September 22, 2017

Mr. William James
National Mining Expert
Great Lakes and Ohio River Division
U.S. Army Corps of Engineers
3701 Bell Road
Nashville, Tennessee 37214-2660

Ms. Deanna Cummings
Senior Regulatory Project Manager
Albuquerque District
U.S. Army Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque, NM 87109

Re: Rosemont Copper Project, Clean Water Act Section 404 Permit, CoE File No.: 2008-00816-MB

Dear Mr. James and Ms. Cummings:

As part of the submittal of the final Habitat Mitigation and Monitoring Plan (HMMP), dated September 12, 2017, Rosemont Copper (Rosemont) provided a document titled Rosemont HMMP Evolution Discussion which outlined the broader context of the development of the Clean Water Act (CWA) Section 404 compensatory mitigation package for the Rosemont Project over several years. We are providing this letter to focus specifically on the changes made to the mitigation package between the September 2014 and the September 2017 HMMP submittals.

The most significant changes between the submittals are:

- Advancing the designs at Sonoita Creek Ranch (SCR) from the conceptual to final design stage, with meaningful input from reviewers,
- Removal of stock tanks at the Rosemont Project site to offset potential indirect effects to downstream waters of the U.S. (WOTUS) resulting from potential reduced downstream flows, and
- Identification of a viable in-lieu fee (ILF) project for purchase of mitigation credits, if needed.

These changes are discussed in additional detail below.
Sonoita Creek Ranch Final Design

As stated in both versions of the HMMP, the Sonoita Creek Ranch (SCR) restoration project is the cornerstone of the mitigation package, providing a rare opportunity for landscape scale restoration of a large ephemeral wash system. The most significant change to note between the 2014 and 2017 HMMPs is that the 2014 HMMP was based on a conceptual design of the SCR project, while the 2017 HMMP reflected the advancement to a final design (dated September 9, 2017).

The final design will result in considerably greater hydrologic and ecological functional lift than the original conceptual design would have, while incurring less risk of project complications and long-term maintenance requirements. While the conceptual design attempted to bolster the existing system with newly constructed channels, the final design represents a complete restoration of Sonoita Creek and its floodplain. The 3 years between the two submittals was spent analyzing the mitigation plan and incorporating the many technical revisions that improved the quality of the final project design. Numerous site visits were made, including a large field sampling trip totaling over 10 days, and each trip into the field revealed new insight that was incorporated into the project. This project has also benefitted from the viewpoints expressed by experts including: Dr. Brian Bledsoe Ph.D. P.E., Dr. Mathias Kondolf Ph.D., James Ashby, researchers from Walnut Gulch Experimental Watershed, as well as comments from the Corps and EPA.

The path from conceptual to final design resulted in improvements on multiple levels, but the most notable change is that the final design backfills the existing, functionally impaired reaches of Sonoita Creek and replaces it with a re-established, sinuous channel that will be allowed access to the floodplain. Where the conceptual design contemplated the mitigation of the impaired reaches by diverting high flows and restoring only those flows throughout the floodplain, the final design allows for a more effective re-establishment of the Sonoita Creek mainstem to a more natural flow design. One of the greatest strengths of the final design is its simplicity, which reduces construction and operational challenges (and associated risk and uncertainty) while enabling greater hydrologic and ecologic benefits than the conceptual design.

The functional benefit improvements, and the reductions to uncertainty, are discussed further below.

1. The final design was developed with the benefit of more comprehensive and detailed analysis.
   - Two hydrologic models were used to develop predicted stormwater peak flow values for the conceptual design, whereas the final design peak flow values are supported by four hydrologic models, a forensic analysis of a local rain event, and by evaluation of gage data at two reference sites (lower Sonoita Creek and Walnut Gulch). The accuracy of the hydrologic analysis in the conceptual design was confirmed by the additional analyses in the final design.
   - The final design utilized the results of a substantial field investigation that occurred over numerous site visits after the conceptual design was submitted. Field data were used to better characterize the existing system used for additional analyses of stream power, sediment transport rates, and channel cross-sectional geometry and width relationships. Site vegetation and soils were also characterized during the field investigation. The gas
pipeline location and approximate depth at its existing stream crossing were determined. Scour depths were calculated and the recommended pipeline reburial depth is more than twice as deep as at the existing stream crossing. Kinder Morgan (the pipeline operator) was briefed on this project and has prepared a preliminary cost estimate for the pipeline reburial. Kinder Morgan engineers will perform their own analysis and determine the final burial depth of the pipeline.

• The channel geometry for the final design is informed by analyses of reference reaches located both on-site and at the Walnut Gulch Experimental Watershed, a nearby and well-researched template arid watershed that has experienced minimal development/disturbance. A power-scaled relationship between channel width and discharge was developed from the reference reaches and applied to the restored channel geometry.

• After submitting the conceptual design and throughout the final design process, Water & Earth Technologies, Inc. (WET) contracted with Dr. Brian Bledsoe Ph.D., P.E., for additional expertise on arid lands stream morphology and function and riparian restoration. He advised WET on hydrology, sediment transport, and ecological considerations, helped design the field sampling program, and advised on project goals and performance standards. The final design benefitted greatly from his input.

2. The final design has a reduced risk of damage or failure during high flow events compared to the conceptual design, because there are no flow diversions or flow splits.

• The conceptual design was relatively complex, with eight (8) constructed channels and six (6) flow diversions (forks) that would function in conjunction with the impaired reaches of Sonoita Creek. The hydraulic design and the resulting inundation of each channel reach was based on specific geometric relationships between the existing Sonoita Creek and the 8 constructed channels. Many of the concerns expressed by Kondolf and Ashby relate to vulnerability at the diversion points, and concern about maintaining split flows within Sonoita Creek.

The final design is less complex by comparison. Two reaches of the existing Sonoita Creek are functionally impaired and will be completely replaced, eliminating much of the complexity and uncertainty related to the conceptual design. The re-established channel will be realigned to better utilize the space available in the valley, and will be freer to migrate, braid, and develop channel complexity than the multiple parallel constructed channels contemplated in the conceptual design. The single re-established channel requires no diversion points and therefore introduces no risk that flow will not be diverted properly. Geometric relationships between several different channels and the maintenance of these relationships are not required for stormwater to flow through the system as intended, i.e. the final design does not need a predetermined or maintained geomorphology to function well.

• Because the final design significantly reduces the volume of excavated soil that must be placed and revegetated adjacent to the restored channel, the required soil repositories are much smaller and feature shorter and flatter slopes than those in the conceptual
design. These slopes are less vulnerable to sediment detachment and erosion, and are better designed to promote robust revegetation on stable slopes.

- The final design includes a robust 15-year (increased from 10-year) monitoring plan that will provide measurable data used to assess performance standards. Furthermore, the monitoring plan spells out the specific types and frequencies of measurements, observations, and analyses that will be conducted after construction in order to meet clearly outlined performance standards, including interim performance standards.

3. The final design will result in greater physical, hydrological, and ecological benefit by providing the restored channel with a larger range of stormflows than would be available under the conceptual design.

- In the conceptual design, the stream reach through the length of the agricultural field was comprised of 3 separate channels (2 constructed channels and the existing Sonoita Creek) roughly parallel, all dividing stormwater from the upstream reach of Sonoita Creek and perennial flow from Monkey Spring to drive ecological function. Distributing the stormwater and Monkey Spring perennial flow amongst the 3 channels would have diluted the stream energy and the flow available at any given time to drive ecological and fluvial processes. The final design does not split or dilute flow among several different channels, but rather places the entire stormflow into the re-established channel. Functions such as sediment transport, overbank flow, and floodplain development and maintenance will be more dynamic and natural because the restored channel will experience a greater range of flows (from zero when dry to peak discharge during each storm event). The greater range of flow is expected to manifest as greater channel complexity as larger pulses of stormwater (and sediment) are conveyed by the channel.

4. The final design promotes channel complexity and provides greater physical, hydrologic, and ecological benefits than the conceptual design channel configuration.

- The final design begins with constructed channel complexity, including the design cross-sectional geometry that includes both an active channel and floodplain benches established during construction. The conceptual design included basic trapezoidal cross-sectional geometry without a distinct floodplain bench. The additional complexity and the expanded inundation area afforded by the floodplain benches will support the development of diverse and broad riparian habitat along the restored channel. Furthermore, the floodplain benches provide energy dissipation during large storm events, protecting the restored channel and adjacent vegetation from damaging flow velocities.

- The realigned and restored channel in the final design focuses xeroriparian habitat development away from State Route 82 provides a much larger buffer between Sonoita Creek and the highway, improving the quality of the migration route and reducing highway/wildlife conflict.

5. The removal of proposed tree plantings and the avoidance of mature riparian habitat at the southern end of the Sonoita Creek Ranch project will ensure the reestablishment and maintenance of desirable riparian habitat throughout the restored Sonoita Creek floodplain.
• The 2014 HMMP included the planting of approximately 8,400 containerized trees (predominately velvety mesquite \((\text{Prosopis velutina})\)) within and adjacent to the constructed channels, with another 900 trees being planted along the overflow channel from the southern pond. As with the removal of flow diversions, the removal of these plantings in the 2017 HMMP was designed to reduce the risk and uncertainty associated with growing containerized plants to maturity, and focus instead on the seeding program, which includes mesquite and other woody species. Observation of the aggressive mesquite volunteerism in the fallow agricultural fields at Sonoita Creek Ranch over the last six years amply demonstrates that there is an extensive and vigorous mesquite seed and root propagule bank in the topsoil at the mitigation site. Dissemination of seed by wildlife and root sprouting after mesquite disturbance is expected to significantly outperform containerized planting survival and establishment. The Corps’ own guidance directs mitigation planners to “use natural recruitment sources for more resilient mitigation establishment” and “take advantage of native seed banks, and use soil and plant material salvage whenever possible.” The guidance goes on to suggest that plantings may be used to supplement mitigation efforts after observing success of seeding and natural recruitment. Indeed, in the 5 to 10 years it takes for seedling mesquite to reach maturity and support habitat for, for instance, the western yellow-billed cuckoo, the size and structure of containerized plants would be indistinguishable from seed-grown plants, and the seed-grown plants would be expected to have considerably less mortality.

• A significant channelization effort previously proposed for the southern end of the mitigation parcel in the 2014 HMMP has been removed from the 2017 HMMP. These southern channels (referred to as Constructed Channels 3 through 5) would have resulted in significant impacts to mesquites and the mature stand of cottonwood \((\text{Populus fremontii})\) trees in this area, and these trees will now be able to be preserved in place.

Mitigation for Potential Indirect Effects to WOTUS

Under the 2017 HMMP, compensatory mitigation for potential reduction in downstream flows (i.e. potential indirect effects to WOTUS) resulting from the Rosemont Project is now more appropriately focused on the potential area of effect. Where previously Rosemont proposed to offset these potential indirect effects through offsite mitigation efforts, the current plan includes the removal of four stock tanks at the Rosemont Project site that will return a significantly greater volume of surface water flow back to the Barrel and Davidson canyon systems than is expected to be removed by the Rosemont Project.

This proposal was informed in part by the Surface Water Mitigation Plan (SWMP) developed by Rosemont in support of the CWA Section 401 state water quality certification for the Project (ADEQ LTF No. 55425). The

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SWMP supports the determination by the Arizona Department of Environmental Quality (ADEQ) that the Project will have no adverse effect on the currently designated downstream Outstanding Arizona Waters (OAW) in Davidson Canyon and Cienega Creek.

In-Lieu Fee Projects

In 2014, there was only a single ILF project selling mitigation credits, and the service area for that project did not include the Rosemont Project area. Currently, there are two ILF projects that include the Rosemont Project area within their respective service areas: 1) the Tucson Audubon Society’s North Simpson Farms project, and 2) the Arizona Game and Fish Department’s Lower San Pedro River Wildlife Area project.

The Tucson Audubon Society has previously stated to the Corps that they would not sell mitigation credits to Rosemont; however, Rosemont and the Corps have confirmed that the Arizona Game and Fish Department can and will sell mitigation credits to Rosemont. Rosemont therefore now has the option to use ILF credit purchases as a supplemental form of mitigation should the rest of the mitigation package not be adequate to meet the compensatory mitigation obligations. While ILF projects are typically preferred by the Corps, given the initial directives by the LA District to secure permittee-responsible mitigation, along with the substantial restoration opportunity afforded by the Sonoita Creek Ranch project, ILF credits are a viable opportunity for supplemental credit for the Rosemont Project.

If you have questions or concerns, I can be reached at (520) 495-3502 or via email at kathy.arnold@hudbayminerals.com.

Regards,

Katherine Ann Arnold, PE
Director, Environment

cc: Kerwin Dewberry, Forest Service
File

Doc. No. 038/17-15.2.1
September 14, 2017

Mr. Trevor Baggiore, P.E.
Water Quality Division Director
Arizona Department of Environmental Quality
1110 W. Washington
Phoenix, AZ 85007

Re: Rosemont Copper Project, Clean Water Act Section 401 Water Quality Certification
CoE File No.: 2008-00816-MB
ADEQ LTF: 55425
401 cert reading file: rs314:005

Dear Mr. Baggiore:

We are requesting that the 401 certification issued to the Rosemont Project be modified to include mitigation activities, which will include discharge of dredged or fill material in conjunction with floodplain restoration. General Condition Number 5 of the Rosemont Copper Project 401 Certification requires that “The applicant must apply for renewal, modification or extension of this Certification if the CWA 404 permit is renewed extended or there is modification to the certified activities.” As you know, Rosemont Copper Company (Rosemont) has been working with the Army Corps of Engineers (Corps) to respond to issues associated with the 404 permit for Rosemont. These activities have involved a discussion of water quality and quantity that ADEQ participated in and have involved a review and a reworking of the compensatory mitigation plan associated with the 404 permit. This is a normal part of the Section 404 permitting process.

For the 401 Certification, the record examined by ADEQ included the FEIS and the Draft ROD, which included a discussion of the mitigation planned for our project. As described, the mitigation included a generalized description of Sonoita Creek Ranch restoration activities. The Corps has requested that the plans for Sonoita Creek Ranch be modified to include filling the channelized portion of Sonoita Creek (8.9 acres) and restoring Sonoita Creek to the floodplain. While 8.9 acres will be filled, waters of the U.S. will be created in the restored floodplain, for an overall net gain in waters of the US, sufficient to mitigate this activity and the Project. Rosemont believes work may qualify as a modification to the certified activities and may need to be included in the project description contained in the 401 Certification for the project.

In addition to the changes to mitigation, the Corps has determined that the “indirect impacts” should more accurately be listed as a modeled reduction in downstream flow and be dealt with in the same manner as ADEQ has decided to manage such potential reduction, specifically, via replacement of any lost flows attributable to the permitted activities. Therefore, project impacts will be described to include a projected
downstream flow reduction of 242 acre-feet of flow, rather than an indirect impact of 28.4 acres. The mitigation plan now describes the replacement of net reduced flows through the removal of specific stock tanks that currently impound water, an approach that had already been identified as a potential mitigation measure in the 401 Certification’s Surface Water Mitigation Plan (part 5.1.5). This firmly ties the existing 401 Certification requirements to the 404 mitigation requirement.

We believe the conditions listed in the current 401 Certification remain appropriate. (Specific Condition 1, which incorporates the Surface Water Mitigation Plan (Plan), is not relevant at the mitigation site, but by its terms the Plan applies only to the areas downstream of the mine site and so there is no need to adjust that condition in the Certification.) To the extent any of the existing conditions are inconsistent with the mitigation activities, that eventuality is addressed through inclusion of a sentence preceding the Specific Conditions that states the conditions apply “Except as specified in the application and supporting documents and allowed, specified or not prohibited in the CWA 404 permit ….” Additionally, the revision of the compensatory mitigation plan associated with the 404 permit has now become a supporting document and should be listed as such in Section 3 of the Certification. Rosemont is providing ADEQ access to this plan through an FTP site. Please see email transmitting this letter for access instructions.

Therefore, we propose the following administrative modifications to the 401 Certification as a clarification to the project described in the FEIS and other documents listed in the Certification.

**Section 1.0 Authorization** – add reference to Sonoita Creek, near Patagonia, to the list of areas affected by certified activities

“...Rosemont Copper Project will not violate applicable surface water quality standards (SWQS) in the subject waterbodies including McCleary, Wasp, Trail, Barrel and Davidson Canyons, and Cienega Creek in the Santa Cruz River Watershed near Greaterville, Pima County; and Sonoita Creek in the Santa Cruz River Watershed near Patagonia, Santa Cruz County.”

**Section 2. Description of Activities Being Certified** – replace language

“NOTE: During the development of the Final Environmental Impact Statement (FEIS), changes were made to the project design that modified certain activities proposed in the CoE Public Notice/Application No. SPL-2008-00816-MB (Public Notice). This Certification is based on activities described in the Public Notice, with the exception of activities modified by the selected action in the USDA Forest Service’s Record of Decision dated June 6, 2017 and the FEIS dated December 2013. This Certification is also based on changes to compensatory mitigation designs that occurred during development of the 404 Permit and Record of Decision by the Army Corps of Engineers. These modifications to the planned activities include the removal of the heap leach facility and process, elimination of fill in McCleary Canyon, the removal of the flow-through drain systems under the waste rock storage areas and dry stack tailings facilities, and fill in a channelized reach of Sonoita Creek to restore an ephemeral system.

The proposed Rosemont Copper Project will directly impact approximately 40.4 acres of waters of the U.S. (WUS) at the Rosemont Project Site and 8.9 acres of WUS at the Sonoita Creek Ranch Mitigation Site through the discharge of dredged/fill material. In addition, approximately 17% of the total stormwater runoff (calculated at 242 acre-feet) from the Project site is expected to be permanently removed from the drainage as a result of the development of the dry stack tailings and waste rock facilities in Barrel Canyon (not considering mitigation). Lastly, approximately 1.1
Rosemont 401 Certification Modification

September 14, 2017

"acres of WUS will be temporarily impacted by water supply line crossing and road access for utility pole construction."

Section 3. Information Reviewed – add mitigation plan provided

“27. Final Habitat Mitigation and Monitoring Plan for the Rosemont Copper Project, prepared by WestLand Resources, Inc. and Water and Earth Technologies for Rosemont Copper Company, September 2017.”

As discussed, the modification Rosemont is requesting will ensure that the Certification is consistent with the project being reviewed by the Corps and will consolidate the authorized activities under one 401 Certification. Rosemont is not requesting modification to any of the conditions associated with the 401 Certification. We are also suggesting updating the Project description to match the Corps’ current characterization of downstream impacts in terms of reduction of flow rather than acres impacted.

We look forward to receiving this clarified 401 Certification. If you have questions or concerns, I can be reached at (520) 495-3502 or via email at kathy.arnold@hudbayminerals.com.

Regards,

Katherine Ann Arnold, PE
Director, Environment

Attachment (electronic): Final Habitat Mitigation and Monitoring Plan for the Rosemont Copper Project, WestLand Resources and Water and Earth Technologies, September 2017

cc: Deanna Cummings, Corps of Engineers SPD – w/o attachment
    Kerwin Dewberry, Forest Service – w/o attachment

Doc. No. 034/17-15.5.6.1