

# ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY



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CERTIFIED MAIL
Return Receipt Requested

March 26, 2008

Attention: E. L. (Ned) Hall Freeport McMoran Copper & Gold Inc. Sierrita Operations 6200 W. Duval Mine Road P.O. Box 527 Green Valley, AZ 85622-0527

Re: Focused Feasibility Study

Dear Mr. Hall:

Though not required by Mitigation Order Docket No. P-50-06, Freeport McMoran Copper & Gold, Inc., Sierrita Operations (Freeport) submitted, and the Arizona Department of Environmental Quality (ADEQ) has completed its review of the December 28, 2007 "Focused Feasibility Study" (FFS) to identify and evaluate "alternatives to improve the effectiveness of the Freeport Tailings Impoundment interceptor wellfield.

Freeport evaluated three Alternatives, namely:

- 1. Expanded pumping at the Interceptor Wellfield;
- 2. New Wellfield east of the Tailings Impoundment
- A. New Wellfield to be located 2,500 feet east of the Tailings Impoundment on Arizona State Land Department" property;
- B. New Wellfield to be located 4,700 feet "along the boundary between Arizona State Land Department and private property;"
- 3. Enhanced capture at the Interceptor Wellfield using injection wells.

The company then stated at Section 5, "Recommended Mitigation Alternative" of the FFS that "Alternative 2B is the recommended mitigation alternative."

At this time ADEQ has decided it would be premature to make detailed comments because as Freeport states at Section 5, "Recommended Mitigation Alternative" of the FFS, the Feasibility Study, required by Mitigation Order Docket No. P-50-06, "will evaluate alternatives for

Northern Regional Office 1801 W. Route 66 • Suite 117 • Flagstaff, AZ 86001 (928) 779-0313 Southern Regional Office 400 West Congress Street • Suite 433 • Tucson, AZ 85701 (520) 628–6733 Freeport McMoran Gold & Copper Inc. Copper Queen Branch Work Plan Review March 26, 2008 Page 2 of 2

mitigation of the larger sulfate plume as part of the development of the Mitigation Plan. The recommended alternative should be further analyzed in the context of the Feasibility Study prior to implementation to ensure consistency with actions being considered for the Mitigation Plan." Clearly this is a limited assessment, and though it examines each Alternative carefully, its scope was rather limited. Notably, Freeport did not examine how source control, pump and treat, and other end uses, apart from reuse at the mine, of treated water from the aquifer may impact the sulfate plume. Moreover, until such time as the Aquifer Characterization Report, accurately delineating the vertical and lateral extent of the sulfate plume, is approved, ADEQ believes conclusions based on feasibility studies conducted in the interim, may be premature.

Nevertheless, ADEQ has attached to this letter copies of the FFS reviews prepared by Salmon, Lewis & Weldon, P.L.C on behalf of Community Water Company, and Haley & Aldrich on behalf of Twin Buttes Properties. Inc. Both reviews raise pertinent issues that Freeport should address as it conducts the Feasibility Study required under the Mitigation Order, for development of the Mitigation Plan. ADEQ will provide comments on this Feasibility Study when it is submitted to the department.

Please call me at 602-771-4614 if you have any questions.

Sincerely,

Robert Casey, Manager

Water Quality Enforcement Unit

cc:

Stuart M. Brown, President Bridgewater Group, Inc. 4500 SW Kruse Way Suite 110 Lake Oswego, or 97035

Ray Lazuk, Freeport McMoran Gold & Copper Inc.

Joan Card, Director, WQD, ADEQ Cindy Campbell, Manager, WQCS, ADEQ Henry Darwin, Administrative Counsel, ADEQ Moses Olade, Environmental Hydrologist, WQCAU, ADEQ Michele Robertson, Manager, Groundwater Section, ADEQ

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February 15, 2008

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Robert Casey Manager, Water Quality Enforcement Unit Arizona Department of Environmental Quality 1110 West Washington Street Phoenix, Arizona 85007

Re:

PDSI Sierrita, Inc.—Mitigation Order on Consent, Docket No. P-50-06 Focused Feasibility Study for the Northern Portion of the Interceptor Wellfield, Phelps Dodge Sierrita, Inc. Mine Tailing Impoundment

Dear Mr. Casey:

On December 28, 2008, Phelps Dodge Sierrita, Inc. ("PDSI") submitted to ADEQ two reports, the first entitled *Focused Feasibility Study for the Northern Portion of the Interceptor Wellfield, Phelps Dodge Sierrita, Inc. Mine Tailing Impoundment* ("FFS"), and the second entitled *Aquifer Characterization Report* ("ACR"). With this letter, Community Water Company of Green Valley ("Community Water") provides its comments on these reports. Community Water appreciates this opportunity to comment and appreciates your agency's cooperation in providing time for comments from the public after submission of these reports.

Community Water has reviewed the ACR and believes the groundwater model depicted in that document to be reasonable and suitable for purposes of PDSI's work under the Mitigation Order. The ACR provides a good analysis of the local hydrogeologic framework and the calibrated numerical model will be useful in analyzing possible mitigation measures. To the extent technical issues may exist with the model, Community Water has confidence that ADEQ will address such issues as necessary. Community Water has no additional comments on the ACR at this time.

<sup>&</sup>lt;sup>1</sup> This letter also includes comments related to PDSI's November 16, 2007 Revised Report re Evaluation of the Current Effectiveness of the Sierrita Interceptor Wellfield ("Effectiveness Report"), which Community Water views as providing support and documentation for the analysis in the FFS.

In regard to the FFS, it appears that PDSI has presented a reasoned and thorough analysis of the issues associated with improving capture of groundwater along the face of the interceptor wellfield. Based upon the information provided in the report, Community Water agrees that the most effective alternatives for establishing hydraulic containment of seepage from the impoundment under the standards of A.R.S. § 49-286(B) are Alternatives 2A and 2B.

This is not to say that Community Water does not have concerns about these alternatives. Either alternative moves the line of containment off of PDSI's property and closer to existing production wells in the area, both public and private. This leaves PDSI with even less room for error and could create new impacts on surrounding landowners. Community Water also is deeply concerned about conceding hundreds of acres of State Land to the plume, especially given the likelihood that this area will be auctioned by the State and developed in the near future. Because groundwater beneath these lands will not be available for use in the future, other sources will be necessary, increasing the pressure on existing supplies and points of groundwater withdrawal.

But given local hydrogeologic conditions and technical constraints as presented in the FFS, these two alternatives appear to be the mostly likely hope for containment of the plume. The selection of either of these alternatives, however, necessitates increased focus on a viable source control strategy and a thorough study of methods for mitigating the existing plume. Although Community Water is hopeful that hydraulic containment of the plume can be improved using one of the two alternatives, containment is never perfect and the possibility exists that containment will not be effectively achieved. The line cannot be moved again without conceding additional land to the plume and further endangering existing groundwater sources. Because containment may not be effective and complete for the life of the mine and beyond, PDSI must develop an effective multi-pronged strategy that seeks not only to contain the plume, but also to reduce or eliminate the source.

The following sections describe Community Water's additional comments and concerns regarding the FSS and PDSI's strategy in addressing the plume. Although many of these comments involve more global issues that may be addressed by PDSI in future documents, Community Water believes that these are vital issues deserving emphasis and study at every step of this process.

## 1. PDSI Must More Thoroughly Address the Handling and Impacts of Water Pumped from the Interceptor Wellfield.

The proposed alternatives for the interceptor wellfield will increase the amount of water pumped from the aquifer. PDSI indicates that the water will be used at the mine, but nothing in the FFS addresses the disposition of water that cannot be used at the mine. Production and corresponding water needs at Sierrita Mine necessarily decrease when copper demand and prices are low. Historically, the mine has experienced long periods of

decreased production or inactivity during economic downturns. Other factors may also reduce water consumption at the mine on a short or long-term basis.

Shutting down wells for other than routine maintenance is not an acceptable option. PDSI operated the interceptor wellfield in the past based upon mining needs, and the resulting data illustrates that containment was not effective. Discharge of the water to washes or retention and percolation ponds is not an acceptable option unless PDSI can demonstrate that this does not result in simply redistributing contamination from one point to another. PDSI must develop a plan now for using or disposing of interceptor groundwater when it is not needed at the mine. As discussed below, water use or disposal becomes an even larger issue after the mine closes.

PDSI also has not addressed the impacts of pumping from the proposed line of new interceptor wells on groundwater conditions in Green Valley. These interceptor wells will be much closer to potable water wells serving the residents of Green Valley than the existing wells. As a result, the new wells could result in changes to groundwater levels or flows that could detrimentally impact residential and production wells. Potential impacts, if any, should be discovered now and addressed, rather than waiting until well owners are already harmed.

Because the new wells will be closer to potable water wells serving Green Valley, PDSI also has less room for error. If containment is not achieved along this new containment line, the line cannot be moved again. At that point, an entirely new strategy will be necessary. ADEQ must ensure that it retains the authority to timely require other forms of containment, control or mitigation if PDSI's proposed alternative fails.

## 2. PDSI Must Provide Mechanisms for Long-Term Operation and Maintenance of the Interceptor Wellfield and Related Mitigation and Source Control Systems.

PDSI provided an annual water balance of the tailings impoundment in the Effectiveness Report, and the approaches used to estimate the various components of the water balance seem reasonable. It is our understanding that annual seepage from the impoundment was determined by essentially balancing the other variables for the inputs and outputs. In reality, seepage from the impoundment would not be expected to vary dramatically year to year as a function of changes in the tailings application rate. The annual seepage rate is probably not sensitive to annual changes, but rather responds to long-term changes or trends in all of the inputs and outputs.

A long-term implication of the data presented in Table 2 of the Effectiveness Report is the enormous volume of sulfate-containing water in storage within the tailings (approximately 160,000 acre-feet, the sum of the Water Retained Column in Table 2). Assuming an average sulfate concentration of 1,800 mg/L, this water contains about 391,000 tons of sulfate. Although it is unlikely that the tailings would drain completely

because some amount of water would always be retained within the tailings, most if not all of the sulfate would eventually be displaced from the tailings by ongoing infiltration, assuming the post mining tailings pile would continue to be subject to infiltration from precipitation. Using the estimated current annual mass flux rate from the impoundment (15,000 tons per year), it would take about 26 years *after mining ends* to remove the "stored" sulfate from the impoundment at current estimated volumes, assuming no other effective methods of mitigation or source control are employed. Actually, it will take longer for all of the sulfate to seep from the impoundment because the retained volume and sulfate mass will be higher (and removal time longer) the longer mining continues. In addition, the current mass flux rate from the impoundment would not be maintained by infiltration of precipitation alone, further increasing actual sulfate removal time after mining ends.

The importance of this estimate is not the actual calculated values, but rather its use in evaluating the final proposed solution for prevention of additional sulfate contributions to the water supply aquifer below the impoundment. The final solution has not yet been proposed, but the success or failure of a proposed solution must consider the long term nature of this problem. As the USEPA has recognized, the majority of existing hardrock mining sites in this country with significant environmental contamination will require cleanups lasting from 40 years to "in perpetuity." Community Water has repeatedly emphasized the importance of requiring PDSI to provide mechanisms for ensuring that the interceptor wellfield and other mitigation and control strategies will remain in operation and effective, well after Sierrita Mine closes. The issue is mentioned only in passing in the FFS, but the information provided in Table 2 of the Effectiveness Report highlights how significant an issue it is.

PDSI has indicated that the mine will be operating for at least another twenty-five years. The Effectiveness Report and FFS indicate that contaminants from the impoundment could continue to leach into the aquifer for another quarter century, and possibly much longer. Therefore, to help prevent further degradation of Green Valley's water supply, the interceptor wellfield might have to be operated and maintained through 2060 and beyond, unless other control methods are implemented that prove successful in shortening the time required to eliminate the source of sulfate.

To date, PDSI has not addressed how it will meet its obligations to effectively operate and maintain the interceptor wellfield and other control and mitigation mechanisms for decades beyond the likely lifespan of anyone now involved in this process. Although PDSI indicates that answers will be forthcoming in future submittals, the company needs to understand that the community will expect more than vague assurances that these issues will be addressed at mine closure. For a containment, control, and mitigation strategy to

<sup>&</sup>lt;sup>2</sup> USEPA Office of Inspector General, *Nationwide Identification of Hardrock Mining Sites*, Report No. 2004-P-00005, at ii (March 31, 2004).

be effective over such a long period, PDSI must provide concrete answers to some very difficult questions. Reasonable and practical solutions are required to issues such as:

- Continued operation and maintenance of the wellfield after mine closure requires funding and personnel that will represent a significant drain on the company's resources for a property than is no longer producing revenue. How can PDSI provide certainty that future company officers will not abandon any commitment to operate and maintain containment facilities for financial reasons?
- Assuming the interceptor wellfield remains active for years or decades after mine closure, PDSI will need to find a home for millions of gallons of contaminated water. What plans can PDSI implement today to ensure that this water is properly handled? Will additional pumps, piping, and related facilities be required to move the water to a location other than the mine?
- If the interceptor wellfield fails to achieve or maintain containment of the plume, additional wells in Green Valley could be impacted. How will PDSI address those impacts in a manner that is reasonable and fair to the well owner?<sup>3</sup>

Community Water has no reason to doubt that PDSI is committed to providing reasonable and effective containment, source control, and mitigation mechanisms. But existing estimates of post-closure costs in the Aquifer Protection Permit (\$705,341) cannot begin to cover the costs of operating the interceptor wellfield for years or decades after the mine closes or for dealing with the disposal of millions of gallons of water no longer needed at the mine. Nor could it possibly include the costs of as-yet undefined source control and mitigation mechanisms. PDSI should demonstrate its commitment to the community by providing the funding and other assurances necessary to ensure that these mechanisms will remain operational and effective for as long as the plume still exists.

Numerous examples exist of mining companies who have failed to meet commitments to local communities regarding remediation of mining-related environmental contamination. ASARCO is a prime example of failed promises, having settled pending environmental claims with the United States for only \$100 million, when the estimated remediation costs at just one ASARCO site have been estimated at over \$450 million. In 2006, the Bureau of Land Management identified 48 hard-rock mining operations in seven states (including six in Arizona) that had ceased operations since 1981 but not been reclaimed as required under federal and state law. Although some operators had provided financial assurance for post-closure reclamation, remediation costs exceeded the amounts available under these financial assurance mechanisms by more than \$67 million.

<sup>&</sup>lt;sup>3</sup> Existing plans for addressing future impacts in PDSI's December 22, 2006 Interim Action Report are inadequate, as discussed in Community Water's March 26, 2007 comments on that plan. Better procedures and protections are required in the final Mitigation Plan.

<sup>&</sup>lt;sup>4</sup> *Id.*, at 37.

Operators at 30 of the sites had gone bankrupt and none of these sites would be fully remediated without taxpayer help.<sup>5</sup>

Although Community Water is hopeful that nothing similar would happen in Green Valley, our residents would be much more comfortable if adequate resources were committed today to substantially reduce or eliminate that possibility. PDSI should step up now and put financial and other mechanisms in place to ensure residents today that their community will be protected in the future. Although such action may not be technically required under the closure and post-closure requirements approved by ADEQ in the Aquifer Protection Permit, it would go a long way toward assuring the community that a viable solution is in place.

### 3. PDSI Should Provide Periodic Updates on Interceptor Wellfield Operations and Containment.

PDSI should commit to providing at least quarterly reports on the interceptor wellfield's operation and the effectiveness of containment. This will ensure that ADEQ and the public are kept aware of the wellfield's status and potential problems as they arise. Community Water assumes reporting will be addressed in a future work plan, once a wellfield alternative is selected and approved, but want to raise the issue now for consideration.

## 4. The Effectiveness Report Should Not be Read to Imply that the Existing Interceptor Wellfield Captures the Entire Mass Flux from the Impoundment.

On page 20 of the Effectiveness Report, PDSI states that the annual sulfate mass flux value of 15,000 tons is approximately equal to the mass captured by the interceptor wellfield during the same period. This observation does not appear consistent with the lack of ground water capture in the middle and northern portions of the impoundment. It seems that an effective capture zone (the southern area) would capture and remove sulfate-containing groundwater that would have passed the interceptor field in the past, in addition to sulfate currently seeping from the impoundment. Therefore, it does not seem reasonable to imply that the entire mass flux from the impoundment is being captured by the current interceptor system. The document did not explicitly state that all sulfate was being captured, but that was the implication of this statement. The similarity in the numbers may only be coincidental.

In summary, Community Water generally agrees with the analysis and conclusions in the FFS. Our most serious concern is a more global one that goes beyond the scope of

<sup>&</sup>lt;sup>5</sup> United States Government Accounting Office, *Hardrock Mining: BLM Needs to Better Manage Financial Assurance to Guarantee Coverage of Reclamation Costs*, at 34-38 (June 2005). The GAO report indicates that the BLM did not provide costs for five of these sites and underestimated reclamation costs at many others.

this particular report and to the overall strategy and mechanisms for dealing with this plume well beyond the estimated life of the mine. Decisions on individual components of PDSI's mitigation, containment, and control strategy must keep in mind the long-term nature of the problem and the practical difficulties that this presents.

Again, Community Water thanks ADEQ for the opportunity to comment on these documents. We also commend PDSI for their work on these documents, which were thorough and well-reasoned. Finally, we would like to thank PDSI for their presentation in the most recent Community Advisory Group meeting, in which PDSI provided ample opportunity for questions and a discussion of technical issues. We believe this approach leads to better understanding between PDSI and the community and would encourage PDSI to employ similar procedures in the future, especially in light of the important documents PDSI will be submitting for review later in the year.

Sincerely,

Salmon, Lewis & Weldon, P.L.C.

By:

Ronnie P. Hawks

cc:

Joan Card, Director, WQD, ADEQ Cindy Campbell, Manager, WQCS, ADEQ Henry Darwin, Enforcement Coordinator, ADEQ Moses Olade, Hydro III, WQCS, ADEQ Michele Robertson, Manager, Groundwater Section Arturo Gabaldon, President, Community Water Company Rebecca Comstock, Senior Counsel, Phelps Dodge

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20 February 2008 File No. 31936-003

Robert Casey Manager, Water Quality Enforcement Unit Arizona Department of Environmental Quality 1110 West Washington Street Phoenix, AZ 85007

Subject: FOCUSED FEASIBILITY STUDY FOR THE NORTHERN PORTION OF THE INTERCEPTOR WELLFIELD PHELPS DODGE SIERRITA, INC. MINE TAILING IMPOUNDMENT MITIGATION ORDER ON CONSENT DOCKET NO. P-50-06

Dear Mr. Casey:

This letter has been prepared on behalf of Twin Buttes Properties, Inc. ("TBPI") to provide comment on the *Focused Feasibility Study for the Northern Portion of the Interceptor Wellfield, Phelps Dodge Sierrita, Inc. Mine Tailing Impoundment* ("Focused FS"), submitted by Phelps Dodge Sierrita Inc. ("PDSI", operating as Freeport McMoRan Copper & Gold, Sierrita Operations) on December 28, 2007. TBPI has an interest in PDSI's Focused FS because TBPI's property is adjacent to and downgradient of the Sierrita Mine, and sulfate contamination from the Sierrita facility has impacted groundwater beneath the TBPI property.

TBPI generally supports the hydraulic containment alternatives proposed in the Focused FS, but believes the Arizona Department of Environmental Quality ("ADEQ") should consider additional analysis and, if appropriate, additional response by PDSI. TBPI believes that this analysis need not delay implementation of the proposed containment remedy, although it may be appropriate for the remedy to be supplemented in the future.

TBPI's concerns fall within two broad areas. First, the approach proposed by PDSI does not appear to adequately evaluate and mitigate potential negative impacts to the local aquifer. If the proposed containment alternatives unduly impact the ability of other users to pump from the aquifer, ADEQ should evaluate treatment, and direct use or reinjection of water by PDSI in the future to avoid such impacts. Second, the containment area proposed by PDSI seems to allow more continued plume migration than may be appropriate. Accordingly, ADEQ should consider impacts to potential water users downgradient of the proposed interceptor wellfield and reserve the option to require additional containment wells upgradient of the current proposed location.

#### Introduction

The 15 August 2007 and 14 November 2007 reports by Errol L. Montgomery and Associates (ELMA) indicated that the operation of the groundwater interceptor wellfield located downgradient, east of the Phelps Dodge Sierrita Tailings Impoundment (PDSTI) west of Green Valley is only partially effective in capturing PDSTI sulfate-impacted seepage in the northern portion of the wellfield.

Haley and Aldrich, Inc. 20 February 2008 Page 2

Hydro Geo Chem submitted on behalf of PDSI a Focused Feasibility Study (FFS) dated 28 December 2007. The FFS evaluates alternatives to improve the effectiveness of the PDSTI interceptor wellfield. Several approaches were considered and a subset of alternatives was evaluated in more detail. Alternatives 1, 2A, and 2B involve augmenting the current network of interceptor wells to improve capture. Alternative 3 involves injecting water to the aquifer in order to create a hydraulic barrier.

Alternative 2B was identified as the "recommended mitigation alternative for controlling sulfate migration from the northern portion of the PDSTI to the regional aquifer". This Alternative involves installing interceptor wells east and north of the PDSTI and extracting groundwater from those wells at combined rates on the order of 3,400 to 6,800 gallons per minute (approximately 5,500 to 11,000 acre-feet per year).

The following comments relate to the recommended Alternative 2B. These comments do not detail Alternative 2B, or speak to its potential effectiveness. Rather, they raise specific concerns related to the evaluation process and considerations that, in our opinion, deserve further clarification following our preliminary review of the document.

#### Regulatory Framework for Groundwater Withdrawals and Impacts Should be Explained

It was not identified in the FFS if the proposed interceptor system should be subject to ADWR requirements such as well spacing requirements or other Tucson Active Management Area (AMA) regulations.

Regulatory issues related to large-volume groundwater withdrawals and resultant long-term aquifer drawdown were not identified in detail in either the design parameter discussion, or the implementation analysis.

It may be that these concerns are already addressed under current water rights rules or other regulatory framework. If this is the case, we would prefer to see these concerns acknowledged and the regulatory setting for these withdrawals more clearly explained. If not, some discussion of the intended future regulatory treatment of these withdrawals would be appropriate.

#### Impact of Withdrawals on Other Green Valley Water Users Should Be Considered

The evaluation of the potential impacts to other groundwater users as a result of recommended alternative interceptor wellfield groundwater withdrawals is not identified in the FFS.

The document indicates that groundwater level declines of 70-90 feet are estimated at each interceptor well after 30 years for the recommended Alternative 2B. The 30-year period is apparently based on estimates of a 25-year operational life span for the PDSI mining and mineral processing operations. No estimates of aquifer drawdown are identified for time periods beyond 30 years, to allow for an increased operational time span or a scenario where groundwater withdrawals from the interceptor wellfield are required to continue beyond the period of operations. Also, data are not identified that evaluate potential long-term impacts to aquifer water levels under adjacent properties.

The selection of the recommended alternative was indicated in the FFS to be pursuant to A.R.S. § 49-286.B, which states that "long-term public benefit" must be considered in the design and



Haley and Aldrich, Inc. 20 February 2008 Page 3

implementation of the remedial system. In our opinion, the availability of groundwater for other water users in the area is a component of "public benefit" that should be evaluated.

As you are aware, this region of the Tucson AMA is already facing the potential for long-term aquifer declines in the absence of new recharge projects or the development of new water sources in the area; TBPI and other local stakeholders are already actively involved in efforts to identify long-term solutions for this issue. This concern raises obvious practical and regulatory concerns for water users in the larger Green Valley area related to the long-term availability of groundwater to serve new and committed demand and the ability of local landowners to meeting assured water supply requirements. To the extent that the proposed Alternative will create additional demands on the local aquifer, the impacts on local landowners could be substantial. Adequate mitigation for this concern might require ADEQ to evaluate future water use alternatives including treatment and reinjection, or other local disposition of withdrawn groundwater to ensure this water is available to local users.

Given the presence of other groundwater users and water-rights holders in the area, we believe the FFS should address potential impacts of its recommended alternative with respect to other current and future groundwater use. For example, the location of the proposed interceptor wellfield east of the PDSTI and Arizona State Land Department (ASLD) properties does not appear to consider impacts to "long-term public benefit" that may be associated with potential groundwater impacts beneath those parcels. We suggest the long-term impacts to current and potential future water users, and water-rights holders in the area, (including impacts on water production, water quality, and the ability of local landowners to meet assured water supply requirements) should be analyzed and considered in the evaluation of alternatives. This is separate from and in addition to the need to address regulatory requirements.

#### **Disposition of Extracted Water Following Cessation of Operations**

The FFS indicates a 25-year expected life of the PDSI mining related operations. During this time, extracted groundwater from the Alternative 2B interceptor wellfield will reportedly be used for PDSI mining and mineral processing operations. It is conceivable that the interceptor wellfield may be required to operate for a time following cessation of operations. However, the disposition of the approximately 5,500 to 11,000 acre-feet per year of potentially impacted groundwater following the period of mining operations does not appear to be addressed.

#### Modeling Should Consider All Relevant Hydrologic Features and Future Growth

Based on the information presented, it was not determined if the particle-trace model incorporates all known hydrologic conditions and features in the study area, such as current or planned non-PDSI water production wells.

For example, based on Figure 14 ("Alternative 2B Simulated Groundwater Capture") of the FFS it is not clear if Alternative 2B addresses sulfate migration in the area west of well MH-30, as indicated in Figure 8 ("Sulfate Concentrations in Groundwater Samples Collected in July Through August 2007") of the FFS.

Also, over the operational life of the interceptor wellfield it is reasonable to expect further development of the nearby properties to the north and east, accompanied by increased groundwater withdrawals in those areas. Such conditions do not appear to have been considered.



Haley and Aldrich, Inc. 20 February 2008 Page 4

If some hydrologic features and conditions are not included in the analysis, the evaluation may not adequately represent particle flow-paths towards the TBPI property to the north of the PDSTI, either at present or in the future. In our opinion, it should be clarified whether the evaluation takes into account other hydrologic features such as the possible future expansion of groundwater withdrawals from the TBPI property to the north and Green Valley to the east. If not, we suggest these be considered.

We appreciate the opportunity to comment and would be happy to answer any questions you may have.

Sincerely yours,

HALEY & ALDRICH, INC.

Jason J. Raucci

Geologist

Kurt J. Blust, R.G.

Vice President

Arizona Registered Geologist No. 25173

Cc: Joan Card, ADEQ

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