult. A number of experts have analyzed the permit, and they have come back to us with a report, and they say it's deficient in eight major areas. They have sent you a written report on that.

One of the things that they mentioned is that the monitoring wells are neither in the right location or in the right construction. The field design for the pilot program is not -- that Curis is going to use for the test is not the same design that they were to use to produce the copper. So we're comparing apples to oranges.

ADEQ Response –
ADEQ has determined that the number, location and construction of monitoring points are protective of those aquifers likely to be impacted, and are similar to the number and locations of monitoring points required in other mining APP permits.

The subject of the temporary APP is the Production Test Facility. The Production Test Facility does not include full scale commercial mining operations. The pilot test well field design would differ from the commercial scale design, given the much smaller nature of the pilot test. The design of the pilot test well field was selected and accepted by ADEQ due in part to the small size of the pilot-scale SX/EW plant, which is consistent with the small number of injection and recovery wells within this very limited size PTF well field and the relatively short operating period per the Temporary Permit.

They also mention that you have not specified the allowable levels and the allowable quality levels. They have not been established as yet. And when they are established, they're not provided to the public anyway. The frequency that you're going to test the groundwater is inadequate. The tests are not many. The testing for contaminants is too early in the operation of that test project to give accurate results. And they also mention that the man-made pathways, those bore holes, coreholes, existing wells, have not been addressed properly. You have not solved that problem. And, of course, the groundwater cleanup proposal is not realistic and you know that, because you know the history of the BHP, they have never yet cleaned up that groundwater.

ADEQ Response –
The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in ARS §49-244, such that all POCs are within 750 feet of the Pollutant Management Area (PMA) and are in the downgradient groundwater direction. POCs will be monitored on a quarterly and semi-annual sampling frequency. Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 will be a nested well screened equivalent to the proposed injection intervals. Monthly testing of MW-01 is required for pH, sulfate and TDS.

The foreseeable use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. Groundwater monitoring in the UBFU, LBFU, and Oxide water bearing units at the POCs between the PTF and the Curis property boundary is protective of any potential downgradient groundwater users.

Ambient groundwater monitoring will be used to establish ALs and AQLs in new POC wells M54-LBFU, M54-O, and M52-UBF. AQLs and ALs have already been established for four currently installed POCs. For newly installed POCs that required ambient groundwater monitoring, the AQLs and ALs that will be amended into the permit. That

information will be available to review through a file review request at ADEQ record Center at (602) 771-4380.

See response to commenter #24(10) and #24 (16).

The rinsing and post-closure groundwater monitoring requirements of the permit are adequate to protect groundwater quality at the points of compliance.

You have a responsibility to protect the water of Arizona. I want you to assume that responsibility, and revoke that Curis permit.

ADEQ Response –
ADEQ has determined that the project, as proposed, satisfies the requirements of BADCT (A.R.S. §49-243(B)), and the protection of AWQS at the points of compliance (A.R.S.§49-243(B)(2-3)).

#200, Karen Wall –
My name is Karen Wall; I'm a resident of Florence; I have been for the last five years. My husband and I retired here. I feel that the temporary individual permit for the Curis pilot test facility should be revoked. Here are just a few of the reasons: The Arizona Administrative Code says that the TIP may be issued to develop data for an Aquifer Protection Permit. In order to develop reliable data, Curis should be required to create the same conditions that would be required for an APP.

ADEQ Response –
Curis has qualified for the issuance of a temporary permit allowed under A.A.C. R18-9-A210. The technical requirements for this permit, as listed in A.A.C. R18-9-A201(B), are the same as those required for a permanent Individual APP, and received the same level of technical scrutiny. The results of the pilot study performed under the temporary APP will be used to evaluate an amendment to the existing permit allowing full scale operations.

Next, Curis' PTF does not fit the maximum two-year window of a TIP, and in fact, it appears that ADEQ might issue a commercial permit before adequate data from the PTF can be fully collected and analyzed. It allows Curis to experiment and move on to commercial operation without actually proving the safety of the process.

ADEQ Response –
See response to commenter #45(2).

Also, the configuration of the PTF wells is significantly different from that proposed in Curis' commercial application. If this were a legitimate PTF, the well configuration would be the same as that for commercial operations, and Curis would be required to demonstrate hydraulic control.

ADEQ Response –

The subject of the temporary APP is the Production Test Facility. The Production Test Facility does not include full scale commercial mining operations. The pilot test well field design would differ from the commercial scale design, given the much smaller nature of the pilot test. The design of the pilot test well field was selected and accepted by ADEQ due in part to the small size of the pilot-scale SX/EW plant, which is consistent with the small number of injection and recovery wells within this very limited size PTF well field and the relatively short operating period per the Temporary Permit.

In accordance with the Temporary APP, hydrologic control is required to be demonstrated prior to the PTF even begins, during injection, throughout the rinsing phase and into closure and post-closure as described in the permit.

The point of compliance wells are located so far away from the injection wells that they are inadequate to detect exceedances of contaminants during the two-year PTF window.

Unabandoned coreholes, bore holes, and old wells are documented to be the leading causes of excursions causing groundwater contamination. Curis has no plans to locate and plug these holes outside the 500-foot well field boundary on state land parcels or other areas of the PTF site, such as the evaporation pond and pipelines. There is no contingency in the event Curis is unable to locate holes it knows to exist.

ADEQ Response –
Curis is required to locate and abandon all coreholes, boreholes and wells within a 500 foot radius of the PTF as described in the Temporary APP Section 2.2.3.a. It is not considered necessary to plug wells or coreholes outside the 500 foot radius whether or state land or privately owned land. The PTF Process Water Impoundment (PWI) will be constructed with a double liner system complete with a Leak Collection and Removal System (LCRS) and the Runoff Pond will have a single liner. The PSI is designed as a temporary structure that will be decommissioned and removed at the completion of the PTF operation. The re-grading of the facility sites will allow for repair, plugging, and abandonment of coreholes uncovered at the time of impoundment construction. ADEQ has added language to Section 2.2.3 of the permit to include that all boreholes or wells located within 150 feet of the Process Water Impoundment and Runoff Pond shall be plugged and abandoned per ADWR rules. The ADEQ APP Program does not regulate pipelines and tanks. These are not covered under BADCT as discharging facilities.

ADEQ's TIP allows insufficient monitoring of groundwater contaminants and does not require the collection of data from drinking water sources, something I find unconscionable. How can Curis prove the safety of drinking water sources without being required to monitor and report test results on those nearby sources?

ADEQ Response –
ADEQ has determined that the number and location of monitoring points is protective of those aquifers likely to be impacted, and are similar to the number and locations of monitoring points required in other mining APP permits. Collection of water samples at the residential drinking water sources is too distant from the site to provide useful

information regarding the protection of AWQS at the POCs. These sources are already regulated and monitored under federal drinking water regulations.

The foreseeable use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. Curis is required to monitor the POCs in the UBFU, LBFU, and Oxide water bearing units which are located between the PTF well field and any potential downgradient groundwater user. The seven (7) hazardous Points of Compliance (POCs) meet the statutory requirement in ARS §49-244, such that all POCs are within 750 feet of the Pollutant Management Area (PMA) and are in the downgradient groundwater direction. Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP.

ADEQ should not also assume groundwater protection based on Curis' promise of restoration, especially considering that no in situ mining operation has ever returned the groundwater to pre-mining conditions. What makes ADEQ think Curis will be the first one?

The TIP issued for Curis' PTF is inadequate and should be revoked. It's not a question of if our groundwater will be affected, it's a matter of when.

Please revoke this permit.

ADEQ Response –
See response to Commenter #64(1).

#201, Wilbur Freeman –
Good evening. My name is Wilbur Freeman and I am a life-long resident of Florence. I served 16 years on the council for the Town of Florence, both as a mayor, vice-mayor, and council member. And I have always had the best interests of the town in my heart and in my brain.

I want to begin, first of all, by thanking ADEQ for being present tonight and explaining to the public the process by which environmental permits of this nature are issued. I, for one, know that this particular permit was issued based on valid engineering practices, science, and proven technology of the in situ mining process, and Curis' ability to perform and uphold the conditions of the permit.

I am especially close to this project because, see, I worked for Conoco in the early '70s on the very same piece of property that Curis owns today. And maybe a lot of folks don't know, but actually this is a reissue of an existing permit that was issued to BHP in the '90s where they successfully ran an in situ project.

In my opinion, emotional issues and personal feelings should have no bearing on whether environmental permits of this nature are issued. They should only be made based on sound engineering practices and Curis' ability to perform and meet those conditions of the permit.
The fact that Curis was issued the temporary permit proves to me that they, in fact, have upheld all the conditions of the permit; otherwise, you would have never issued the permit to them in the first place.

The vocal minority doesn't concern me as the undeniable and undisputable facts are that the majority of both the residents and the businesses of this town support this project.

Also, no one can also deny that good-paying private sector jobs are vital to our local economy.
Go ask any business downtown on Main Street, what's left of them, if they welcome new industry to the area. An environmentally safe industry that will help boost their profits and revenues and what you will hear is an overwhelming "Yes."

One last comment, ADEQ needs to hold Curis' feet to the fire and hold them accountable to the residents of this town. As this project continues to move forward, and I believe it will, I want to again for both your expertise and your oversight.

ADEQ Response –
The comment is noted.

#202, Larry Putrich –
My name is a Larry Putrich; I'm the vice chairman for the Florence Mining Zoning Commission. Last year in September, we held hearings here regarding the copper mine. We listened over two evenings to something on the order of 14 hours of testimony and commentary from a lot of people. At the end of that, it was pretty simple to see that Curis doesn't know what they're doing, mostly, on this in situ mine. The first question I asked was "Why are you calling this a closed-loop system, when in fact it is not a closed-loop system?"
The answer was "It depends on what your definition of open loop or closed loop is." By definition my shirt is blue.

ADEQ Response –
Not enough information is to provide a Response. It is unclear what is being referenced as a closed-loop system.

Secondly, we talked about the solution. Solution being something like .0203 percent, and I asked the engineer if he was sure that that was enough sulfuric acid to actually extract the copper. He wasn't sure. He said that, by analysis, we think so.

ADEQ Response –
The proposed In-Situ Copper Recovery (ISCR) process involves injecting a lixiviant (99.5% water mixed with 0.5% sulfuric acid) through injection wells into the oxide zone

of the bedrock beneath the site for the purposes of dissolving copper minerals from the ore body.

Thirdly, recovering all of the solution that's being injected. I asked him the question how he knows that he's going to extract all of the solution that he's injected into the in situ mine.
And he said "Well, we go by analysis." Well, I don't know how you're going to look at a picture of that aquifer and you know how the in situ mine works. I don't know how you can tell that you're getting, even if you come up 110 percent, I don't know how you can tell you're going to get all of that solution out of there.

Hydrologic control is maintained by numerous Operational considerations as described in the Temporary APP. Groundwater sampling at the POCs, MW-01 and at the mine block wells during closure and into post-closure will evaluate the effectiveness of BADCT.

And we're not so much -- we're worried about the sulfuric acid, but we're also worried about what sulfuric acid is going to break loose in the rock. There will be a lot of new things into the aquifer. So I would just like to remind you of a couple of things: A couple of years ago, Harland & Wolff, shipbuilders in Belfast, Northern Ireland, called the Titanic unsinkable. Whoops! Lt. Col. George Armstrong Custer writes in his book "My Life on the Plains," said to the cavalry that (inaudible) all the Indians on the plains. Whoops!

Curis said that "Don't worry about it; we know all about in situ mining; we can handle it." They already had an exceedance. Whoops! And let me remind you, $3 million is nothing. Curis is a foreign entity, anything goes wrong, poof, they're gone.

ADEQ Response –
The surety bond for $3,487,743 submitted by Curis Resources satisfies the financial assurance requirement in accordance with A.A.C. R18-9-A202(C)(2). The cost estimates have been evaluated by ADEQ and determined to be adequate for closure and post-closure of the APP facilities at the Florence Copper Project PTF.

#203, Bob Harris –
Good evening, my name is Bob Harris. I'm just an old country boy from Texas. Not real bright, I don't have an engineering degree, but I believe this in situ mine for injection to work out there, they have to be dealing with fractured rock. Which means there are fissures and cracks and everything else running in through this rock formation that they're going to inject into. Common sense also tells me that if you pump in a solution into the ground, you're going to get absorption, and you're going to get migration. My concern is not really downward, but the sideways migration. How are they going to control that? If you've got fractures in the rocks, they're running everything, you're going to run into the other bore holes, and they're going to migrate.

ADEQ Response –

Sideways migration of subsurface in-situ solution would be captured by the extraction wells surrounding the injection wells. Fractures in the bedrock were determined through modeling, not to hinder the ability to recover solutions. Please see comment #182 Town of Florence.

Any minor amounts of lixiviant remaining in remote pore spaces and fractures at the end of rinsing operations will be buffered by the surrounding groundwater.

Second thing is this all comes down to I believe ADEQ is a governing and regulating board
Is that correct? Also, you are a non-policing board, so any information that you receive from any applicant you issue a temporary permit to, they have to furnish you with that information. Folks, we're dealing with millions and millions and millions of dollars. Any time I've seen money in a government agency, it's almost a guaranteed disaster. If you don't believe it, look at the Rocky Flats up there in Colorado; they've been shutting that program down; people are still dying up there that lived on that land. It is completely safe. And all the documents will still say that.

ADEQ Response –
ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and conformance with the Arizona Mining BADCT Guidance Manual, in order to obtain the necessary permit required to discharge.

#204, Tom Merrifield –
My name is Tom Merrifield, I'm with Geoscience Centers. I've worked for the Town of Florence, and I've also worked for them since 2004 as part of wastewater compliance, permitting, and water wells solution. I'm also a contractor for another company in California, and I oversaw wells and monitored data management for a couple of fields that (inaudible) water floods and injection and recovery processes.

The first point that I have is Flotium [phonetic] which was used, software which was used for the analysis for the pump tests. Currently it's not being used, it's actually been shown not to work. The last version of Flotium was in 1995. I've spoken to people who developed it and they don't use it anymore. The issue of the Flotium injection utilized for (inaudible) in possession was utilized however – (court reporter asks speaker to move closer to the podium) They use it to evaluate the connectivity of fractures, and the issue that was that the purpose of the aquifer software is not being used, if this software is not being used, then we need to reevaluate that issue right there. The problem is that if the homogeneity of the aquifer impacts the well placement, it impacts demonstration (inaudible), it impacts the water balance, and ultimately, the design characteristics for the above-ground infrastructure. And that's the first thing, for those reasons alone the permit needs to be denied.

The second thing is if you look at individual BADCT that's currently used for in situ mines and similar types of (inaudible) in fracture. The methods and methodologies were not incorporated into this study. I pulled my resources from the EPA, and also the Canadian Council of Scientific Advisor Council, from the FRED/FracMan Group across the United States, and as well as Solemjay [phonetic], which is a consultant for Curis.

And in my mind, the individual BADCT that is normally used for in situ mining is not being used here, and for that reason I think the permit should be denied. And it looks like I'm out of time, so---

ADEQ Response –
ADEQ believes that potential pathways for solution migration have been adequately addressed in the Application or addressed by the permit conditions.

When exploration and technical work began at this facility, it became apparent that the Oxide Zone behaved hydrologically like a porous media rather than a fractured media. Since 1996, work at the facility has been conducted using the Equivalent Porous Media Assumption (EPMA). The EPMA has been confirmed and re-confirmed on numerous occasions using many different approaches such as corehole data including geophysical studies aquifer tests, corehole packer tests, and tracer studies,. In summary, the EPMA has been utilized for seventeen years when conducting technical studies at the facility, and porous media characteristics of the Oxide Zone have been well documented, confirmed and re-confirmed. Two previous APPs and a UIC permit were technically based upon the EPMA. The permittee has committed to conducting additional aquifer tests to again confirm porous media flow in the Oxide Unit. For these reasons, discussions of fractures and fracture flow in the Oxide Zone are not applicable to this project because the Oxide Zone does not behave as a fractured media.

ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and conformance with the Arizona Mining BADCT Guidance Manual, in order to obtain the necessary permit required to discharge.

BADCT requires that injection and recovery wells be properly designed per BADCT Section 3.4.5. However, specific well field design layout is not covered under BADCT due to such site variables as field size and SX/EW plant location. The BADCT Manual (Section 3.4.1) states that "There are numerous variations of in-situ leaching that may be applied to a given site based on the depth and hydrogeologic characteristics of the ore body and other factors. The discharge control system which constitutes BADCT for an in-situ leaching operation may depend upon the type of in-situ leaching operation and will always be a composite of: site characteristics; design construction and operations; and

closure/post-closure measures." Curis has provided and ADEQ has approved an adequate site characterization and design for construction for the PTF operations.

#205, Seraphim Larsen –
My name is Seraphim Larsen, I live in Cactus Forest. I've lived up here for ten years.

Arizona is a copper state, and I support all of our Arizona efforts to create mining jobs in Arizona. And I know we do need jobs here in Florence. I have been actively working for more than five years to find ways to create a better business climate in Pinal County and to attract better jobs here. But jobs should not come at the expense of poisoning our water, the most precious resource we have here in the desert. And which your agency is specifically designed to protect.

According to the U.S. Geological Survey, in situ mines cause irreparable damage to the aquifers, and I quote, "To date, no remediation of an ISR operation" -- ISR meaning in situ -- "in the United States has successfully returned the aquifer to baseline conditions." This is being reported in 2009 by the U.S. Geological Survey. Contamination occurs as a result of leaching agents in this case, sulfuric acid, which causes, and I quote here, "significant risks of contaminated groundwater systems outside the mining zone." In other words, the horizontal leaching. This was quoted from the 2009 paper of the Western Mining Action Network.

This particular segment was studied by the EPA, which found "very high levels of radionuclides that are leachable," EPA study of the BHP mining project, 1999. These risks have been highlighted again and again and again. And I'm surprised you continue to ignore them.

Every single in situ mine located on an aquifer has created irreparable damage to that aquifer, there have been no exceptions. According to the World Information Service on Energy, there have not been any exceptions in the USA or Germany or Bulgaria or Ukraine or anywhere else in the world in the history of in situ mining. How does ADEQ expect this one mine to be an exception to the universal rule? I would ask you to show us one example of an in situ mine on top of an aquifer that is actually not contaminating the aquifer. There aren't any examples.
Twenty (20) years from now what good will the jobs be when the groundwater is so polluted that people can't live here? Please think of the generations to come. Let's work together and find better ways to reinvigorate the Florence economy without putting (inaudible) at risk.

Also, if anyone is interested, here's a diagram that shows that 40 percent of in situ mines do have vertical excursions in which the sulfuric acid rises from the mine zone where the copper is, and if you want that information on that, let me know. And if you have any information on copper mines, any in situ mines that have not polluted the aquifer, let me know. I haven't seen a single one.

ADEQ Response –

ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and conformance with the Arizona Mining BADCT Guidance Manual, in order to obtain the necessary permit required to discharge.

See response to Commenter #64(1) regarding in-situ mining.

ADEQ is aware that radionuclides naturally occurring in host rock may be leached as a result of sulfuric acid being applied to copper ore bodies. The Temporary APP contains provisions to characterization the radionuclide concentrations in the discharge and meet AWQS or established AQLs for radionuclides at the POCs. Additionally, the mine block wells, were actual injection will take place, will be required to meet predetermined AWQS, including radionuclides.

#206, Bruce Marsh –

My name is Bruce Marsh; I am an environmental engineer, and I was recently employed by the Curis Florence Copper Project. I have worked extensively on development, mining, environmental cleanup, and community projects.

I've spent the last three months talking to many different people about this project and heard the passions of some of the people opposed to the Florence Copper Project. And frankly, those passions are understandable. I realize that there are some misunderstandings and distrust, and Curis must accept its share of the responsibility for letting that happen.

This demonstration project, this in situ process, can be done safely, it will be done safely, because it must be done safely. Not only will you provide oversight, if the project moves forward, the U.S. EPA will continually scrutinize this process, and clearly this community, the people right here tonight, will be looking over our shoulders, as they have every right to do.

You're here tonight to hear comments about the permit that you've issued for a two-year demonstration, a pilot project, designed to provide the information and data that you, we, and everyone will need to determine if and how this project might move forward into a full-scale operation.

Curis' parent company has a 25-year global track record in mineral exploration, engineering,
environmental science, and project development. As an added measured safety for this community, and as required by you, Curis' surety bond guarantees that funds will always be available to restore this property to its original condition.

To a casual observer used to seeing Arizona mines with open pits and tailing ponds, it may seem odd that a copper recovery operation has more in common with a water treatment plant and will be compatible with the long-term development of the community, but this in situ process provides for exactly that.

25 years from now when our project is completed, the long-term master plan for Florence will allow this ground to be used for housing, schools, recreation, or whatever is in the best interest of the community at that time. We invite everyone here tonight to come visit our project and see it.

Finally, I would like to thank Mayor Rankin and others for taking their time to talk to me. Know that we will do everything possible to earn your confidence and trust. To ADEQ for giving us the opportunity to show that we can do this safely. And for issuing the permit, and the opportunity speak this evening.

ADEQ Response –
The comment is noted.

#207, Lee Decker –
I appreciate this opportunity to speak in support of ADEQ's issuance of a temporary individual permit for Curis' proposed pilot facility. My name is Lee Decker. I am an attorney with the law firm of Gallagher Kennedy.

The first point I would like to make is that ADEQ has clear legal authority to issue temporary individual permits, and more specifically to issue a temporary individual permit to authorize operation of Curis' pilot facility. Arizona's Water Quality Control Act (inaudible) that ADEQ has grants ADEQ broad administrative authority to adopt rules establishing procedures for reviewing and then issuing individual permits.

In 2001, ADEQ exercised this express statutory authority when it promulgated its Temporary
Individual Aquifer Protection permit rule. This rule was carefully vetted through a substantial stakeholder process and allows pilot facilities, such as the proposed Curis facility, to apply for permit coverage using a carefully adapted process for pilot projects. To date, ADEQ has issued nine temporary individual permits.

Although a unique process was adopted for the pilot facilities, the rule ensured that the temporary permits would be just as protective of groundwater quality as any other type of individual permit. Contrary to what others have claimed, a temporary individual permit is not a waiver, it's not an exclusion, or exemption from APP requirements.

ADEQ's temporary individual permit rule authorizes ADEQ to issue a permit to an applicant under two separate conditions: First, for a facility with a discharge lasting no longer than six months; and second, to a pilot project to develop data for a full-scale project. The pilot facility that is being authorized under this permit at issue tonight expressly meets this second condition. Curis' proposed pilot facility has a very limited

purpose, which is to develop data to support moving forward with an individual APP for the full-scale project.

Although ADEQ has received several allegations to the contrary, another point that should be stressed is that this permit includes several extraordinary conditions to protect groundwater that meet and then substantially exceed legal requirements.

One example of the extraordinary conditions in this permit is the establishment of six point-of-compliance wells around a two-acre well field. Most facilities of this size require, at most, one or two point-of-compliance locations. Curis also agreed to an internal sampling well, and agreed to sample for certain parameters to make sure that the well field is performing adequately. This well was not legally required, but was installed at the request of ADEQ.

By accepting this permit, Curis has voluntarily agreed to implement permit conditions beyond what would otherwise be legally required.

ADEQ Response –
The comment is noted.

#208, Jim Burns –
I've already passed in my notes, and I'm just going to take a second. I find it interesting to see Florence has taken on acid use in the city limits, when they passed a law against its use and specifically named Curis Copper Mines and then gave a pass to agriculture. I've discovered that Arizona stands by itself with regards to poor government practices, that in any other state would be discrimination and against the law.

The City of Florence also shut down their access, out there where their plant is, yet you go to
Felix Road at Anthem, and it is three or four times worse for access to the Curis facility, and that road was passed by the planning, passed by the city, and financed by the city. I feel that they, the people that sit on the city council, have a real problem with what is right and fair. They have no common sense, and no sense of right or wrong, and they're supposed to be impartial in making decisions and it's clear that in this case they're not.

The City of Florence along with the developers and the private utilities in my determination are trying to put the copper mines out of business so they can build houses out there. Where are they going get their water? There's a lot of questions that so far have not been answered, and before this permit is refused, which could be -- answer most of the questions that have not been answered to date. I believe it's the responsibility of the city and others to pony up the bucks and have these tests done. They act and look like a kangaroo court, trying to force their desires on a company that has broken no laws and has done no damage to any citizen.

ADEQ Response –
The comment is noted.

#209, Greg Brown –
My name is Greg Brown. I'm the VP of Operations at Johnson Utilities. Johnson Utilities is the drinking water provider and we are located adjacent to the Curis mine project. Our source water is the groundwater from the same aquifer Curis wants to pollute. We have 15 wells downgradient. Our closest one is 1.2 miles from the mine.

ADEQ Response –
The Oxide Unit which is targeted for in-situ leaching at the PTF is a separate and distinct geologic unit from the LBFU drinking water aquifer. ADEQ acknowledges that Johnson Utilities owns a registered well ADWR #55-212512 that is approximately 1.2 miles northwest from the Temporary APP PMA boundary. ADEQ understands that the well is not connected to the Johnson drinking water system.

Using the data from Curis' estimated composition of solutions, Table 3.1 in their APP application, they predict a nitrate concentration in the groundwater after rinsing of 110 parts per million. How did ADEQ issue a temporary permit with no AQL or AL for nitrates? Arsenic is predicted to be 15 parts per billion after rinsing.

ADEQ Response –
Table 3.1 in the Application does predict a nitrate concentration in the groundwater after rinsing of 110 part per million (ppm). The input for this modeling parameter (Make-up Water-Column 8) was BHP data from a UBFU well located off-site which was carried over into the modeling completed for Curis. Using rinse groundwater nitrate concentrations from the UBFU would be the worst-case scenario as predicted by the model. This caused the high nitrates used in the Make-up Water Column to carry over into other columns in Table 3.1. since it was used as an initial input parameter. Nitrate contamination in the UBFU occurs on a regional basis and is assumed to be the result of agricultural practices. Curis proposes to use rinse water (formation water) from the Oxide Unit which contains nitrate concentration generally less than 1.0 ppm. Formation rinse water will be drawn into the PTF wells from the Bedrock Oxide Unit surrounding the PTF well field and will not come from the LBFU or UBFU aquifers.

No ISCR activities or other mining related historical site activities have included the use of nitrate bearing compounds in any form. Since nitrates are elevated sometimes above an AWQS due to agricultural practices and since the permittee process does not include nitrate, nitrate was not included as an AL or AQL.

As described above, the make-up water input concentrations used in the modeling was from a UBFU well located off-site. Curis does not propose to use UBFU water to rinse the injection zone, rather formation water from the Oxide Zone surrounding the PTF wells.

The temporary permit has an AQL of 50 parts per billion for arsenic; however, the Clean Water

Drinking Act has a limit of 10 parts per billion, which we have to abide by. Per Arizona Revised
Statute 49-243(a)(6), ADEQ must consider the use of the water from aquifers in the discharge impact area. It's clear Curis did not consider the drinking water aquifer that serves all of our customers. It's also clear you did not consider the quality of the water in the existing aquifer or you have would not have allowed AQLs that degrade the quality of the existing water.

ADEQ Response –
The Federal MCL for arsenic is 0.01 milligram per liter (mg/L), and the Arizona AWQS for arsenic is 0.05 mg/L. For purposes of this permit, ADEQ has established a use protection level (UPL) for arsenic of 0.01 milligrams per liter (mg/L), which concentration is consistent with EPA's primary drinking water standard for arsenic. The UPL will be applied at the northwest corner of the State Mineral Lease Land. Alert levels for arsenic shall be established for each of the POC wells through consideration of fate and transport of arsenic in groundwater to ensure that the UPL is not exceeded at the northwest corner of the State Mineral Lease Land.

ADEQ did consider the use of the water from the aquifers in the discharge impact area. The applicant has evaluated the potential migration of pollutants from the facilities and estimated a discharge impact area (extent of impact on the aquifer) based on hydrogeologic conditions at the site. Through this evaluation, the applicant has shown that the methods used to limit the impacts to the groundwater will be effective and constituent adequate measure to protect groundwater. In addition, groundwater modeling studies concluded that the aerial extent of sulfate contamination, defined at 2 mg/L above background concentration (depiction of the DIA), would extend only 150 feet from the PTF well field mainly in the lower oxide zone during the five year post closure period. There are no drinking water wells within the DIA.

AQLs will or have been set at the AWQS. AQLs that have not or will not be set at the AWQS, will be calculated using statistical methods using ambient groundwater quality.

When we were first approached by Curis, we noticed that our wells and other proposed wells were not included in their study or groundwater model. We are not alone. In your comprehensive request for additional information, you stated that there is a potable water system 1.2 miles from the mine and requested the applicant to depict the location of the wells within 1.5 miles.

And you also requested the applicant to model the effects of mining and rinsing on area drinking water wells. And you also asked Curis to evaluate the potential of mine solutions migrating along preferential paths, such as previously drilled bore holes, fractured zones, where the lower basin fill unit is in direct contact with the mining area, and faults. You have not received answers to these questions, but yet you issued a temporary APP.

ADEQ Response –

All technical deficiencies associated with the Temporary APP Application have been satisfied.

There is -- there are so many unknowns, no person or model can predict where the leach solution will migrate. Any failure of their systems, and systems fail, could allow a release. The solution could find preferential paths not known at this time and move outside of the containment. Once released, the downgradient users will incur substantial costs to clean up the groundwater, if that is even possible.

As you know, their closure and post-closure financial insurance does not cover our costs.

ADEQ Response –
Please see Response to Comment #24(12).

#210, Sharon Reid –
My name is Sharon Reid. And my husband and I are retired residents of Florence.
After Curis' has mined for 20 years and used billions of gallons of water, injected chemicals that foul our aquifers, and completed processes in copper, Curis will remove the posts that supposedly kept the contaminated water contained, bury the solids in the evaporation ponds, lay off a handful of local employees, close its Florence office, and enjoy their profits back at their home offices in Canada. This is what could happen if ADEQ issues this temporary individual permit.

ADEQ has the responsibility to protect the health and safety of the community in Florence and surrounding communities. And if this were in Scottsdale or Phoenix, we wouldn't even be having this hearing.

ADEQ Response –
ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and conformance with the Arizona Mining BADCT Guidance Manual, in order to obtain the necessary permit required to discharge.

An application for an APP in the areas indicated would be required to follow the same statutes and rules used in the review of the Curis temporary APP.

#211, Justin Merritt –
Good evening. Justin Merritt with Southwest Mining Partners. We are the landowner for approximately 4700 acres surrounding that proposed Curis mine. And as you know, we've expressed heavy opposition to this project. We believe it entirely incompatible and inappropriate for this location

As you are aware, we have submitted numerous formal comments and intend to submit more formal comments by the end of the deadline. Just to touch on a few of the points that some of the others have expressed tonight. The problem we find first is the application method is highly offensive, entirely inappropriate, and a direct threat to the town and residents of Florence.

This permit, as explained by Curis and as explained by the attorneys, is set up to be a pilot test project to supply data that would support a mining operation. This should be a true proof-of-concept operation. What Curis has proposed is not that. This is not a pilot test project.

ADEQ Response –
The subject of the temporary APP is the Production Test Facility. The Production Test Facility does not include full scale commercial mining operations. The Production Test Facility well field will be limited to conducting tests, on approximately 2.2 acres of land, within the State Trust Land parcel, to provide data which might be used in an application for a permanent individual aquifer protection permit. Following the completion of the Production Test project, Curis will have the option to submit an application to ADEQ for a significant amendment to the existing permanent individual APP to allow mining, and that the amendment would be subject to all of the requirements for public participation and appeal. Review of this application will include an evaluation of pilot test results. The design to be employed for commercial operation has not yet been approved by ADEQ.

As indicated within Curis' own proposal, they propose to sample for data only once during a two-year mining period. If that's the case, why are they gathering data only once during that time period? The placement of water wells within range of where the contaminants will travel during the two-year operation, Curis' proposed sample at depths inconsistent with where the injection will occur. Setting up in its simplest form a great game designed to -- not designed to determine the true impact of this operation.

ADEQ Response –
It is unclear what the commenter refers to when stating "they propose to sample for data only once during a two-year mining period." ADEQ has required a well located adjacent to the PTF well field. Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP. MW-01 will be sample at the same depths as injection will occur. Additionally, POCs screened in the Oxide Unit are compared to equivalent depths of injection.

They propose to leave the aquifer at five times the federal drinking water standard for our state and three times the standard for sulfate. Once again, this operation is nothing more than a sham designed for Curis to use as a public relations piece. The agency should not allow Curis to use them as a pawn for these types of endeavors.

ADEQ Response –
The commenter is integrating standards to be met at the POCs and target rinsing goals to be met at the mine block wells. The protection of AWQS at the points of compliance is the legal basis of the APP Program. The POCs are installed in the UBFU, LBFU and Oxide aquifers. The drinking water standards for arsenic has been considered and will be applied through consideration of fate and transport of arsenic in groundwater to ensure that the UPL is not exceeded at the northwest corner of the State Mineral Lease Land for the POCs. There is no federal MCL for sulfate, however there is a secondary MCL for sulfate at 250 mg/L. Three of the currently established ALs for sulfate at the POCs is set below 250 mg/l sulfate. Other sulfate ALs for newly installed POCs will be based on ambient groundwater quality at the site. The mine block wells are located within the PMA and screened in the Oxide zone. The PMA allows the permittee to place pollutants within the test mine block for the purposes of in-situ leaching. The mine block rinsing standards proposed in Section 2.9.2 are conservative to ensure that BADCT is met and that AWQS will be maintained at the POCs, or no further degradation occurs relative to that pollutant. The 750 mg/l sulfate mine block rinsing standard is one of the permitting requirements required to serve as an initial trigger to end the rinsing phase. The 750 mg/l sulfate rinsing standard was the sulfate concentration at which AWQS were predicted to be met at the mine block wells.

We implore ADEQ to use the full extent of their federal authority and every avenue they can, to use the strictest regulations within this permit. We applaud ADEQ for taking some steps to (inaudible) inappropriate proposals; however, we don't think enough has been done.

As you know, this process has been highly scrutinized and will continue to be highly scrutinized. All of this material, all of the applications, and all of the documents with it will be well-documented. Does this agency want to be remembered as signing off on a project that's inevitably going to be a catastrophe? It's been widely publicized (inaudible) that there is going to be an appeal.

We encourage the agency to take the steps to build in the measures that are necessary, do what's right, and revoke this permit.

ADEQ Response –
ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and conformance with the Arizona Mining BADCT Guidance Manual, in order to obtain the necessary permit required to discharge.

#212, Don Kempton –
I'm a fifth-generation Arizonan, raised my family in Florence, born in Florence. I have concerns about -- I have concerns about the environment, but one thing that I think we've

missed is the acid and alkali chart, the alkali is just as harmful as the acid side. Anybody in here able to grown strawberries at their house? We cannot, not without some special additives put together, because we're too alkali. The nature of this sulfuric acid on a leaching, it neutralizes the water with the right mixture, it cancels itself out.

I don't know all of the chemical part of mining, of everything else, but I do know that that acid, if you've got a swimming pool and you test the pH in your swimming pool, how many put lime in their swimming pools in Arizona? None. It's always acid because our soil, our water is hungry for that balance.

My thoughts are when acid (inaudible) and it gets into the caliche part, it will have a chemical reaction and it will go neutral. I learned it in grade school. I learned it in high school.
When they leach that metal and begin to move it, they have to carry it -- that acid solution has to carry it, and if it gets dissolved and is not strong enough (inaudible), it won't continue to move.
I commend ADEQ for their study. I think the best thing to do is to have everyone go to the
well, bring in a water sample, and when you guys get a reading on it, right now before all of a sudden we come up with my well is contaminated, we need to get across the board anybody who wants to get on board get a sample so it can be set up and we can monitor this. But it's not going to move.

It can get into the water source, but the acid is going to balance it out, our (inaudible) is alkali, which means it's basically lime. East of the Mississippi, they put lime on their farms; here we put gypsum because we're alkali.

ADEQ Response –
The comment is noted.

#213, Jim Pajer –
My name's Jim Pajer. I've lived here for almost four years. I have four points that I'd like to make today. The first one is people from Curis repeatedly talk about 99.5 percent water, .5 percent sulfuric acid. (Inaudible) is going to leach out the copper from the -- from the earth bed. And if it's leaching out copper, the problem is what else is it leaching out? And the people from -- from (inaudible), many of them are concerned about other contaminants that are going to be present when the sulfuric acid leaches out the copper. And those are the kinds of things that we really have to pay attention to. They never want to talk about that.

ADEQ Response –
ADEQ is aware when sulfuric acid is applied to a copper ore body, copper and other metals will be leached. Other metals that have AWQS, and some metals that do not have an AWQS, are required to be monitored at the mine block wells, a monitoring well and the POCs. Permit limits in the form of ALs and AQLs will be set at the POCs. AQLs are generally set at the AWQS, unless background water quality indicates a different

concentration. AWQS must be met at the points of compliance (POCs) and or no further degradation of the aquifer relative to that pollutant at the POCs can occur. The permit contains required contingency actions that will be implemented if alert levels for a non-AWQS metal and or an AWQS metal are violated at the points of compliance. Violation of the AWQS or an AQL at a point of compliance is a permit violation.

Second point I want to make is -- is that, and Tom Rankin pretty much stole my thunder on this here, when he talked about the fact that he strongly recommended that you have independent third-party company be responsible for this test program, if you go ahead with it. I think there's two key components of that third-party company, number 1 is, they should be the people that maybe help guide you to listen to the various constituents from Johnson Water, from Southwest Partners, who have many objections to the way this permit has been set up. And they can maybe help guide you as to what kind of things you should do to make sure that you're covering all of your bases.

The second thing is, they should be the people that actually conduct and determine the protocol how frequently you monitor, how close to the levels you monitor, and let them take the samples and let them announce it. I come from the chemical industry, and that's the way it's done. You always have third-party companies come in and take samples, unannounced visits, is the way it is normally done.

ADEQ Response –
All APP permittees self-monitor and report. ADEQ also conducts compliance inspections to ensure that monitoring results are valid. The sampling will be overseen by Arizona registered engineers or geologists, and analyzed by Arizona licensed laboratories.

Third point that I wanted to make has to do with the surety bond of $3 million. That is clearly inadequate if you have a worst-case scenario. And I think that if you are concerned about protecting the quality of our water, you need to be concerned about the worst-case scenario, and that means that you can have more than $3 million bond. I would like to see you go to the parent company of Curis and ask them to sign on and take responsibility if there is a worst-case scenario.

The last thing -- the last point when you're considering this here, think about if you lived in this community what your attitude would be about potential risk of having your water contaminated.

ADEQ response –
Please see Response to Comment #24(12).

#214, Eric Barcon –
My name is Eric Barcon. I'm vice president of Barcon Corporation. I've been involved in mine projects over the last 25 years, and I've watched ADEQ, EPA, every governmental agency possible graduate through the times, through the technologies, through the public process. I've worked on mines as recent as Carlota and Resolution. The rules and regulations that the government has out to protect the public, I feel, are

very adequate, whether it be this mine or any other mine that I have been involved in. We've even taken mines to the lead accreditation to get rebuilding certificates. Technology has changed, the times have changed, your regulatory committee has stayed up with those times. It's no longer (inaudible) if you can go after this and minimize the environmental footprint, you guys have endorsed those things and have put safety measures in place to protect the public and endorse economic growth.

The copper's been put here already, there's no change in that. So you've got to protect the public. Of course you guys have those guidelines in place, of which the Florence Mining Project will adhere to, in conjunction with your team. My team if, in fact, we're successful on getting anyone here, and satisfy all parties involved.

I just encourage everybody here to learn, educate, not he said, she said, they said, whatever.
Educate yourself on technology, process and procedures, and then make rational decisions.

ADEQ Response –
The comment is noted.

#215, Sue Shoetker –
Hi, my name is Sue Shoetker. I live in the Sun City (inaudible). From my understanding, your temporary permit allows Curis to inject a caustic substance, sulfuric acid, into the bedrock. The injection of acid will not just release the copper, it's also going to release a lot of other substances, like arsenic, magnesium and radioactive chemicals.

ADEQ Response –
The Temporary APP requires discharge characterization and groundwater monitoring for arsenic, magnesium, and radionuclides. Permit limits in the form of ALs and or AQLs in groundwater are set for arsenic, magnesium, and radionuclides such as adjusted gross alpha and radium 226+228.

I went on to Google to try and figure out how this mining might impact me. I found a 1999 report by EPA entitled "Technologically-enhanced naturally occurring radioactive materials in the Southwest copper belts of Arizona." This EPA report specifically discusses the Curis site. It used data from their own agency to make its conclusions. The report states that the Curis land contains very high levels of radionuclides, and that they're leachable. If the bedrock were solid and stable, I would not raise concern, but from what I understand, that bedrock is brittle with natural fissures and faults, and man-made bore holes for prior industrial use. Thousands of them. This is where the concern lies. Seepage is inevitable, unless all the natural and man-made fissures and the bore holes can be sealed. Your permit does not require this. The land defined is not in the middle of nowhere; it's in the middle of the town with thousands of residents, just a few miles from my house. The aquifer where our drinking water comes from is adjacent to the mining land. From what I understand, the mining operations will occur from 460 to 1200 feet below ground, which Curis claims is beneath any drinking water supplies.

However, Johnson Utilities' wells are at 500 to 1000 feet, their closest well is less than two miles downstream from Curis' lands. So our drinking water wells are at the same depth as the area to be injected where the acid will release various contaminants. Contaminants which will very likely seep through the fractured bedrock, right into our aquifer.

ADEQ Response –
The bedrock does contain fractures and faults. Curis has demonstrated in their application through groundwater modeling, that hydrologic control, can be maintained. The APP requires maintenance of hydraulic control during operations.

The Temporary APP does require that Curis located and abandon all coreholes and wells within a 500 foot radius of the PTF in accordance with Section 2.2.3.a.

ADEQ believes the commenter is referencing the Johnson Utilities registered well located approximately 1.2 miles northwest of the PTF and screened in the LBFU. ADEQ is aware that the Johnson Utilities well is not connected to the drinking water system. The PTF will inject into the Oxide Unit between 500 to 1,200 feet below ground surface. Extraction wells, observation wells, monitoring wells and POCs are located between the PTF injection wells and the Johnson Utilities well. ADEQ concurs that injection at the PTF site in the Oxide Zone is taking place at the same depth below ground surface as the Johnson Utilities well could conceptually extract groundwater from, however, the PTF injection is taking place in a separate and distinct geologic unit (Oxide) then the screened interval of the Johnson Utilities well (LBFU) and the comparable depths below ground surface for the PTF Oxide injection zone and potential groundwater withdrawal location in the LBFU are over 1.2 miles away from each other.

The mission of ADEQ, as I understand it, is to protect and enhance public health, welfare, and the environment in Arizona. It's important to take into consideration here the mining operation is adjacent to a master planned community, with a lot of families, children, park sites, and elderly in Sun City. We are all (inaudible) from this mine. The operation will put all of us at risk. The prior company that attempted to mine copper on the Curis property was not able to control the contamination, and from what I understand, no mining operation in North America has ever been able to restore the water.

ADEQ Response –
ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and conformance with the Arizona Mining BADCT Guidance Manual, in order to obtain the necessary permit required to discharge. ADEQ has determined that the Applicant has demonstrated that AWQS will be maintained at the POCs or no further degradation will occur relative to that pollutant.

#216, Brett Tanner –

My name is Brett Tanner and I'm representing the AMIGOS, which is the Arizona Mining & Industry Get Our Support. I'm going to defer my comments to the president, who will be speaking. But I know there's an earlier gentleman that asked if anybody had lime in their swimming pool and he gave me an opportunity raise my hand. Yes, I have. I know a gentleman named Al Pass [phonetic], who is an engineer out of Harvard who taught me how to safely (inaudible) lime, and do it in a proper way to neutralize your pools and acids. He was very clear in how he protected me, my pool, and my family.

These are the types of technical people that are part of this group who are supporting this project, people like Starr Curtis, and making sure that these chemicals that have, sitting by themselves, (inaudible), if used properly can be done safely and effectively to protect the community.

ADEQ Response –
The comment is noted.

#217, Philip and Irene Capana –

Good evening. My name is Philip Capana. My wife and I reside at 3836 North Hidden Canyon Drive, Florence, Arizona. My wife Irene and I are in opposition to the Florence Copper Mining Operation.

The Safe Drinking Water Act Amendment of 1995 requires the State of Arizona to be guided by the directly affected public in decisions of drinking water safety. Most of the directly affected public here, who actually reside in Florence, are against the mining operation because it's a dangerous risk to our drinking water.

We have a right to have a clean drinking water supply that is free of harmful contaminants. We look to you to protect our drinking water and protect our health. As we see it, preventing contamination from entering our water supply in the first place is the best approach.

Please, no mine, no contaminants, including arsenic. Inorganic arsenic, which results from industrial mining operations, is the most toxic type of arsenic. It is ranked by the International Agency for Research on cancer as a Group 1 carcinogenic. Inorganic arsenic is known to cause bladder, lung, and skin cancer in humans, with liver, kidney, and prostate now considered targets of arsenic-induced cancers.

ADEQ Response –
The foreseeable use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. Groundwater monitoring in the UBFU, LBFU, and Oxide water bearing units at the POCs between the PTF and the Curis property boundary is protective of any potential downgradient groundwater users.

Ms. Capana -

The federal limits for arsenic levels are 10 parts per billion. Keep in mind that the level is twice the 5 parts per billion levels that the EPA originally proposed, and that New Jersey actually established. If the Curis mines operation is allowed to operate, arsenic levels may be as high as 50 parts per billion, which is five times federal standards, or it could be higher, much, much higher.

The mining operation will endanger our drinking water and cannot be allowed to operate.

ADEQ Response –
For purposes of this Temporary APP, ADEQ has established a use protection level (UPL) for arsenic of 0.01 milligrams per liter (mg/L), which concentration is consistent with EPA's primary drinking water standard for arsenic. The UPL will be applied at the northwest corner of the State Mineral Lease Land. Alert levels for arsenic shall be established for each of the PTF POC wells through consideration of fate and transport of arsenic in groundwater to ensure that the UPL is not exceeded at the northwest corner of the State Mineral Lease Land.

ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and conformance with the Arizona Mining BADCT Guidance Manual, in order to obtain the necessary permit required to discharge. ADEQ has determined that the Applicant has demonstrated that AWQS will be maintained at the POCs or no further degradation will occur relative to that pollutant.

#218, Christopher Rod –
I'd like to take a moment and let's just recall what it's like being in a park playing under the lights. Maybe you were racing toward the goal, rounding first base, or just throwing a ball to your dog. Can you imagine the heartbreak of having that opportunity taken away from you? I saw this happen firsthand when I had to tell my team of young softball players that the game they had practiced all week for was cancelled because somebody stole copper wiring out of the light posts. Everybody needs copper.

Good evening. And thank you for the opportunity to speak to you today. My name's Christopher Rod. I'm a registered civil engineer in the state of Arizona, and for the past 19 years I've worked in the field of hydrology and geomorphology. I am not employed or contracted with Curis Resources, but I am here to speak on its behalf.

I learned first about the project through a meeting last year. Upon seeing a presentation, I was struck by the idea of extracting copper from a site using noninvasive processes. I have worked on mine reclamation and I was very cautious about what was being implemented at the Florence copper facility. Upon review of the site's unique geology, the state-of-the art extraction technology, and the overabundance of safety precautions

that are being proposed, I firmly believe that what is being considered by Curis with this pilot project is safe and effective.

This leads us to a decision. Before us is the opportunity to begin the testing phase of the pilot project through the issuance of a temporary permit. I encourage you to approve this permit and allow the Florence Copper Project to move on to demonstrate if this resource can be safely harvested from the land without opening up the earth.

Everyone, including myself, talks about responsible and sustainable development, using the land in a manner that it can be reused later. Here is the opportunity to let that happen. Imagine a mining facility that is not characterized by deep open pits and long mine shafts or men in the ground. One that during its operational life is no more intrusive than a solar farm. One, that upon completion, can be easily transformed into a park or a series of fields where kids can play ball unaware that the copper in the lights above them came from a well below them.

ADEQ Response –
The comment is noted.

#219, Vicki D'Elia –
My name is Vicki D'Elia and I request that you revoke the temporary permit.

From day one Curis has been telling half truths and showing us and you only half the picture. Their property line ends just east of the current drinking wells and proposed future drinking wells. This water source is 1500 feet below ground, yet Curis claims the only drinking water -- the only drinking water in their ISCR zone is 200 feet below ground. They also claim the clay aquitard acts as a protective barrier to this water source. My drinking water is west of their property; however, this aquitard does not run vertically to protect that water.

ADEQ Response –
ADEQ understands that the commenter is referencing the middle fine grained unit (MFGU). This unit may act as a barrier to upward migration of fluids into the upper basin fill alluvium. However, it is not relevant to fluid migration in the oxide zone or the lower basin fill unit. ADEQ has not evaluated or considered the concept of a protective clay aquitard (MFGU) relative to required pollution control measures for BADCT.

The groundwater flow has been determined to run west by northwest directly to this deep water basin and, therefore, any contaminants from their operations will poison this deep water basin. Florence Gardens, and people here in this part of Florence, are not concerned about this, because they don't get the water from that source.

ADEQ Response –
The foreseeable use and current use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. Groundwater monitoring in the UBFU, LBFU, and Oxide water bearing units at the POCs between the

PTF and the Curis property boundary is protective of any potential downgradient groundwater user.

Your permit requires Curis to plug and abandon all bore holes, wells located within 500 feet of the PTF well field boundary. BHP previously drilled hundreds, if not thousands, of bore holes throughout the property. How can you assure me that each and every one of these bore holes that can lead to the contamination of my drinking water will be found? And will you inspect all of these after they are plugged, or will you just take Curis' word? To do that that is a bit like putting the fox in charge of the henhouse.

ADEQ Response –
See response to commenter #24(10) and #24(16). ADEQ will not provided oversight for the abandonment of coreholes or wells. The abandonment will be completed by Arizona licensed well drillers, and overseen by Arizona registered engineers or geologists.

Additionally, Curis has proposed POC wells to monitor for contamination be located not at the edge of their PTF, but at a distance that assures contamination will not be discovered during the PTF operations. I hardly think this is considered to be sufficiently located, as required by the permit, to provide real results of contamination when it happens.

ADEQ Response –
POC locations are required by A.R.S. § 49-244 to be placed on the downgradient edge of the pollutant management area. The seven (7) POCs are located correctly, as required by the cited statute. ADEQ has required a well located adjacent to the PTF well field. Monitoring well MW-01 shall be located in the downgradient groundwater direction at or near the PTF well field boundary. The placement of MW-01 shall be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP.

It seems to me that the permit sets Curis up for success. It does not appear to follow the core functions of your department or its mission to protect and enhance public health, welfare, and the environment in Arizona. I am the public and you have an obligation to serve.

I have yet to be shown or find a report of one in situ mining operation anywhere in the world that has not resulted in contamination of groundwater. If you are committed to highest standards of ethical behavior stated in your principles and values, you will hold Curis to the same. Your obligation is to these people in red shirts, not to -- not to -- is not to a foreign company who is less forthcoming and overly zealous about its mining practices.

ADEQ Response –
ADEQ Aquifer Protection Program is responsible for issuing permits to protect groundwater for facilities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper

Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and conformance with the Arizona Mining BADCT Guidance Manual, in order to obtain the necessary permit required to discharge.

#220, David Rawls –

I'm David Rawls. I have 63 years' involvement with mining, and unfortunately many of those years have been battling against forces that are basically shutting this country down.

Before I talk about that, the first thing I want to say before I forget, our country has many supplies, everything it needs, and generally enjoys a lower price, where a country doesn't produce anything, those countries are not only poor countries, irrespective of what name they might have.

In my case, my family has had mining claims in Arizona, we had (inaudible). Ten years after my dad built (inaudible) roads in this area, an area of which shouldn't be classified as a natural forest, but dad (inaudible) the operation was small, and all of a sudden we were invaded by the United States Forest Service and the fact that we had a copper mine(inaudible), showing future (inaudible), all of(inaudible) respect.

So I'm here today to say that this project should not be stopped from allowing it to be -- to be allowed to prove itself. It should be allowed to prove itself. If it won't work, if it doesn't pan out, it will end. So America is becoming a very poor country. Mining has been shut down. (Inaudible) have been shut down. Small towns have been bypassed by the interstate highways. It has to stop or it will be the end of America.

Ancient civilizations like Ancient Greeks, they were prosperous and did better and better, until they got full of themselves and they will be like them and make museums out of them. And that's the period of Ancient Greece, and we know what happened to Ancient Greece, they lost. And I'm afraid America will do the same. God bless America.

ADEQ Response –
The comment is noted.

#221, Rick Grinnel –

I'll give you my notes, except I can't read my own writing. My name is Rick Grinnell. I'm the vice president of the Southern Arizona Business Coalition. We're based out of Tucson, Arizona. My attendance here is to lend support for Curis Mines on behalf of the members and governing body of our organization, but we don't do this just as a blanket support. Our efforts are to support (inaudible) mining, commercial (inaudible) throughout all of Southern Arizona, as one economic engine does impact another economic engine.

I've also been part of, reviewed, and incorporated various processes over the years, and you have a very arduous task, and I thank you for your commitment, discipline, and

responsibility. Your (inaudible) and integrity for the State of Arizona owes you a great debt of gratitude. This is a legal process and technical process, not a political process.

After we had engineers and hydrologists and professionals out at the Curis mine, our organization decided not only to support them, but also to help them enhance the opportunities in Southern Arizona, south of the Gila, if you will, will have economic insurance, that is much needed in our state.

Mining has changed over the last time (inaudible) has been permitted. The technological detail that is involved with the EPA, the Forest Service, Fish and Game, all these agencies have employed various techniques that have allowed us to review things much better than we were able to. Our processes aren't our father's mines. My grandfather came here from Mexico in the late 1800s to learn to work on the railroad, transportation, and mining industry.

Mining has been important to our society, it's a valuable resource, and I find no information or fact that would suggest that Curis is not going to live up to its expectations that is commanded by the responsibilities of this department. And I thank you for your time and appreciate your efforts

ADEQ Response –
The comment is noted.

#222, James Del Coure –
What I think of the (inaudible) day when the Wright Brothers said they will never get off the ground, and in my father's lifetime they put a man on the moon. There's a few circle of people I know with the Curis mine, all of them take showers, that won't (inaudible), they drink it subsequently.

My concern is most of the people I speak with are concerned with the economic uncertainty. This is a fact that while our economy is in limbo, we just saw a legislative inactivity to all Resolution copper projects that would become the largest copper producing mine in North America. 400 people will lose their jobs over the next six months. That's more than the people in complete attendance that we had tonight.

The average copper wage is over $78,000 a year in the industry. So let's not revisit the occurrence of all (inaudible). The professionals, ADEQ confirm the groundwater would not be virtually affected and have an issue of Curis not (inaudible) plans and project.

I do support the mines and I wish to advocate for your approval to sustain the current permit, the process as the necessary safeguards and in compliance with the legal requirements. So I ask you to issue the permit

ADEQ Response –
The comment is noted.

#223, George Johnson –

Good evening, ladies and gentlemen of the jury. I'm here tonight -- that was a joke . I'm here tonight to do what I can to protect the quality of our water, the quality of the life of the people, tens of thousands of people that use our water and have homes above it.

Now, when, and this is just my humble opinion, these people that are stock regulators that come in here, none of them have ever operated and developed an in situ mine, yet all of a sudden they're all experts. Your department, when they came in with the original permit, you came back with a deficiency letter, 78 deficiencies, plus (inaudible).

I understand that Curis pulled their permit. Why didn't they go ahead and ask for the deficiencies? Why didn't they clear them up? There's no emergency here at all. The only thing that will happen with an emergency -- well, I don't know what to expect.

ADEQ Response –

The 78 deficiencies referenced in the Comment is an ADEQ Comprehensive Request for Additional Information (Technical Deficiency) Letter dated September 7, 2011. The September 7, 2011 ADEQ Letter was prepared as a result of a review of a Significant Amendment Application for P-101704 dated January 2011, for commercial mining operations at the site. Since the issuance of the September 7, 2011 ADEQ Letter, Curis Resources suspended the request for the Significant Amendment Application for P-101704 in a letter dated December 20, 2011. Since the request to conduct commercial operation at the site was suspended by Curis, the Applicant was not required to respond to the Technical Deficiencies for commercial operations as stated in the September 7, 2011 ADEQ Letter.

A new Application for a Temporary APP (P-106360) to conduct a small scale pilot test was submitted by Curis March 1, 2012. Any technical deficiencies associated with the Temporary APP have been satisfied.

But EPA inspected 160 or 190 defective in situ mines in the country here, not a one of them, or I should say all of them, had water contamination. That should tell us something. And here people have never developed or operated a mine like this telling us they know what to do. They don't have the money to do it. They've got to go out and get investors, they've got to sell stock, they've got to make things look good. But at the bottom of all the propaganda, there's a big disclaimer, a paragraph so they can't be sued.

All I can say is that there's no emergency, please go through, they should have to -- it's going to destroy our way of life. You want to do it here? Do it in the middle of Scottsdale, too, and see what happens.

ADEQ Response –

ADEQ has determined that Curis has met the requirements for technical and financial capability to carry out the terms and conditions of the Permit.

#224, Jerry Kenyon -

My name is Jerry Kenyon. My expertise comes from being born in the mining industry. My family owned a company for 100 years, and supplied an income for my family for 100 years.

When I took over the company in 1973, I had already worked for my dad a number of years, and I learned a lot about the mining industry. I got involved in technical equipment and building and processing, which required me to get a whole new education. And I worked with Amax in their R&D center, worked with a lot of rebuilding their equipment, I had to know what the types of equipment that would be compatible, with the chemicals that they used.

And I just think that this particular process has to have an opportunity to prove itself. The opposing party don't have to prove themselves, they can stand up there and tell all kinds of stories, but aren't required to prove anything. Curis is looking forward to proving something. And I spent time out there looking and listening and talking to them, and I thought it was a fantastic idea. I just believe they should have the opportunity. It's the American way.

ADEQ Response –
The comment is noted.

#225, Debra Bates -
Thank you. And I thank the ADEQ for holding this meeting. If my voice is raspy, it's raspy because we don't have a whole lot of water in the room.

I'm Dr. Debra Banks. My background is in STEM, science technology, engineering, and mathematics, both by teaching and by bench. I'm also representing tonight John Westmoreland, who is a newly retired management engineer, and along with his newly retired bride, Marcia Westmoreland, who is a nurse.

So after several days of contemplating over what we have put together in the meetings that we have gone to, this is the three points, with a grand finale. The three points are the financial surety without the bond, sufficient bond funding being forwarded by Curis, suggests suspicion. It will also cost them accreditation, which I am also very well invested in, after going through ten of them, but at the engineering level.

ADEQ Response –
The financial requirement was satisfied through a surety bond for $3,487,743. The cost estimates were prepared based on current market costs for typical activities associated with closure of discharging facilities of the size and number found at the Curis PTF. The cost estimates have been evaluated by ADEQ and determined to be adequate for closure and post-closure of the APP facilities at the Florence Copper Project PTF.

The second point is the operational setup. It was unclear as to the extent to which the instruments that are being used are going to be actually monitoring parts per million. I

say that sincerely, because my master's was based on the toxicity and genetic diversity, and I know what the heck I had to go through to calibrate instruments.

ADEQ Response –
The sampling results are analyzed and reported by Arizona Department of Health Services licensed labs. The actual reporting limits (i.e. parts per million, milligram per liter, etc.) will vary according to the media sampled (soil, water, air), the analytical method used, the parameter(s) being analyzed, among many other factors. Field and laboratory instrumentation used for environmental sampling is required to be calibrated in accordance with industry standards.

The last and grand finale is the three of us wonder how this would have got -- hold on – if Curis is very serious about their operation or if they're going to sell it off once they get a pre-permit. Therefore, we're asking to deny the permit.

ADEQ Response –
ADEQ has no comment on future property transactions.

#226, Cori Hoag -
My name is, registered geologist, working at other copper operations subject to the APP regulations. In the 1990s I worked on the installation and operations of BHP's in situ recovery test facility, which successfully demonstrated that groundwater health and safety and all environmental controls were maintained before, during, and after BHP's leach test.

The Curis proposed pilot test will be operated similar to BHP's, under the regulations similar in monitoring of ADEQ and EPA, historic core holes will be closed and wells drilled and installed with the latest drilling techniques. Modeling is done with state-of-the-art 3-D visualization and simulation software to predict and manage groundwater flow and process solutions subsurface.

What's different from 16 years ago when similar field test was completed? 16 more years of water quality baseline sampling in all nearby aquifers, updated flow models, and huge leaps in instrumentation technology. BHP can only dream of the real-time monitoring technology available today.

I have carefully read the permit issued by ADEQ, and have seen the additional protections that have been added relative to the same permit I operated under BHP's employment, issued more than 16 years ago for the same size and type of pilot test. The only difference now is the length of the test.

ADEQ Response –
The comment is noted.

#227, Mark Nichols -

My name is Mark Nicholls, Arizona registered geologist. I work for an engineering company in the employ of Curis. I'm responsible for much of the hydrologic information that's been assembled for the permit. In particular, I'd like to address a couple of points that we heard earlier this evening regarding software that was used, aquifer test data, were all conducted under industry standard procedures, those aquifer tests were analyzed by proprietary software owned by one of the consultants that was responsible for that at that time. And in particular that software was developed based on mathematical principles that are industry standard and have been more for than 80 years in the groundwater industry.

In particular, the technical folks will understand the Tice and Jacob solution methods for analyzing the test data. Those were embodied into the proprietary software used to analyze those aquifer tests.

In addition, those tests were used to support a new groundwater model which was developed, based on 15 years of groundwater data, the best data available from DWR, who is responsible for pumping at the state level. DWR, in particular, we obtained all of the groundwater production data that DWR had for that model. And, of course, they don't have future data; that's the purpose of the model, is to project out the future (inaudible) and things like that.

Johnson Utilities alleged that their wells are not included in that model; certainly if they had been reporting their groundwater production to DWR, we'd have that data and that model would be included.

Again, we can't know what the future production will be, but certainly that model is based on the best available data, the best available industry standard software, it's been reviewed by other consultants in town, and it's been reviewed by the EPA. And none of those entities have had problems with the software used or the methods used or the analysis of the data with those models.

A few other points, we've heard people say tonight that no other in situ mining projects have been reclaimed or, let's say, restored back to pre-mining aquifer conditions. Certainly, some of the studies that were cited tonight referred to mining projects that were -- I'm sorry – mining projects that were remediated back to the regulatory standards under which they were permitted, and those standards may not have reflected the initial groundwater condition before those mines were in progress.

And in particular, the State of Texas required that rinsing continue for six months after leaching was completed without further testing or analysis and was the basis of one of the reports.

ADEQ Response –
The comment is noted.

#228, Christina Duval –

First off, I want to thank you. I appreciate you permitting me to publicly state my opposition to this project, and to the temporary aquifer protection permit number 106360.

Let me state that I am a resident in this area. I live downgradient to the proposed mine; therefore I'm impacted by your decision. I'm here by my own volition. I'm not being paid to state my objection and comments. I'm a former regulator, so I'm looking through your permit as I was a regulator. Permitting Curis to operate this test will result in contaminating.

According to the March 2012 report, "Nuclear Fuel's Dirty Beginnings," all stages of ISL mining impact surrounding water quality because the process invades ore deposits and fundamentally alters groundwater chemistry. Furthermore, it states that they have never found a single ISL operation where an aquifer was restored to its pre-mining state for all contaminants. That's a very recent report, 2012, March. And relative to the cost of cleanup, it states, and I quote, "The cost of what cleanup has been done, a price tag that is certainly in the hundreds of millions of dollars, has been borne in large part by the taxpayers, rather than the mining companies."

So my concern lies in the contamination of the aquifer, the lower basin fill unit, which is adjacent to the proposed mining area, as well as the resulting cleanup costs, which will most certainly be borne by the 80,000 residents of the area.

Furthermore, I have reviewed the temporary aquifer protection permit, and have numerous concerns and comments. I will also submit written comments.

First, throughout this permit there are many instances in which the word "shall" is used. The term "must" needs to be used instead. Those of us who are familiar with government speak realize that the term "must" is much more definitive and provides little wiggle room for the permittee. As a government agency, the ADEQ's mission, as I'm sure you're aware, is to protect and enhance public health, welfare, and the environment in Arizona, thus the terminology must be changed to show that your agency is serious in its duty to protect Arizona.

I won't get through all of this. I will submit my written comments. Monitoring is inefficient, inadequate. There are also -- you guys know what to expect, (inaudible) and Curis has not been able to prove they're a trustworthy company. Thank you for your time.

ADEQ Response –
Please see Response to Comment #24(12).

ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and

conformance with the Arizona Mining BADCT Guidance Manual, in order to obtain the necessary permit required to discharge. ADEQ believes that the terms, conditions, and restrictions of the Temporary APP, in conjunction with monitoring and enforcement activities, if needed, by ADEQ constitute adequate measures to protect water quality.

"Shall" is typically used in laws, regulations, and permits, to express what is mandatory. ADEQ will retain "shall" rather than "must" for mandatory permit requirements.

ADEQ considers the POC locations and sampling frequencies to be adequate to evaluate the protection of AWQS at the points of compliance. Additionally, ADEQ believes the groundwater monitoring parameters and frequency specified in the Temporary APP are adequate for the proposed pilot test. The permit requires quarterly and semi-annual groundwater monitoring at the POCs, and monthly monitoring at monitoring well MW-01 adjacent to the PTF well field. This is a more accelerated and stringent groundwater monitoring program as compared to other mining permits.

#229, Dennis Tucker -
My name is Dennis Tucker. I'm a professional engineer, practicing environmental engineering for 28 years. I did not have any prepared remarks. Most of the points I wanted to make have been made by other engineers and geologists that have spoken. So for -- in the interest of time, I'll just be brief and say I've reviewed the permit, and in my opinion, I feel that it's extraordinarily rigorous for any (inaudible) of this type of situation. So I commend you on the exceptional controls that you've entered into the permit.

Based on what I know about the core volumes subsurface conditions, there's a tremendous amount of data that's available over several decades, and the subsurface conditions were all understood by the engineers and geologists, and what we're really here for tonight is to comment on what's essentially a temporary permit, a very small-scale engineering demonstration test to prove out that the concepts are valid, and that the subsurface can be controlled as we -- again, several people have already stated, this is not a new technology. It's a leaching process that's been used around the world, primarily in uranium and some other materials. And it's used today in Wyoming.

And so I support the permit and I feel that we have should give the company a chance to demonstrate the viability of the project.

ADEQ Response –
The comment is noted.

#230, Eric Cantlin -
My name is Eric Cantlin; I reside at 3576 North Corona Court in Florence, Arizona. First of all, I would like to thank the board for the opportunity for us to hold the meeting. To sit a board of this importance on the environmental quality assurance in the state of Arizona is a position I'm sure none of you take lightly. Just a few quick points.

Water is the essence of life. Without water, nothing lives. Not one in situ mining operation found in North America has been found to not have left contaminated underground water.

ADEQ Response –
ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and conformance with the Arizona Mining BADCT Guidance Manual, in order to obtain the necessary permit required to discharge.

With thousands of holes at this site and future holes to be drilled, you can guarantee that will happen. Placing water in the wells, at such a distance from the public water -- from the public drilling sites is absurd. Water will travel through sand at approximately 8 inches per hour. That's sand. We know this is not sand out there at the proposed site for the drilling operations.

ADEQ Response –
ADEQ is aware that approximately 686 coreholes have been drilled regionally, of which approximately 208 coreholes have been drilled on the Curis owned property and approximately 127 coreholes were drilled on the State Land parcel. Curis is required to locate and abandon coreholes and wells in accordance with Section 2.2.3 and Section 3.0. of the Temporary APP.

That could take anywhere from one-half to two years to reach the monitoring well site. Drilling right through the existing aquifer with water flowing northwest means drawing potable water at those locations will definitely have contaminated issues. Once your water is contaminated, there is no reversal. You can say in recent history of looking at public officials that have led stellar careers, and you can say as the executive board of environmental quality assurance for the state of Arizona, I did an outstanding job for my tenure. But please do not let this be your legacy of making a decision that is going to affect the future of the Florence Southern Valley area of Arizona and your mankind.

They say when man has integrity, nothing else matters. When a man does not have integrity, nothing else matters. Please use your wisdom, and your sound judgment, and education to deny this proposed permit.

ADEQ Response –
The foreseeable use and current use of groundwater as drinking water was considered in developing the terms, conditions, and restrictions of the Temporary APP. Groundwater monitoring in the UBFU, LBFU, and Oxide water bearing units at the POCs between the PTF and the Curis property boundary is protective of any potential downgradient groundwater user.

ADEQ is requiring a monitoring well MW-01 adjacent to the PTF well field. The placement of MW-01 will be sufficiently located to measure changes in chemical groundwater concentrations emanating from the injection zones within the effective time frames of the Temporary APP.

#231, Sydney Hay -:
My name is Sydney Hay, and I'm president of the AMIGOS, it's a trade association of mostly small and mid-size businesses that depend on projects like Florence Copper to survive, and to employ electively tens of thousands of Arizonans. Our board of directors recently passed a unanimous resolution in support of this project, because of$2.2 billion in new economic activity, 681 high-paying jobs, a rise in average personal income for Pinal County of over 700 million, and over 300 million in tax revenues to local governments. Tax revenues that can certainly pay for a lot of the board governmental oversight, such as that which ADEQ does. Our AMIGOS member companies include a significant number of environmental firms, and many folks of those types of firms have spoken tonight. And those are firms with highly educated, highly specialized people, using the very latest technology to protect our environment. If they didn't do that right, if they didn't do that well, well, they wouldn't be in business any longer.

I trust those types of experts, those independent experts, and I trust the oversight of ADEQ. So that this pilot project goes forward. I thank you for your time, and I thank you for what you do for our environment.

ADEQ Response –
The comment is noted.

#232, Stacy Brimhall -
Thank you for your time. My name is Stacy Brimhall; we have farms to the north of this project, to the west of this project, to the south of this project, and ranches to the east of this project. I know what I'm about to say really isn't what you regulate, but our best problem over the years has been houses, and a project like this really takes away the value or the opportunity to have that at some point in time.

I don't know whose science is right. I don't know if their science is right or the opposition's science is right, and I apologize for not taking the time to know more about that. But what I do know is that moms and dads decide where they want to live. I understand that power lines have not been determined whether or are not they are used or not, but I do know the development is happening around them, and so it takes away everything that my wife and I have worked towards for not just ourselves, but for future generations.

I normally don't oppose projects; I'm a strong believer in property rights, but I've also had horrible experiences in the Gila Valley where we have two farms 20 miles away from Freeport Mine, and they are building a molten sulfur transfer station in between our two farms, doing the same exact thing, and what I learned through that process is that there's

no regulation, local regulation. What they do for the purpose of putting this 20 miles away from the mine is basically, I believe, so there won't be oversight.

I didn't know this, but apparently on county land, Arizona (inaudible) mining companies believe that they could build a facility such as a dynamite storage facility. And I'm not saying that Curis is a Freeport, I have no respect for Freeport, but you have to allow a little cancer to start on the body of Florence and I believe it grows into a big cancer. So I implore you to deny this permit. I, again, appreciate your time.

ADEQ Response –
ADEQ Aquifer Protection Program is responsible for issuing environmentally protective permits to facilities and activities that are subject to the requirements of Arizona Revised Statutes (A.R.S.) §49-241. The APP application submitted by Curis for the Florence Copper Production Test Facility has been evaluated and determined to meet all of the requirements of A.R.S. §49-241, Arizona Administrative Code (A.A.C.) R18-9-A210, and conformance with the Arizona Mining BADCT Guidance Manual, in order to obtain the necessary permit required to discharge.

#233, Gary Gilchrist -
Yeah, I'm nervous. Anyway, my name is Gary Gilchrist. I've been here all my life. My family has been in the farming business (inaudible). My dad's a Gilchrist, my mother was a Rusty [phonetic]. This land out here has been farmed for 80 or 90 years. It's had chemicals dumped on it from the sky to flood irrigation. It's got a river running through it called the Gila River running right through the heart of mining land, Salmon Wells[phonetic], dumping into the little town of Florence, running through the sand, you know, eight inches a minute, or whatever, and then about ten miles outside of town here there's a little well out there; if you go across the tracks and look to your left you'll see it. At this time that we're speaking they're pumping water from the mine in Superior to that well, and I've heard all this talk about the water -- God, I love you people; I know your heart's in the right -- you mean well, but you're getting your information through the mail. Every 30 days you get a letter in the mail from your utility company feeding you this stuff.

God love you, but my opinion here is this is about the developers and this is about construction. I don't know who this gentleman is who is farming his land, but I know a lot of farmers that's made big money from real estate and developer people that's come in and bought their farms for big money.

This little outfit up here, Curis, what they're going to put in the ground is just a drop in the bucket from what's already been put in this ground. I don't see the beef. I don't.

ADEQ Response –
The comment is noted.

#234, Robert Kozlowski -

Robert Kozlowski, K-o-z-l-o-w-s-k-i. I live at 8059 West Millerton Way, Florence, in Merrill Ranch. I don't have a formal presentation, I've been listening with great interest to everything that's been said. There's a couple of points that I hadn't heard raised that I think may need to be.

I share concerns about the project and some of those concerns stem not only from the water quality issues, but the potential hazards associated with the use of a caustic solution, like sulfuric acid. Getting back to that solution, that acid to the facility, it's got to happen somewhere somehow. I don't know what that solution is, I don't know if it's been discussed, but I only see it getting there a couple ways, on a tanker truck or potentially on a rail car, rail line. Either way, there's always a potential for a catastrophe when you're transporting caustic material.

ADEQ Response –
The Aquifer Protection Program was established to protect groundwater resources, and has no jurisdiction over transportation considerations for chemicals.

So I have a real concern about that. Also as a result of that, should it happen to be, as a result of the traffic, you know, down the highway that, in fact, we're going to see a significant increase in volume of that type of vehicle going down that corridor, and I'm a little concerned about volume of traffic down the corridor and the types of vehicles being involved. So that's basically, you know, a couple of concerns that I had that are relative to not only the water itself, but, you know, the use of our facilities.

ADEQ Response –
The Aquifer Protection Program was established to protect groundwater resources, and has no jurisdiction over vehicle traffic issues.

There's one other thing, and that is I suspect that what's going to happen, potentially more so in the Merrill Ranch development than elsewhere in Florence, is that if and when it appears that it's going to be given the go-ahead and if that's decided that we're going to see that, that's going to place a shock right through the heart of the growth of Merrill Ranch that, in fact, people aren't going to want to purchase out there, knowing, in fact, there's potentially an environmental issue looming.

ADEQ Response –
The Aquifer Protection Program was established to protect groundwater resources, and has no jurisdiction over real estate transactions.

And so I think that's going to have a negative impact on the economy, will have a negative impact because you'll see people that potentially may decide maybe I don't want to live here, a mile and a half away waiting for something to happen. So just my thoughts.

ADEQ Response –

The APP Program is designed to protect groundwater quality. The potential economic advantages or disadvantages of the operation are not a consideration of the APP process.