

DOCUMENT REVIEW COMMENT FORM — (US ENVIRONMENTAL PROTECTION AGENCY)

The U.S. Environmental Protection Agency (EPA) has reviewed the Preliminary Administrative Final Environmental Impact Statement (AFEIS) for the proposed Rosemont Copper Mine Project (Project), in Pima County, Arizona. Our comments are provided pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act. These comments were also prepared under the authority of, and in accordance with, the provisions of the Federal Guidelines (Guidelines) promulgated at 40 CFR 230 under Section 404(b)(1) of the Clean Water Act (CWA).

EPA has reviewed this preliminary document to the extent that the brief review period allowed, however, the comments below should not be considered all encompassing of EPA’s concerns and input related to this project or this EIS. We appreciate the enormous amount of additional analysis and work that has gone toward producing this revised document, and we note substantial improvements in every section of the document, as well as changes to the project design and mitigation measures to provide additional protections for the environment. **Nevertheless, the proposed project continues to present serious environmental issues, and EPA has identified significant information gaps that should be resolved prior to publication of the EIS for further public review.** EPA staff will continue to be available to assist the Forest Service in further revising this EIS.

To the extent possible, EPA has provided multiple citations for those comments that refer to an issue and/or information that we have found in multiple locations in the document; however, it is likely that some comments will apply to locations in the document that we have not explicitly cited. As appropriate, we request that the Forest Service apply our comments and recommendations through the document to all occurrences of each issue.

Ch	Section	Page	Line	Comment/Change requested
3	Seeps, Springs and Riparian Areas	6	Table 106	Cienega Creek Reach 1 is characterized as having an ephemeral flow regime. On June 27, 2013, Dr. Robert Leidy, a senior scientist in EPA Region 9’s Wetlands Office, visited Cienega Creek Reach 1. Based upon his best professional judgment, the classification of this reach as ephemeral is inaccurate. Significant portions of Reach 1 immediately upstream from the confluence with Gardner Canyon exhibit characteristics of perennial flows and contained surface water at the time of his visit, which coincided with the driest period of the year for this region (June). USFS should examine whether the assumption of this stretch as ephemeral is well founded and/or correct Table 106 to reflect existing perennial conditions in referenced portions of Reach 1. Dr. Leidy is preparing a trip report that will outline his findings and we will provide his report to the USFS for reference.
3	Seeps, Springs and Riparian Areas	8	8-10	The AFEIS notes that, with the exception of several springs in Davidson Canyon, isotopic data have not been made available to help determine the sources of water to springs in the analysis. Isotopic data for all potentially affected springs in Davidson Canyon would be invaluable. Do isotopic data exist for other potentially affected streams in Davidson Canyon or elsewhere in the study area? If such data are available, they should be acquired, analyzed and incorporated into the AFEIS.

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3	Seeps, Springs and Riparian Areas	8	15-18	For those individual springs and seeps for which there is insufficient data to determine the source of water and probable impact, the AFEIS assumes that there will be an impact. EPA applauds the Forest Service for this approach to impact analysis in the face of uncertainty. We recommend applying a similar approach when discussing the scope of impacts related to groundwater drawdown, given that the results from the groundwater modeling contain a very high degree of inherent uncertainty.
3	Seeps, Springs and Riparian Areas	8-11		Several springs, seeps, streams, and riparian areas within the assessment area likely contain jurisdictional waters of the United States, including wetlands that will be indirectly impacted by the proposed project, primarily from groundwater drawdown. Although the AFEIS estimates 407 acres of mapped hydriparian habitat in the assessment area, a subset of these are jurisdictional waters of the United States that have not been delineated. For example, BLM staff estimate that over thirty perennial and seasonal wetlands of various acreages are associated with Cienega Creek within the Las Cienegas National Conservation Area (J. Simms, personal communication with Dr. Robert Leidy, EPA, June 2013), some or all of which may be waters of the U.S. Without a jurisdictional determination covering the assessment area, the Corps and EPA will be unable to determine the full scope of indirect impacts to areas regulated under the Clean Water Act. We recommend that the EIS be revised to acknowledge that potentially extensive areas of waters of the United States, including wetlands, occur in the analysis area, that the reach and extent of these waters has not yet been determined, and that, therefore, potential indirect impacts from the proposed actions on these waters has not been quantified. Alternatively, the applicant could provide USFS with an expanded “preliminary jurisdictional determination” (PJD) that covers not only the project site but the entire assessment area, so that USFS may disclose this information in the EIS.

3	Seeps, Springs and Riparian Areas	15	<p data-bbox="415 199 2011 334">10-17 The AFEIS refers to the groundwater models as “the most appropriate tool for estimating potential impacts to surface waters”, referencing Ugorets et al. 2012. ¹ We do not believe that conclusions contained in Ugorets <i>et al.</i> (2012) and in the <i>Groundwater Quantity</i> section of the AFEIS support a conclusion that the quantitative groundwater models are an appropriate tool for estimating impacts to surface waters that the EIS characterizes as “distant” (outside the project area, but within the study area).</p> <p data-bbox="491 370 2011 768">The AFEIS clearly acknowledges in several resource sections of Chapter 3 and in the expert report by Ugorets <i>et al.</i> (2012) that the models are not able to accurately predict small groundwater changes (changes of less than 5ft) over long time periods (<i>e.g.</i>, hundreds to thousands of years). The AFEIS frequently refers to near and long term predictions of groundwater drawdown and the effects thereof using terms such as “speculative” and “highly uncertain”. For example, the near-term model predictions of groundwater drawdown impacts to Empire Gulch stream flow are described as “speculative” (p. 33, lines 23-24). Long-term impacts on Empire Gulch stream flow based on the models are described as “highly uncertain” (p. 33, lines 31-32). The AFEIS concludes that, along Empire Gulch “...predictions of impact to stream flow based on these levels of drawdown would be speculative...with a high level of uncertainty...” (p. 33, lines 39-42). In addition, the AFEIS characterizes the quantitative modeling of the long-term impacts along Cienega Creek as “...highly speculative.” (p. 34, lines 24-25). The FEIS concludes for Cienega Creek that “...because of the margin of error of the models and the long time frames involved, these predictions have a high level of uncertainty. Quantitative predictions of changes in stream flow in the long term are entirely speculative.” (p. 35, lines 4-6)).</p> <p data-bbox="491 803 2011 1073">Furthermore, Ugorets <i>et al.</i> 2012 (p.5) refers to the qualitative level of certainty in using the models as follows: “In SRK’s professional opinion, the qualitative level of certainty for the existing models to make predictions listed in Item 2 above [i.e., predicted levels of groundwater drawdown] is low...In addition to the constraints and limitations found in any numerical model, other factors not included in the models will likely have an influence on conditions 1,000 years from closure. Numerous, unknown future factors [e.g., climate change, land use] and conditions have the potential to produce drawdown impacts much greater than the reported 0.1-0.2 ft...Thus, the predicted impacts to the surface water sources cannot be considered reliable with the accuracy stated in Item 2 above.” In addition, it is generally recognized that small changes in groundwater levels have the potential to adversely affect springs, seeps, stream surface flows, and riparian areas.</p> <p data-bbox="491 1109 2011 1398">These acknowledgements in the AFEIS support the conclusion that the groundwater models are not suitable for predicting impacts to most, or all distant springs, seeps, and riparian areas and, therefore, should not be relied upon as the basis to quantitatively or qualitatively assess the likely impacts to such areas from project-related groundwater drawdown. The AFEIS should, instead, indicate that, even with the considerable efforts put forth by Coronado National Forest and other involved parties, and the substantial expertise brought in to support this analysis, the inherent limitations in the accuracy of groundwater modeling, as well as the scope and temporal scale of potential effects involved in this case, are such that the models performed are not a reliable means of predicting impacts to distant springs, seeps, streams and riparian habitats. This recommendation should be carried forward to other chapters and resource sections within the next iteration of the EIS wherever use of the groundwater models is discussed.</p>
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3	Seeps, Springs and Riparian Areas	15	10-17	Given the limitations of the groundwater models, it is often reasonable to reach opposite conclusions regarding impacts than those presented in the AFEIS. Where applicable, we have outlined in the comments below why the information provided regarding drawdown could also support a conclusion opposite to the one provided in the AFEIS.
3	Seeps, Springs and Riparian Areas	16	21-23	The AFEIS states, “For Upper Cienega Creek there is no direct potential to affect surface water quality, unless changes in stream flow indirectly affect aspects of water quality (temperature, for instance)”. We note that pages 33-35, in the <i>Seeps, Springs and Riparian Areas</i> section state that all three groundwater models suggest that there is the potential for near- and long-term drawdown along Upper Cienega Creek to result from project related groundwater pumping. Small changes in stream flow can result in significant changes in water temperature, especially in warm, arid environments. Water temperature is an important measure of water quality. The AFEIS should disclose that even small surface flow reductions from groundwater drawdown would be likely to increase temperatures, and thus lower surface water quality in Upper Cienega Creek.

¹ Ugorets, V., Cope, L. and C. Hoag. 2012. Pt. 3 SWCA Questions 1 through 3- Professional Opinions to Assess Impacts to Distant Surface Waters and Modeling Certainty. Memorandum dated August 8, 2012 prepared by SRK Consulting to Chris Garrett, SWCA. 8 pp.

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3	Seeps, Springs and Riparian Areas	17	Table 108 Issues 3D.2 & 3D.3	<p>The Proposed Action is stated to have no effects on the number of stream miles changed from intermittent/perennial flow status to ephemeral flow status. We have several concerns regarding this conclusion: As previously discussed, the groundwater models cannot accurately predict small (less than 5 foot), long term changes to groundwater levels, especially on more distant waters, such as Cienega Creek.</p> <p>Tables 60-64 of the <i>Groundwater Quantity</i> resource section report for Upper Empire Gulch Springs present the following ranges of modeled groundwater drawdown based on sensitivity analyses: 1) end of active mining (<0.1-0.2 feet); 2) 20 years after active mine closure (<0.1-0.5 feet); 3) 50 years after closure (<0.1-1.8 feet); 150 years after closure (0.1-5.0 feet); and 1000 years after closure (2.3-6.0 feet). If the output of the groundwater modeling and the sensitivity analyses are accepted, these data indicate that potentially significant groundwater drawdown in the vicinity of Empire Gulch is likely to occur. Furthermore, the upper boundary of the sensitivity analysis performed indicates impacts in excess of 5 feet; the threshold established as the limit of accurate prediction for the modeling performed, further supporting the conclusion that significant drawdown is probable. Hydrologic changes are predicted for Empire Gulch from groundwater drawdown that could have a potential “effect on springs and stream flow, potentially shifting some or all of the stream length from perennial to intermittent” (AFEIS, p. 38, lines 8-10). The AFEIS states that Upper Cienega Creek receives surface water (and groundwater) flow from Empire Gulch. The AFEIS concludes that “a small change in stream flow [in Cienega Creek] could result in the loss of surface flow during these drought periods” (p. 34, lines 34-35). The contribution of flow from Empire Gulch to Upper Cienega Creek has not been determined, so adverse effects to surface flows from a reduction in Empire Gulch contributions remain plausible and uncertain, contrary to the conclusion of “no effect” indicated. Based on this reasoning, it is, therefore, not accurate to conclusively state that there will be no drawdown-related changes to stream flows in these waters.</p> <p>Table 108 should be revised to more accurately reflect the conclusions presented in the body of the AFEIS that groundwater drawdown effects are highly uncertain and definitive conclusions regarding the proposed project’s potential effects on stream flow in Cienega Creek cannot be made. The FEIS should explain that the predicted groundwater drawdown in Empire Gulch may result in changes in stream flow in both Empire Gulch and Cienega due to their connection. The FEIS should not dismiss the potential for drying of the streams to occur.</p>
3	Seeps, Springs and Riparian Areas & Groundwater Quantity	3 13	22-28 28-36	<p>These two sections of the AFEIS conclude that no seeps, springs, hydriparian or mesoriparian habitat, areas with perennial stream flow, or critical areas that would be affected by groundwater drawdown were identified within or beyond the western model boundary. The AFEIS should clarify whether detailed surveys of springs and seeps, and other critical areas (similar to surveys conducted on the eastern slopes of the Santa Rita Mountains within the model boundaries) were conducted within and immediately adjacent to the western model boundary, particularly within the Santa Rita and Empire mountains.</p>

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3	Seeps, Springs and Riparian Areas	33	10-42	<p>EPA recommends that additional information regarding the potential adverse environmental consequence of seemingly small changes in groundwater levels be added. The AFEIS repeatedly characterizes changes in ground water levels of < 1 foot as “small” (e.g. p. 37, line 24 and p. 38, line 23). The use of the descriptors “small” or “very small” are not meaningful absent some relative measure of ecological significance or risk.</p> <p>Seemingly “small” changes in groundwater levels may have profound adverse affects on surface and shallow subsurface (<i>i.e.</i>, groundwater and hyporheic) flows. In part, this is because the wetted surface area of many aquatic habitats in the arid Southwest, including the Cienega Creek watershed, is characterized by shallow surface water depths (<i>e.g.</i>, << than a few inches), especially during the drier portions of the year (April-early July), and is, therefore, extremely susceptible to drying from small changes in groundwater levels. Significant changes to stream base flow are possible because, typically, inflow to streams originates from the topmost portions of the subsidizing aquifer; small declines in the water table can significantly reduce groundwater contributions that sustain stream flow.²</p>
3	Seeps, Springs and Riparian Areas	34-35		See above comments regarding the risk or significance of 'small' drawdown affecting surface flows, such as those modeled for Upper Cienega Creek.
3	Seeps, Springs and Riparian Areas	37	22-23	The statement, “there is no reasonable analysis to indicate that stream flow in Cienega Creek would be impacted in the near term,” is not an accurate description of the modeling results or level of accuracy. Because of model uncertainty, it would be equally reasonable to reach an opposite conclusion; that is, that there is no reasonable analysis to indicate that stream flow in Cienega Creek would not be impacted in the near future. This language should be revised to accurately reflect model uncertainty and the ability to make supportable conclusions from the models as previously discussed.
3	Seeps, Springs and Riparian Areas	38		As previously noted, based upon the personal observations of R. Leidy, EPA, June 27, 2013, the assessment area supports extensive waters, including wetlands, the jurisdictional extent of which has not yet been delineated. This includes the reach of Empire Gulch immediately downstream from Upper Empire Gulch Spring. Please see our previous comments on this matter.

² Typically, there is a nonlinear relationship between groundwater-stream interactions such that changes in groundwater levels and stream flow are rarely a simple 1:1 relationship. A consequence is that relatively small drawdown of groundwater levels can result in significant declines in groundwater contributions to stream base flows. For example, one study (Knox 2006, cited in Earman and Dettinger 2011) demonstrated that declines in groundwater storage of about 3-5% resulted in a decline of stream base flow of 31% and total stream flow of 35% (Earman, S. and M. Dettinger. 2011. Potential impacts of climate change on groundwater resources – a global review. *Journal of Water and Climate Change* 24: 213-229).

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3	Seeps, Springs and Riparian Areas	38	20-36 34-36	The AFEIS states that, “no areas of riparian vegetation associated with Cienega Creek would reasonably be expected to be impacted based upon the hydrologic changes described.” The conclusions of little or no predicted hydrologic changes or expected effects on riparian vegetation are based on speculative models characterized by a high degree of uncertainty, or insufficient information. We do not concur with the conclusions that there likely will be no indirect effects on riparian vegetation based on the model results provided. As previously stated, the data presented in Tables 60-64 of the <i>Groundwater Quantity</i> resource section report levels of groundwater drawdown such that if the output of the groundwater modeling and the sensitivity analyses are accepted for Cienega Creek and for the Gardner/Cienega confluence, these data indicate that potentially significant levels of groundwater drawdown are a possibility in the near- and long-term along Cienega Creek. However, EPA maintains that conclusions regarding impacts are not supportable because the modeling is not accurate enough to predict impacts < 5 feet and the discussion fails to recognize that even small fluctuations in the groundwater table can result in significant changes to surface flows. Furthermore, the contribution of flow from Empire Gulch to Upper Cienega Creek has not been determined, so adverse effects to Cienega Creek from the loss of water contributions from Empire Gulch are a realistic possibility. Please revise conclusions in the AFEIS to accurately represent potential project impacts on stream flow from changes to groundwater levels.
3	Seeps, Springs and Riparian Areas	39-40		The AFEIS concludes, “Predictions of losses to recharge to the shallow alluvial aquifer and therefore loss of water available to support riparian vegetation have a high level of uncertainty.” (p. 40, lines 5-6). The <i>Surface Water Quantity</i> resource section of Chapter 3 states that quantification of aquifer recharge is not possible and therefore has not been completed (see Indirect Effects to Aquifer Recharge, p. 32, lines 29-33). The AFEIS then concludes that, “Reach 4 of Davidson Canyon has been classified as hydroriparian habitat. Similarly, this habitat is unlikely to experience effects, given the unlikely effects on recharge of the alluvial aquifer [from the project].” (p. 40, lines 15-16). Based on our earlier comments related to this issue, and since there is great, unquantified uncertainty in the predictions, this conclusion is not supportable.

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3	Seeps, Springs and Riparian Areas	53	16-37	The AFEIS acknowledges that predicted increases in temperatures and reduced precipitation resulting from climate change will continue to reduce the quantity of stormwater and groundwater available for use by riparian vegetation; result in shifts from perennial to intermittent flow along upper Cienega Creek and Empire Gulch; and increase the vulnerability of springs and riparian vegetation. The AFEIS discusses stream flow monitoring results from Pima County that document reductions in the length of wetted-channel/stream flow within the lower reaches of Cienega Creek Preserve from the ongoing decade-long drought. The AFEIS does not, however, adequately characterize potential cumulative effects from project-related groundwater drawdown and increasing demand for groundwater as a result of residential and commercial growth within the context of drought and projected climate change. ³ Currently, only 13 percent of the length of Cienega Creek within the preserve exhibits a wetted channel during the driest portion of the year (<i>i.e.</i> , June) on the heels of the ongoing drought. The AFEIS should reflect the latest science on climate change by explicitly acknowledging the moderate-to high levels of confidence of the latest climate change science model predictions for the American Southwest. If, as the AFEIS states, “prolonged droughts [similar to the ongoing Southwestern drought] brought on by climate change could result in similar shifts from perennial to intermittent flow along upper Cienega Creek and Empire Gulch” (p. 56, lines 2-3), then the potential additive/cumulative adverse effects from the project and other water demands on streams, wetlands, and riparian areas in the context of climate change should be clearly discussed in the AFEIS.

³ There is compelling scientific evidence that the American Southwest will experience changes in climate extremes over the next century. Projected changes in climate parameters (and the level of confidence in the projections) for the Southwest Border Region include increases in: average annual temperatures (high level of confidence of occurrence), average summer temperatures (high); average annual maximum temperatures (medium-high); annual number of days with maximum temperatures > 100° F (medium high); heat wave duration (high); and drought (high), coupled with decreasing annual precipitation (medium-high). Climate change is likely to significantly affect: the dynamics of stormwater and groundwater recharge systems (primarily through changes in the quantity and quality of available groundwater); stream flow, especially summer base flows; aquatic and wetland biogeochemical processes; and ultimately the health of riparian areas and wetlands and the animals that depend on these habitats, particularly in the arid Southwest. For examples, see: Dixen, M., Stromberg, J., Proice, H., Galbraith, A., Friemer, K. and E.W. Larsen. 2009. Potential Effects of Climate Change on the Upper San Pedro Riparian Ecosystem, in Ecology and Conservation of the San Pedro River. J. Stromberg and B. Tellman, editors; and Proceedings of the National Academy of Sciences (PNAS). 2010. Climate Change and water in Southwestern North America. Special Feature. PNAS December 14, 2010: 21256-21299.; and Green, T.R., Taniguchi, M., Kooi, H., Gurdak, J.J., Allen, D.M., Hiscock, K.M., Treidel, H., and A. Aureli. 2011. Beneath the surface of global change: impacts of climate change on groundwater. Journal of Hydrology 405: 532-560.; and Perry, L.G., Andersen, D.C., Reynolds, L.V., Nelson, S.M., and O. Shafroth. 2012. Vulnerability of riparian ecosystems to elevated CO₂ and climate change in arid and semiarid western North America. Global Change Biology 18: 821-842.

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3	Groundwater Quantity	1 3	38-41 1-3	<p>This section of the AFEIS provides <i>qualitative</i> conclusions that project-related groundwater drawdown will have either no effect, or will result in only small changes to, seeps, springs, stream flows, and riparian areas. Given that the AFEIS frequently acknowledges the serious limitations of the groundwater models, these conclusions are not well supported. Additional documents and studies, and the opinions of experts (see p. 8, <i>Scientific Uncertainty and Professional Disagreement</i>) are referenced in the AFEIS in support of many of the qualitative conclusions regarding changes to groundwater levels, but none of these supporting materials change the overriding finding that the groundwater models are not able to accurately predict the effects of changes in groundwater levels beyond the 5 foot drawdown contour. In light of the stated inability of the models to provide adequate resolution on this issue, we recommend that impact assessments be based on a risk analysis that considers the likelihood or probability of an event occurring, followed by an assessment of the consequences. The AFEIS should discuss the risk to vulnerable aquatic and wetlands habitats from reliance on predictions from groundwater models that cannot accurately detect small changes.</p> <p>All three groundwater models discussed in the AFEIS predict eventual groundwater drawdown in the assessment area. If the output of the groundwater modeling and the sensitivity analyses are accepted, the probability of occurrence of some level of drawdown (from 0.1 ft up to 5ft) at sensitive waters in the assessment area remains very high. The environmental consequence (<i>i.e.</i>, vulnerability) of springs, seeps, stream flows, wetlands and riparian areas in the study area to groundwater drawdown is potentially great because these habitats are rare, are currently threatened and shrinking because of on an going drought and projected climate change, and because relatively small changes in the levels of groundwater and surface water can and often do have large negative environmental consequences. A high probability of any ground or surface water drawdown combined with high vulnerability means that the environmental risk to aquatic resources and wetlands, and the organisms they support, should be characterized as great. The EPA believes that such potential for ground and surface water drawdown could lead to significant long-term indirect/secondary effects to aquatic resources pursuant to the 404(b)(1) Guidelines (40 CFR 230.11).</p> <p>Based on all of the above, we find the conclusions in the AFEIS of <i>small</i> or <i>no effect</i> to aquatic and riparian resources from groundwater drawdown to be unsupported. The FEIS should clarify that the groundwater models are not reliable for predicting impacts to distant springs, seeps, streams and riparian areas, and therefore, quantitative and qualitative conclusions based on these models are not supported by the model outputs. This recommendation should be carried forward to other Chapter 3 resource sections within the AFEIS where use of the groundwater modeling is discussed.</p>

Ch	Section	Page	Line	Comment/Change requested
3	Groundwater Quantity	5	24-27	The groundwater analysis area extends east of Cienega Creek, yet appears that seeps, springs, streams, wetlands and riparian areas that may lie east of Cienega Creek were not inventoried or assessed for potential effects of groundwater drawdown. Over thirty perennial and seasonal wetlands of various acreages are associated with Cienega Creek within the Las Cienegas National Conservation Area (BLM staff estimate). According to BLM, the majority of these wetlands are adjacent to Cienega Creek between Cinco Canyon and Oak Tree Canyon, and include the Cienequita, Spring Water, and Cinco Ponds wetlands. Other wetlands are found upstream of the Mattie Gulch and Cienega Creek confluence (<i>i.e.</i> , Cold Spring wetland). Many of these wetlands and aquatic features would likely qualify as jurisdictional waters of the United States (R. Leidy, personal observation, June 27, 2013). If there are potential project effects on Cienega Creek from groundwater drawdown, it follows that there would also be potential effects from groundwater drawdown on these waters, as they are immediately adjacent and hydrologically connected to Cienega Creek. The EIS should describe these aquatic features adjacent to Cienega Creek, identify their likely CWA jurisdictional status, and indicate what the potential impacts to these features may be.
3	Groundwater Quantity	18		<p>With regard to the various groundwater models employed, EPA has the following observations:</p> <p>For all models, the AFEIS recognizes that predicting groundwater levels hundreds or thousands of years in the future is “speculative”.</p> <p>For the Montgomery and Tetra Tech models, historic water-level data used as a basis for the models were primarily limited to data beginning in 2008 in the immediate vicinity of the mine. The short period of records for this groundwater data set introduces potentially significant uncertainty and errors affecting model calibration and the ability to make accurate predictions over long time periods. The ability to predict future groundwater levels over the life of the mine and beyond with certainty necessarily requires relatively longer data sets.</p> <p>For the Montgomery and Tetra Tech models, existing Cienega Basin pumpage was not quantified or modeled, but is recognized as increasing. This unknown pumpage will affect the accuracy of future predictions of groundwater drawdown.</p> <p>Based on the model limitations, the EIS should disclose that the groundwater drawdown models are not suitable for predicting impacts to distant surface water resources for the long time periods over which impacts of the proposed project are expected to occur.</p> <p>EPA notes that the Meyers Model has been peer reviewed, but the results of that review were not made available to Coronado National Forest for inclusion in the AFEIS.</p>

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3	Groundwater Quantity	28	Table 53	Issues 3A.1 and 3A.3: The AFEIS concludes that Gardner Canyon, Davidson Canyon and Cienega Creek are unlikely to experience substantial drawdown over any time period. As previously discussed, EPA does not believe this statement is well supported. Please refer to EPA comments and recommendations regarding this issue in the <i>Seeps, Springs and Riparian Areas</i> resource section of Chapter 3.
3	Groundwater Quantity Also Biological Resources	66 87	37-43 30-40	The basis for the statement that estimates of reduced surface water flows in Davidson Canyon are conservative is unclear. Because of topography alone, flows from the project site would likely continue to move downslope by surface and or shallow subsurface pathways and contribute recharge to lower Davidson Canyon. EPA recommends that the discussion in lines 37-43 be deleted so as not to inappropriately minimize the significance of the potential impacts to aquifer recharge.
3	Groundwater quantity	68	15-27	If the overall volume of rainfall falling in the basin is expected to decrease, then it is highly unlikely that net recharge in the basin could reasonably be expected to increase, regardless of potential changes in the distribution of precipitation. This passage should also note that higher temperatures would increase evapotranspiration (ET) from plants, thereby reducing groundwater storage and increasing drawdown. Resultant shifts in plant communities (<i>e.g.</i> , hydriplant toward xerophilous) could serve to further exacerbate drawdown.
3	Biological Resources	13-15	Table 116	Issue 5B.1: For the proposed action, the column, “Acres by type of terrestrial and aquatic habitat lost, altered, or indirectly impacted,” refers the reader to Table 123 for detailed information regarding these impacts; however, tables 121-123 (pp. 90-91, 97) document direct impacts (acres lost) to vegetation types and special status species and contain no information on <i>indirect</i> impacts. Table 105 in Chapter 3 of the <i>Seeps, Springs and Riparian Areas</i> resource section presents quantitative estimates of project effects to riparian areas, but does not include estimates for jurisdictional waters of the United States, including wetlands. The EIS should include the quantitative estimates of indirect impacts from the proposed action, shown in Table 108 of the <i>Seeps, Springs and Riparian area</i> resource section, in the Biological Resources section.

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3	Biological Resources		Table 116	<p>Issue 5B2: For the proposed action, qualitative assessment of impacts on aquatic habitats and surface water that supports wildlife and plants such as stock tanks, seeps and springs are discussed. As previously cited, relatively small changes in groundwater levels can and often do result in significant reductions in associated surface water. Because the surface waters in question here contain very little water during the driest times of year, the EPA believes that impacts to Empire Gulch could include not only transition from perennial to intermittent stream flow, but transition from intermittent to ephemeral flow or complete drying of all or portions of stream reaches.</p> <p>In addition, the basis for the finding that impacts to hydriparian habitat along Cienega Creek and Davidson Canyon, while possible, are “not anticipated” is not clear. As noted elsewhere throughout the resource sections of the AFEIS, the groundwater models are unable to accurately predict small changes to groundwater levels (<5 ft.) over long periods, or the potential effects of water table drawdown on these waters and riparian areas. Given such uncertainty and the information provided in the AFEIS, it is reasonable to anticipate that the proposed action could cause changes to groundwater levels that would adversely affect stream surface flows, springs and seeps associated with Cienega Creek, Gardner Canyon and Davidson Canyon. Issue 5B2 should be revised to accurately reflect the potential for impacts from the proposed action to Cienega Creek, Gardner Canyon, and Davidson Canyon.</p>
3	Biological Resources		Table 116	<p>Issue 5B3: It is also possible that indirect effects from groundwater drawdown will not only result in changes in the function of riparian areas for wildlife, but in the complete loss of some functions. This Issue should be revised to reflect the potential for the complete loss of some functions.</p>
3	Biological Resources		Table 116	<p>Issue 5C1: Analysis of disturbance that could create conditions conducive for invasive species should not be limited only to the 5,589 acres of the project area that is disturbed. As noted elsewhere in Table 116, indirect impacts from groundwater drawdown could potentially result in the transition of hydriparian to mesoriparian or xeroriparian habitat. Such a transition would provide an opportunity for the invasion and spread of native mesquite and non-native tamarisk into riparian areas. Issue 5C1 should be revised to reflect the fact that many additional acres could be impacted by invasive species in riparian areas within the analysis area due to the indirect effects of groundwater drawdown.</p>

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3	Biological Resources		Table 116	Issue 5E.1: For the proposed action, “Acres of habitat disturbed for each special status species, including impacts to designated and proposed critical habitat”, is limited to within the 5,589 acre area of direct impacts. However, according to the AFEIS, the U.S. Fish and Wildlife Service’s biological opinion concludes that, because of the indirect effects of groundwater drawdown, the proposed action is likely to adversely affect designated critical habitat for the federally-listed endangered Gila chub and threatened Chiricahua leopard frog, and likely to adversely affect the federally-listed endangered Gila topminnow (AFEIS, pp. 105 am 111). Table 116 does not include a quantitative estimate of acres of critical habitat that is indirectly disturbed or lost from the proposed action, even though critical habitat for these species has been quantified. To the extent that reliable estimates of habitat loss resulting from groundwater drawdown can be estimated, this table should be revised to reflect those additional acres of critical and non-critical habitat indirectly impacted. Where data accuracy limits the ability to estimate this quantitatively, this limitation should be disclosed and the table should report only direct impacts.
3	Biological Resources	16		The AFEIS does not include a discussion of the federal Clean Water Act (CWA) or Department of Army regulations as influencing or guiding the analysis of biological resources. In particular, there is no reference to the 404(b)(1) Guidelines and restrictions on discharge, most notably 40CFR 230.10(b)(3): adverse effects on endangered species; and (c): significant degradation of waters of the United States; and 40CFR 230.11(g) and (h) determination of cumulative and indirect/secondary effects on aquatic ecosystems. There is no discussion of impacts to jurisdictional waters of the United States impacted by the project. This section should be revised to include a discussion of applicable portions of the CWA and 404(b)(1) Guidelines, and Department of Army regulations. It should also provide assessment of impacts to jurisdictional waters of the United States.
3	Biological Resources	20		The AFEIS indicates that wetlands are associated with only two springs. The AFEIS does not discuss the extensive riverine and palustrine wetland systems within and adjacent to Empire Gulch, Gardner Canyon and Cienega Creek that will or may be indirectly impacted by the proposed action. Many of these wetlands are likely to be jurisdictional waters of the United States, but the reach and extent of federally regulated wetlands have not been delineated; therefore, the extent of indirect impacts to these waters has yet to be determined. These waters should be delineated or the EIS should note that an unknown number of acres of wetlands and jurisdictional waters exist in Empire Gulch, Gardner Canyon, and Cienega Creek and, because the reach and extent of these waters has not been delineated, the extent of indirect impacts to them is unknown.
3	Biological Resources	27	33-35	The discussion of hydroriparian vegetation types does not acknowledge that portions of this vegetation type include jurisdictional wetlands regulated under the federal CWA. The reach and extent of these federally regulated wetlands have not been delineated; therefore, the extent of indirect impacts to these waters has yet to be determined. Riverine and palustrine wetlands that occur in several areas adjacent to Cienega Creek have not been identified in lines 33-35 of this section. These unidentified wetlands may be jurisdictional waters of the United States and may be impacted indirectly by the proposed action. As previously recommended the EIS should acknowledge that extensive waters of the United States, including wetlands, occur in the analysis area and that the reach and extent of these waters has not been delineated and potential indirect impacts from the proposed action on those waters has not been quantified.

Ch	Section	Page	Line	Comment/Change requested
3	Biological Resources	40-41		The Huachuca water umbel is an obligate hydrophyte (i.e. almost exclusively found in wetlands). The habitat descriptions in the AFEIS for this hydrophyte and several other sensitive aquatic/wetlands species do not specifically identify or use the term <i>wetlands</i> in the description. For greater clarity, language to this effect should be added.
3	Biological Resources	78		This section should be revised to include a discussion of the indirect effects of the proposed action on jurisdictional waters of the United States (40 CFR 230.11(h)), including wetlands in the project analysis area (as opposed to the project area).
3	Biological Resources	86-88	16-20	<p>The AFEIS states, “Further, natural variability with these riparian systems has been documented and indicates that several feet of fluctuation in groundwater levels regularly occur, generally with no ill effects. For these reasons, while modeling has been used to qualitatively suggest what might occur, only changes in groundwater level more than 5 feet are considered to have certainty for predicting changes to riparian areas”. The statement that there are no ill effects from observed natural variability in groundwater levels is speculative in the absence of detailed monitoring data of the possible effects of fluctuations on shallow groundwater levels, stream flows at various locations, and the flora and fauna that rely upon these water sources. For example, has a correlation between fluctuating groundwater levels and the timing of decreases in stream flow and stream drying, or changes in the water table in the soil profile been documented? Wet/dry mapping by the Pima Association of Governments has documented that the percentage of Cienega Creek that flows in the Preserve above and below the confluence of Davidson Canyon has steadily decreased since monitoring began in 1984; with only 13 percent of the Cienega Creek supporting flowing or standing water in June 2011 (see AFEIS, Chapter 3, <i>Surface Water Quantity, Surface Water Trends</i>, p. 21). Secondary effects of ground water drawdown from the proposed mine would cause additive adverse impact to Cienega Creek resulting in further reduction in the length of wetted channel. A similar trend over this period of decreasing wetted channel length during the driest month of June has been recorded in Cienega Creek within the Las Cienegas National Conservation Area (data provided by Jeff Simms, BLM, 2013). In addition, groundwater drawdown of < 5 feet would not be detected by the models, but this drawdown would have an additive effect on overall natural variation in groundwater tables. This means that the combined effects of natural variability <i>with</i> drawdown from the proposed action could have significant impacts on the aquatic, wetland and riparian habitats.</p> <p>Please revise this section to remove speculative conclusions about <i>no ill effects</i> from natural groundwater variability, and clarify that any effects from the proposed action are additive to natural fluctuations.</p>

Ch	Section	Page	Line	Comment/Change requested
3	Biological Resources	86	35-40	<p>The AFEIS concludes that no change in riparian habitat along Cienega Creek and Gardner Canyon is expected to occur as a result of the proposed mine. As we have commented previously regarding the <i>Groundwater Quantity</i> resource section of Chapter 3, conclusions of little or no predicted hydrologic changes or expected effects on riparian vegetation are based on speculative models characterized by a high degree of uncertainty. We do not concur that there are adequate data to conclude that there likely will be no indirect effects on riparian vegetation nor that there will be no subsequent effects to aquatic wildlife habitat (40 CFR 230.10 (c) and 230.11 (h)).</p> <p>Tables 60-64 of the <i>Groundwater Quantity</i> resource section report for Cienega Creek (2 sites) and for the Gardner/Cienega confluence report the following ranges of modeled groundwater drawdown based on sensitivity analyses: 1) end of active mining (<0.1feet); 2) 20 years after active mine closure (<0.1feet); 3) 50 years after closure (< 0.1-0.15 feet); 150 years after closure (<0.1-0.35 feet); and 1000 years after closure (<0.1-0.8 feet). If the output of the groundwater modeling and the sensitivity analyses are accepted, these data indicate that potentially significant levels of groundwater drawdown are a possibility in the near- and long-term along Cienega Creek. Conclusions regarding impacts are not supportable because the modeling is not accurate enough to predict impacts < 5 feet. The discussion does not acknowledge that even small fluctuations in the groundwater table can result significant changes to surface flows. Furthermore, the contribution of flow from Empire Gulch to Upper Cienega Creek has not been determined; therefore, adverse effects to Cienega Creek from this scenario cannot be ruled out.</p> <p>We recommend that this language be revised to accurately reflect the unknown potential for impacts from the proposed action to Cienega Creek and Gardner Canyon, given the limitations of groundwater models.</p>
3	Biological Resources	87	12-13	The AFEIS estimates that 122 acres mapped as hydroriparian habitat along Empire Gulch could be affected by groundwater drawdown from the proposed action. The amount of CWA jurisdictional wetlands that could be affected has not been documented. Please refer to previous recommendations on reach and extent of CWA jurisdictional wetlands.
3	Biological Resources	88 89	25-33 1-14	The AFEIS acknowledges that indirect/secondary impacts could occur to sensitive plant and animal species in Empire Gulch due to groundwater drawdown from the proposed action (40 CFR 230.11(h) and 40 CFR 230.41(b)). The EIS should acknowledge that indirect impacts could also occur to sensitive plants and animals along Cienega Creek and Gardner Canyon from groundwater drawdown from the proposed action (see comments regarding page 86, lines 35-40, above).
3	Biological Resources	68		Refer to previous comments and recommendations regarding climate change.

Ch	Section	Page	Line	Comment/Change requested
3	Surface Water Quantity	32	29-33	The indirect/secondary effects of reduced aquifer recharge and bank storage from the proposed action on downstream waters in Davidson Canyon and Cienega Creek are potentially significant, as aquifer recharge is important in maintaining surface flows and shallow subsurface water levels for aquatic organisms and riparian vegetation and wetlands. We question the conclusion in the AFEIS that aquifer recharge cannot be quantified. Estimates of pre- and post-project aquifer recharge have been conducted for several development scenarios in the adjoining San Pedro River watershed (for example see (1): Levick L., et al. 2006. Simulated changes in runoff and sediment in developing areas near Benson, Arizona. U.S. EPA Office of Research and Development, Las Vegas, NV, and USDA Agricultural Research Service, Tucson, AZ, EPA/600/R-06/158 and ARS/1873. (2): Goodrich D.C. et al. 2004. Comparison of methods to estimate ephemeral channel recharge, Walnut Gulch, San Pedro River Basin, Arizona. Pp. 77-99 In Recharge and Vadose Zone Processes: Alluvial Basins of the Southwestern United States, ed. By F.M. Phillips, J.F. Hogan, and B. Scanlon, Water Science and Application 9, Washington D.C.). To the extent feasible, the EIS should provide a quantitative analysis of reductions in aquifer recharge to Davidson canyon and Cienega Creek that are attributable to the proposed action.
3	Surface Water Quantity	37-38		Refer to previous comments and recommendations regarding climate change.
3 & App B	Multiple			The AFEIS does not adequately support the statement that mitigation measures compensate for impacts to waters of the U.S. EPA believes that implementation of the mitigation measures described in the AFEIS and discussed below would not fully compensate for the project's impacts to waters of the United States (waters) (40 CFR 230 Subpart J). The substantial loss and degradation of water quality and other aquatic ecosystem functions are likely if the proposed mine is constructed. Of particular concern is that the geographic extent of indirect effects to waters from groundwater drawdown related to the mine dewatering is not fully known, in part because waters have not been fully delineated within the assessment area. In the absence of a full delineation of waters, it is not possible to provide adequate compensatory mitigation for indirect effects.

Ch	Section	Page	Line	Comment/Change requested
App B	Mitigation Measure FS-SSR-01	21-22		<p>The U.S. Army Corps of Engineers (Corps) and EPA, in coordination with potential In Lieu Fee (ILF) sponsors, Pima County and Tucson Audubon, are evaluating the feasibility of enhancing approximately 22 acres of Cienega Creek, downstream of Pantano Dam. The proposed ILF project would utilize surface water rights purchased by Rosemont Copper, severed and transferred to the ILF sponsor, Pima County, and released downstream of the Pantano Dam. Rosemont Copper would purchase ILF credits from the ILF sponsors to mitigate impacts from the proposed copper mine.</p> <p>While EPA supports returning surface water to Cienega Creek, it is uncertain whether additional water downstream from Pantano Dam would result in the proposed ecological enhancements along Cienega Creek. This ecological uncertainty is based, in part, on incomplete information on the existing geologic conditions below Pantano Dam. The potential exists for surface water to percolate deep into the aquifer without creating the necessary hydrologic conditions to support enhancement of the existing riparian community (Pima County, Tucson Audubon pers comm.)⁴ Added to this uncertainty are the long-term effects of the ongoing decadal drought and climate change to Cienega Creek. ILF sponsors acknowledge that the proposed quantity of water rights currently being considered for sever and transfer from Rosemont Copper to the Pima County is not sufficient to support enhancement of the creek. Additional water rights, the purchase of an existing groundwater well and a long term assessment of the proposed enhancement project would be required in order to determine whether this is a viable ILF project and whether mitigation credits would be available through the proposed ILF project for purchase by Rosemont Copper. The amount of time required for the sever and transfer of water rights to the ILF sponsor, itself, may make the consideration of any ILF credits as mitigation for Rosemont Copper unacceptable. The approval process could take two years or more and there are no guarantees Rosemont Copper will obtain approval from Arizona Department of Water Resources to sever and transfer these water rights should irrigation districts and other water right holders object (p. 44, Supplemental to the Biological Assessment Proposed Rosemont Copper Mine Santa Rita Mountains, Pima County, Arizona Nogales Ranger District, dated February 2013).</p> <p>1) There is no assessment in the AFEIS demonstrating how the proposed ILF compensates for project impacts; 2) Currently, there is uncertainty whether the local geologic conditions and the amount of water potentially available are sufficient to successfully implement the proposed ILF program; 3) Additional water rights are necessary to conduct enhancement downstream of Pantano Dam; 4) Declining water levels due to drought and climate change may affect the availability of water in Cienega Creek and further jeopardize enhancement efforts; and 5) The proposed ILF project, if approved, would be considered an enhancement or functional lift of existing waters providing limited compensation for the direct and indirect loss of acreage and function in the watershed as a result of the proposed project. Therefore, due to the significant uncertainties described above, EPA does not believe this mitigation measure can provide compensatory mitigation to offset impacts to waters under section § 404 of the CWA. These points are further enumerated in the comment below.</p>

⁴ On June 19, 2013, EPA and the Corps participated in a meeting with Pima County and Tucson Audubon to discuss the potential for the development of an ILF project in Cienega Creek.

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App B	Mitigation Measure FS-WUS-01	24		<p>The lands proposed for conservation consist of 383 acres of ephemeral wash and riparian habitat in Davidson Canyon, Mulberry Canyon and Barrel Canyon. The parcels include upland buffer habitat, as well as three springs. The restrictive covenant would preclude real estate development and restrict grazing. The AFEIS states that the proposed recordation of restrictive easements would compensate for loss of waters, but does not describe how this would be compensatory (Appendix B, p.24).</p> <p>Pursuant to the <i>Final Rule for Compensatory Mitigation for Losses of Aquatic Resources</i> (2008 Mitigation Rule), preservation as 404 mitigation can be used when the resources to be preserved provide important physical, chemical or biological functions for the watershed; contribute significantly to the ecological sustainability of the watershed; and are under threat of destruction or adverse modification (40 CFR Part 230.93(h)).</p> <p>Based on the information provided in the AFEIS, EPA does not believe preservation of these parcels is appropriate compensation for project impacts. These mitigation parcels do not have water rights. In addition, most of the mitigation parcels all lie downstream from the impacted drainages and may themselves suffer indirect effects from the proposed copper mine. Mitigation parcels located in Reach 2 of Davidson Canyon will be adversely affected by reduction in stormwater surface flow and potentially changes in sediment delivery from the mine. The AFEIS states that an estimated 502 acres of riparian habitat along this reach may be affected through reduced recruitment, increased mortality rates, decreased canopy height and vegetation volume, and a transition to deeper-rooted species such as tamarisk or mesquite (Chapter 3, p. 39-40).</p>

Ch	Section	Page	Line	Comment/Change requested
App B	Mitigation Measure FS-BR-08	30-31		<p>The 1,200-acre Sonoita Creek Ranch is six miles south of Sonoita, Arizona. Approximately 590 acre-feet per annum of water rights are appurtenant to the ranch. The AFEIS states Rosemont Copper would purchase and convey the property and water rights to a Corps approved ILF sponsor, for the establishment of an ILF project. The ILF project would include the discontinuation of agriculture and the use of perennial flows from Monkey Springs to establish wetland and riparian habitat. The mitigation credits generated by the ILF project would be available for purchase by Rosemont Copper. The AFEIS states Rosemont Copper would also receive some compensatory mitigation credit for the conveyance of the ranch and water rights to the ILF sponsor. The amount of credits for purchase is yet to be determined, though the anticipated number of credits would provide only a portion of the overall mitigation credit requirement for the proposed project.</p> <p>The Corps and EPA have discussed with Arizona Game and Fish Department (AGFD), as a potential ILF sponsor, the feasibility of enhancing and restoring Sonoita Creek Ranch. EPA recognizes the conservation value of Sonoita Creek Ranch, but given the existing geomorphology of the site, we remain concerned with proposals to create and enhance wetlands on the ranch. In addition, the site is far removed from the Davidson Creek/Cienega Creek watershed and therefore, does not provide ecological benefit for the loss of acreage and function that would occur from the proposed project.</p> <p>The Sonoita Creek Ranch is located outside the Cienega Creek watershed. Waters at the Sonoita Creek Ranch site are not hydrologically connected to Cienega Creek. Located in another subwatershed of the Santa Cruz River; these waters drain in a different direction. In addition, the ILF project currently in development may not be ecologically successful and self-sustaining, as required in the 2008 Mitigation Rule (40 CFR 230.94(c)). Based on the information provided to date, EPA does not believe the proposed Sonoita Creek Ranch ILF project provides appropriate compensatory mitigation under §404 CWA.</p>

Ch	Section	Page	Line	Comment/Change requested
3	Seeps, Springs, and Riparian Areas	58	6-8	<i>Chapter 3. Affected Environment and Environmental Consequences</i> includes a section titled, <i>Conclusion on Mitigation Effectiveness</i> , which states that mitigation measures presented in each section of the analysis would <i>effectively avoid, minimize, reduce, rectify, or compensate for impacts</i> (Chapter 3, p. 58, Appendix B, p. 3, lines 6-8). The AFEIS provides no supporting documentation/assessment demonstrating how the mitigation proposed to offset impacts to waters is compensatory.
App B	Introduction	3	6-8	<p>The statement that, “Davidson Canyon parcels would be effective at avoiding future impacts to xeroriparian resources located along Davidson Canyon by establishing conservation easements” (Ch. 3, p. 58, lines 8-10) does not acknowledge the fact that these riparian resources may be degraded from the indirect impact of the copper mine due to their location both downstream of the project and within the cone of depression for groundwater drawdown. Although the AFEIS acknowledges conservation at Sonoita Creek Ranch is outside the analysis area and the Cienega Creek watershed, it provides no justification to support the conclusion that this parcel would be effective at mitigating riparian resource impacts (p. 58, lines 10-13).</p> <p>Other proposals for enhancement below Pantano Dam in Cienega Creek have not been properly vetted in the document, given the uncertain ecological benefits and the legal complexities for securing water rights (Ch. 3, p. 58, lines 14-20). The statement in lines 23-24 of p.58 that, “The creation, enhancement, or replacement of water sources is likely to support additional riparian habitat,” despite the fact that “the exact location and nature of the habitat is not known,” is presumptive and this passage should be removed.</p>
3	Table 111, 112			As stated in the 404(b)(1) Guidelines, no discharge of dredged or fill material shall be permitted if it causes or contributes to violations of an applicable state water quality standard (40 CFR 230.10(b)(1)). Reductions in stream flows, alterations in sediment transport, groundwater drawdown and increases in the concentrations of pollutants have the potential to degrade water quality (<i>e.g.</i> , warm water aquatic wildlife) and the aquatic ecosystem. The proposed project may not comply with the restriction on discharge as required by the Guidelines. Indirect effects may result in significant degradation to outstanding natural resource waters in violation of applicable water quality standards.

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3	Seeps, Springs, and Riparian Areas	42-45		<p>Of particular concern to EPA is the analysis of the mine project’s potential effects to Outstanding Arizona Water (OAW) in Davidson Canyon and Lower Cienega Creek. We recommend revision on a number of fronts.</p> <p>The AFEIS states that the contribution from the mine site would represent only a portion of the runoff reaching the OAW (lines 7-11). It also states that the existing water quality in Davidson Canyon and Lower Cienega Creek have already incorporated the existing water quality for Barrel Canyon and, therefore, if predicted water quality from waste rock runoff does not exceed that which exists in Barrel Canyon, there is little likelihood that existing water quality from the OAWs would be affected (lines 15-17). The fundamental error in this analysis is the failure to acknowledge the additive effect (<i>i.e.</i>, mass loading) of pollutants into stream channel.</p> <p>The modeling performed for estimating runoff from the mine site did not include total dissolved solids (TDS); therefore, a comparison to existing water quality could not be made (p. 43). High TDS can adversely affect the health of aquatic organisms.</p> <p>Predicted concentrations of some pollutants from waste rock runoff exceed concentrations downstream in Davidson Canyon and Lower Cienega (<i>e.g.</i>, arsenic, lead, selenium and zinc) (Table 112). The AFEIS notes the limited availability of water quality data, yet it relies on the same partial data to conclude that, “it is not likely that runoff from waste rock would degrade existing water quality in the Outstanding Arizona Water segments of Davidson Canyon or Cienega Creek” (p. 44, lines 37-40). EPA acknowledges that on a July 23, 2013 call with Coronado National Forest and their consultant, EPA was informed that the data in the AFEIS in regards to the water quality from waste rock runoff may not have been presented accurately and likely overstates the possibility of water quality impacts from the mine site. This section should be revised and the EIS should indicate whether the project poses a risk to downstream water quality. (see next comment)</p>

Ch	Section	Page	Line	Comment/Change requested
3	Seeps, Springs, and Riparian Areas	42-45		<p>(continued from above)</p> <p>Any degradation of Davidson Canyon and Cienega Creek water quality would be significant because they are designated as high quality waters that constitute Outstanding National Resource Waters due to their exceptional recreational and ecological significance to the State of Arizona. The State of Arizona classifies Davidson Canyon and Cienega Creek as Arizona Outstanding Waters (AOWs), also referred to as Tier III waters under federal anti-degradation policy. Arizona's anti-degradation rules provide that the "[d]egradation of an AOW ... is prohibited." ACC R18-11-107. This provision is consistent with federal anti-degradation requirements, which provide that water quality shall be maintained and protected in Tier III waters, and that the water quality in Tier III waters may not be lowered to accommodate economic or social development in the area where the waters are located. 40 CFR 131.12(a). As discussed, the proposed project's potential to result in reduction in stream flows to Davidson Canyon Wash and Cienega Creek, its alteration of sediment transport, groundwater drawdown, and contribution of metals such as selenium may represent a failure to maintain and protect existing water quality in those AOWs. This would be inconsistent with applicable anti-degradation policy.</p> <p>The 404(b)(1) Guidelines at 40 CFR 230.10(b)(1) restrict discharges that would violate applicable State water quality standards (which include anti degradation policies) in waters. Such significant degradation of the aquatic ecosystem in Outstanding Natural Resource Waters is also not consistent with the 404(b)(1) Guidelines at 40 CFR 230.10(c), and 230.11(h).</p>

Ch	Section	Page	Line	Comment/Change requested
3	Biological Resources	141		Under <i>the Summary of Mitigation Effectiveness</i> in Chapter 3 of the <i>Biological Resources section</i> , the AFEIS notes that mitigation measures, both onsite and offsite, can help offset effects in the project area. Despite proposed mitigation, the AFEIS concludes that, “While these measures would partially compensate or offset for impacts of the mine, they would not effectively offset all impacts, and significant impacts to habitat and some species would remain.”
3	Seeps, Springs and Riparian Areas	55		The mitigation measures described in the AFEIS rely on the development of two ILF programs and land conservation. As previously stated, EPA does not believe these actions are likely to be compensatory. The USFS also identifies design features to minimize impacts to waters. While design features may qualify as mitigation for the NEPA analysis, this form of mitigation is related to impact avoidance and minimization, not compensation. Section 404 of the CWA requires “mitigation” to consist of all three, with compensation required for impacts that are not avoidable (e.g., through design features). The proposed mitigation is insufficient to meet the restrictions on discharge required by the Guidelines at 40 CFR 230.10(d) and 40 CFR 230.12(a)(3)(iv).
App B				Independent of the requirements to avoid, minimize and, finally, compensate for impacts, the 404(b)(1) Guidelines prohibit discharges which will cause or contribute to significant degradation of waters of the United States. In consideration of the mitigation measures described in the AFEIS, the direct and indirect/secondary impacts from discharges of dredged or fill material from the proposed project will not be adequately offset. As a result, these impacts are likely to cause or contribute to significant degradation of waters. EPA has reached this conclusion based on the information currently available to us from the USFS and the Corps, assessing the factual determinations required under the 404(b)(1) Guidelines by Subparts B and G, and consideration of Subparts C-F, with special emphasis on the persistence and permanence of the direct and indirect/secondary effects outlined in these subparts (40 CFR 230.10(c)).The information currently available supports a conclusion that the proposed project will result in significant degradation because it will have significant direct and indirect/secondary effects on the structure and function of the aquatic ecosystem such as: significant adverse effects to regional water circulation and fluctuation; and significant adverse effects to aquatic organisms due to reduced flows, increased water temperatures, suspended sediments and potential increases in selenium contamination.
				Based on the information currently available to EPA, the proposed project will result in significant degradation to waters, including the “Outstanding Waters” of Davidson Canyon and Cienega Creek. These impacts are substantial and unacceptable impacts to aquatic resources of national importance.

Ch	Section	Page	Line	Comment/Change requested
3	Surface Water Quality	31	2-10	<p>The reference to ADEQ’s action with regard to coverage under AZ Multi Sector General Permit (MSGP) is not accurate. ADEQ has issued an authorization certificate to Rosemont Copper but still requires the submission of the Storm Water Pollution Prevention Plan (SWPPP) 60 days in advance of any mining activity. If the discharge from the mining operation had been within 2.5 miles of the OAW, Rosemont would have been required to submit the SWPPP with the NOI vs. 60 days in advance of mining; because it is not, Rosemont must submit the SWPPP 60 days prior to commencement of mining operations.</p> <p>The SWPPP must demonstrate that the discharge will not degrade existing water quality in the downstream Outstanding Arizona Waters (OAW). ADEQ will review the SWPPP and determine if coverage is granted under the MSGP. ADEQ can also deny coverage under the MSGP and require the applicant to apply for an individual permit. Throughout the document, there are references to a storm water plan describing controls and management; however, an SWPPP, as required by the MSGP, has not yet been submitted for review and action by ADEQ.</p> <p>The EIS should reflect the correct status of ADEQ’s permit coverage and the requirements associated with the SWPPP.</p>
3	Seeps, Springs and Riparian Areas	44		<p>The AFEIS concludes that any stormwater discharge would not result in an impact to the downstream Outstanding Water because ADEQ’s issuance of coverage under the MSGP (see above), would not allow it. This conclusion cannot be reached until the SWPPP has been submitted and accepted by ADEQ under the MSGP requirements. The SWPPP must demonstrate that any discharge will not degrade water quality in the downstream OAW. For the purposes of NEPA, it should not be assumed that mitigation measures and BMPs applied under the SWPPP would be fully effective without foreknowledge of the nature of the mitigation and control measures that would be employed.</p>
3	Seeps, Springs and Riparian Areas	44	10	<p>This passage should be revised. Any discharge from the mining site must meet permit requirements and applicable water quality standards at the point of discharge. The AFEIS indicates that water samples collected from Barrel Canyon exceed current Water Quality Standards and seems to suggest that, for this reason, discharge from the mine that exceeds standards is less significant.</p>
3	Seeps, Springs and Riparian Areas	44	17	<p>The AFEIS concludes that “...in the case of the Outstanding Arizona Waters (OAW), the (401) regulatory permitting process will also provide a safeguard against degradation of existing water quality...if the certification is issued, then the ADEQ by definition is determining that Outstanding Arizona Waters will not be degraded.” (Chapter 3, Seeps Springs and Riparian Areas, p. 4, lines 14-21, and 22-23). In practice, the protection of OAW is more complex, and will depend, in part, on the scope of several regulatory actions. The EPA believes that the area of effect includes water bodies beyond the direct fill footprint that are appropriately considered under ADEQ’s 401 action. However, we also believe the Forest Service must consider State antidegradation standards and policies to protect designated uses and prohibit any lowering of water quality in OAW, and that compliance with CWA anti-degradation requirements must be independently assured under the Section 404(b)(1) Guidelines (40 CFR 230.10(b) and (c), and 40 CFR 230.11(b), (e), and (h)).</p>

Ch	Section	Page	Line	Comment/Change requested
3	Surface Water Quality	18-22		<p>The AFEIS does not adequately address the cumulative impacts on the designated uses and applicable water quality that would result from reductions in stream flow and potential sediment loading to downstream waters. Mining activities are expected to last 24.5 – 30 years (depending on the alternative chosen), and the report identifies significant impacts to waters of the US (WUS), including removal /permanent impacts to portions of Scholefield, Wasp and McLeary Canyons and Barrel Canyon, and 154 ephemeral drainages (35.3 - 52.6 acres), which are all ephemeral tributaries to Davidson Canyon and downstream Cienega Creek.</p> <p>The AFEIS did not model suspended sediment concentration or total dissolved solids coming off of waste rock, (Chapter 3, Seeps and Springs, p.43); therefore, a comparison to existing suspended sediment concentrations in the water could not be made.</p>
3	Air Quality	3	20	<p>The AFEIS states that the revised modeling submitted to ADEQ in July 2012 demonstrates compliance with the NAAQS. This is accurate for the purposes of ADEQ’s regulatory permit process. However, the NAAQS modeling analysis for ADEQ’s permit process is not that same as the NAAQS modeling for the EIS. The EIS NAAQS modeling accounts for many more emission sources than what ADEQ regulates under its Class II Synthetic Minor Permit for the Rosemont Project. For instance, tailpipe emissions (e.g., a major contributor of NO2 emissions) are not regulated as part of ADEQ’s permit.</p> <p>The current language here regarding NAAQS compliance could be misinterpreted as indicating that the project meets the NAAQS. As stated regarding Chapter 3, page 45 (see below comments, where the impacts of specific alternatives are discussed, the NAAQS are predicted to be exceeded under some alternatives, at least at the fence line (Barrel Trail and Scholefield).</p> <p>This language should be revised to accurately describe that the ADEQ NAAQS analysis represents only a portion of the NAAQS analysis that the EIS addresses.</p>
3	Air Quality	4	30	<p>The AFEIS states that compliance with NAAQS is assessed at the perimeter fence line for each alternative. The results of the NAAQS analysis are further discussed on Chapter 3, page 45 for each of the alternatives, and are summarized on page 43, Table 45. For those alternatives that are below the NAAQS at the fence line, it is unclear whether the NAAQS is predicted to be exceeded inside the fence line, in areas that are publicly accessible. Language should be added here indicating that the “perimeter fence line” is an actual physical fence line that would prevent public access to contiguous property.</p>
3	Air Quality	27	40-42	<p>The AFEIS states that, “Allowable prevention of significant deterioration increments currently exist for three criteria pollutants: SO2, NO2, and PM10. The emission of pollutants by the mine cannot exceed these increments at Class I and Class II areas.” The criteria pollutant PM2.5 also has allowable prevention of significant deterioration increments. As commented elsewhere, PSD Class II increment values are exceeded under certain scenarios. Please include PM2.5 in the list of criteria pollutants for which deterioration increments exist. For any scenario chosen, the project should demonstrate that emission reductions and mitigation measures have been taken and shown by modeling to result in predicted values less than the increments.</p>

Ch	Section	Page	Line	Comment/Change requested
3	Air Quality	42	37	PSD Class II increment values are exceeded under certain scenarios (page 43, Table 45 summarizes modeling results). It appears that the PM2.5 increment is predicted to be exceeded for <u>all alternatives</u> for the 24-hour averaging time. PM2.5 increments for the annual average period are predicted to be exceeded for the Barrel Trail and Scholefield alternatives. Also the Scholefield alternative shows that the NO2 annual increment is predicted to be exceeded. For any scenario chosen, the project should demonstrate that emission reductions and mitigation measures have been taken and shown by modeling to result in predicted values less than the increments. In light of the data indicating that PM2.5 increments for the 24-hour averaging time will be exceeded under all alternatives, additional mitigation measures should be discussed for reducing emissions of this criteria pollutant.
3	Air Quality	43		Table 45 summarizes the air quality modeled impact. There are exceedances of the NAAQS and PSD class II increments for several scenarios. No change suggested for table entries. However, as previously commented, for any scenario chosen, the project should demonstrate that emission reductions and mitigation measures have been taken and shown by modeling to result in predicted values less than the applicable NAAQS or PSD Class II increments.
3	Air Quality	45	4, 10, 17, 28	These scenarios result in predicted exceedances of the NAAQS, the PSD Class II Increments, or a combination of the two, at the perimeter fence line. For any scenario chosen, the project should not be approved until mitigation measures have been established and shown by modeling to result in predicted values less than the applicable NAAQS or PSD Class II increments.

Ch	Section	Page	Line	Comment/Change requested
3	Air Quality	16		<p>EPA finalized a partial disapproval of the Arizona Regional Haze Plan on July 15, 2013. This plan addresses visibility protection within the State of Arizona and does not meet the requirements of the Clean Air Act or Regional Haze Rule. EPA will be preparing a Federal Regional Haze Plan to address the deficiencies identified in the state plan. The Rosemont Copper Project would cause visibility impairment and contribute to visibility impairment at several Class I areas, and more mitigation will be needed. Rosemont will have to be evaluated in light of EPA’s actions, and ADEQ will have to address any visibility impairment in future Regional Haze Plans.</p> <p>Table row “Regional Haze Rule, 40 CFR 51” states that, “The Coronado must analyze the impact on visibility by the Rosemont Copper Project to applicable Class I areas.” There are predicted visibility impact exceedances, as described in our comment below. For any scenario chosen, the project should at least minimize and/or mitigate its potential to contribute or cause visibility impairment. Possible approaches to minimizing or mitigating visibility impairment may include further conversion of the haul truck fleet and diesel generators to more Tier 4 engines, and further enhancement of controls of fugitive (including fugitive dust), non-fugitive, and tailpipe emissions. The project should implement fugitive dust control at least as stringent as required in Maricopa County rule 310, including strict limits on visible dust emissions that leave the property.</p> <p>For any scenario chosen, the project should demonstrate that emission reductions and mitigation measures have been taken and shown by modeling to result in lower delta deciview values. In addition, the project’s permit should include fugitive dust control requirements no less stringent than those required in PM10 non-attainment areas in Arizona. For each of the sources where equipment changes or operational changes have not yet been pursued, the EIS should explain why further reductions were not pursued.</p>

Ch	Section	Page	Line	Comment/Change requested
3	Air Quality	54	30	<p>It is stated that all of the action alternatives could contribute to noticeable visibility impairment at each of the Class I areas analyzed. Reference is made to EPA’s criteria (40 CFR 51) that a delta deciview level of 0.50 or more is considered to contribute to visibility impairment and that a delta deciview level of 1.0 or more is considered to cause visibility impairment.</p> <p>Based on our review of the available visibility modeling information, the applicant has made more recent operational changes to reduce emissions. These mitigation efforts are presented in Chapter 3 on pages 64-67. We have confirmed that these changes are included in the latest modeling. Despite these changes to reduce emissions, visibility impairment is still being predicted. It is unclear what further opportunities for emission reductions have or have not been pursued.</p> <p>Possible approaches to minimizing or mitigating visibility impairment may include further enhancement of controls of fugitive, non-fugitive, and tailpipe emissions (including fugitive dust) and further conversion of the large haulage truck fleet and the diesel generators to Tier 4 engines.</p> <p>Another alternative that could be explored for practicability is the use of a hybrid electric haul truck system. Hybrid electric haulage trucks have been used at the Barrick Goldstrike facility and other mine sites internationally. While such a system may or may not be feasible for this project due to phasing and other design limitations, it should be noted that, in addition to reduced emissions, hybrid haul trucks exhibit large power and speed improvements relative to diesel-only engines, increasing the turn-around time and, in turn, increasing productivity of the mining operations. Other cited benefits include reduced diesel fuel related expense and reduced noise.</p> <p>For any scenario chosen, however, the project should demonstrate that emission reductions and mitigation measures have been taken and shown by modeling to result in lower delta deciview values. For each of the sources where equipment changes or operational changes have not yet been pursued, the EIS should explain why further reductions were not pursued. In addition, the project should demonstrate that fugitive dust emission controls in the permit are at least as stringent as in required in Arizona PM10 nonattainment areas.</p>

Ch	Section	Page	Line	Comment/Change requested
3	Air Quality	57	12	<p>The deposition analysis threshold (DAT) results are discussed. The AFEIS states that the Project’s maximum annual average deposition for nitrogen exceeds the DAT in three Class I areas. There are no mitigation measures proposed for this impact.</p> <p>Recent analysis of nitrogen deposition suggests that desert ecosystems may be among those particularly susceptible to ecological impacts from this source of pollution. Further, Saguaro National Park may be approaching or in excess of the “critical load” amount of nitrogen deposited, above which harmful changes in the ecosystem are anticipated. These impacts may include the promotion of non-native (invasive) species, a reduction in biodiversity, and an increase in fire risk. (John Notar, National Park Service, Personal Communication, July 18, 2013). The USFS and Rosemont should pursue options for reducing this significant project-related impact. The EIS should be revised to include a discussion of potential mitigation measures and their anticipated effectiveness. One option for investigation by Coronado and Rosemont may be the purchase of nitrogen offsets. Major nitrogen emitters exist in the region that could be retrofitted to reduce emissions equivalent to Rosemont’s contribution. For any scenario chosen, the project should demonstrate that emission reductions and mitigation measures have been taken and shown by modeling to result in lower nitrogen deposition impacts to the applicable Class I areas.</p>
3	Air Quality	9	5	<p>Meteorological hourly data used is from April 2006 through May 2009. This represents only 3-years of meteorological data, although on page 14 of the December, 2012 AERMOD modeling report, it states that modeling was conducted using March 2007 through February 2010 data, at the direction of the Forest Service. Still, only 3 years were used. Typically, for air quality modeling under 40 CFR Part 51, Appendix W, 5 years of meteorological data are preferred, if available.(See Appendix W, Section 8.3.1.2). The EIS should explain why the modeling performed in this case deviates from using the standard 5 years of meteorological data.</p>
3	Air Quality	9	35	<p>A 2004 EPA guidance document is referenced. This document was revised and an addendum issued in 2012. Upon review of the reference material, we note that the 2012 guidance document was, in fact, used for the modeling. Please correct the document citation to indicate that the 2012 EPA guidance was used.</p>
3	Air Quality	43		<p>Table 45 - NO₂ Background Concentration value of 24.5 ug/m³: This value, even though it is the highest concentration at the monitoring site, may be inappropriately low. It is based on two years of data and is the lowest concentration in the State of Arizona. The EIS should explain why the selected value is an appropriate choice.</p>

Ch	Section	Page	Line	Comment/Change requested
3	Air Quality	39	29	This line refers to the CALPUFF modeling report, “Rosemont Copper Company Revised CALPUFF Modeling Report to Assess Impacts in Class I Areas” (JBR Environmental Consultants Inc., 2013c), which addresses Class I increments, NAAQS, visibility and deposition. Not mentioned here is the modeling protocol document that precedes the modeling report, “Rosemont Copper Company, CALPUFF Modeling Protocol to Assess Impacts in Class I Areas” (JBR Environmental Consultants Inc., 2012e). On page 2 of the second cover letter of this protocol document, it states that a revision to the CALPUFF model’s regulatory option was made. It is unclear whether Rosemont deviated from the EPA modeling guidelines. Please identify what modifications, if any, were made to the default regulatory version of the CALPUFF modeling system code (including CALPOST, CALMET, etc.), so we may understand whether such modifications would be acceptable and/or representative of the intended objective of the modeling analysis used for the project.
3	Groundwater Quality and Geochemistry	7	3-7	<p>The AFEIS states that mineralogical analysis was not necessary to support the geochemical modeling performed for the project. The decision not to perform a mineralogical analysis for this project is contrary to industry standard practice as defined in the Global Acid Rock Drainage (GARD) Guide.</p> <p>The GARD Guide was developed by an international organization of mining companies with the aim of reducing the liabilities associated with acid rock drainage⁵. The GARD Guide identifies mineralogical analysis as an “essential component of static testing...” The GARD Guide refers to mineralogical testing as a required, not an optional, analysis, stating that, “Mineralogical information is an essential component of drainage chemistry prediction because mineralogical properties determine the physical and geochemical stability and reaction rates of geologic materials and mine wastes.” Furthermore, “the type of mineral phase indicates the major chemical constituents and relative reaction rates under different weathering conditions. Surface exposure, grain size and deformities also affect the rate of weathering. One of the most important uses of mineralogical data is to support selection and design of other tests and interpretation of their results. Mineralogical analysis is usually required for a ‘representative’ sub-set of the static test samples and each kinetic test sample... Mineralogical data will indicate which minerals likely contributed to test results and the likelihood they will contribute similar amounts in the field. Properties of interest will depend on the mineralogical composition, questions raised by other test work and site-specific weathering conditions.”</p> <p>While EPA cannot conclude from its review of the available materials that the lack of mineralogical analysis in this case poses a significant risk to environmental health, we recommend that this section of the EIS be revised to clarify the basis for the Forest Supervisor’s decision not to require this important aspect of the geochemical investigation.</p>

⁵ International Network for Acid Prevention, Global Acid Rock Drainage Guide, http://www.gardguide.com/index.php/Chapter_5b

Ch	Section	Page	Line	Comment/Change requested
	Groundwater Quality and Geochemistry	7	8-12	<p>The AFEIS states, “While the geochemical analysis, specifically the potential for acid rock drainage, has been fully assessed and found by the Coronado to be reasonable and valid, in consideration of public concerns regarding the uncertainty associated with geochemical modeling, existing waste rock characterization and interpreting the potential for acid rock drainage, three monitoring components have been incorporated into the mitigation and monitoring plan (see appendix B for full details).”</p> <p>This passage should be revised to acknowledge that monitoring is a key component of any site characterization and prediction program and should be a component of project monitoring regardless of public (or EPA) concerns.</p>
App B	FS-GW-03	18		Under this mitigation measure, one sample would be collected and submitted for testing for every 250,000 tons for PAG and every 5,000,000 tons for Non-PAG. In most cases, the number of samples is based on tons but not varied by classification. This approach would allow for 250,000 tons of PAG to be diluted within 4,750,000 tons of Non-PAG. The EIS should offer data to support why the proposed sampling rate is appropriate for ensuring adequate operational geochemical characterization and how this approach compares to one based on taking cores from each ore shoot.
App B	OA-GW-06	70		We recommend that Coronado require that Rosemont install mid-point groundwater monitoring. Specifically, monitoring wells should be placed between possible sources and the POC wells. In particular, monitoring wells should be placed down gradient of the proposed heap leach for those alternatives that include this facility.

Ch	Section	Page	Line	Comment/Change requested
2	Action Alternatives	36	15	<p>EPA notes that the heap leach facility has been removed from the Barrel (preferred) Alternative. We are pleased that the potential water quality issues associated with the closure of this facility and its planned burial under waste rock would be eliminated should this alternative be selected for implementation. However, all other action alternatives continue to include this facility. EPA notes the discussion of heap closure contained in Ch. 3, <i>Groundwater Quality and Geochemistry</i>, p. 20, however as closure of the heap leach facility represents a significant and important component of all action alternatives except for the Barrel Alternative, the discussion of heap closure should be provided in Chapter 2, <i>Action Alternatives</i> rather than, or as well as, in Chapter 3.</p> <p>EPA continues to be concerned with the potential environmental effects of this facility for those alternatives that include it. Although some additional information has been provided regarding closure and management, the AFEIS does not provide further details substantiating the claim that the biological treatment system proposed will perform as described in reducing all contaminants to below Arizona Aquifer Water Quality Standards. Further, post closure management of the heap facility would likely be necessary to adequately maintain semi-passive water treatment components, and the closure design described in the AFEIS does not address this need. The EIS should disclose how such expenses would be paid for in the long term. The discussion of Financial Assurance contained in Chapter 2, p. 69 adds to the brief mention of the matter contained in the DEIS, however it does not provide a thorough description of post-closure site management, a discussion of the specific activities that would require long term funding, nor disclosure of the related bonding or trust establishment. EPA is committed to continuing the national interagency dialogue on financial assurance to seek a meaningful and permanent resolution between our agencies on this issue. In the meantime, we continue to believe that disclosure of financial assurance requirements in the EIS is an important aspect of NEPA disclosure for those projects with the potential for post-closure impacts requiring long-term management. In the absence of the specific financial figure, the EIS should at least disclose the types of activities that would require coverage under the long term trust. In this case, the AFEIS identifies some monitoring that would be required post-closure, but does not specifically identify mitigation or maintenance activities that would be needed to ensure the environment is protected. If such activities would be required, we recommend that they be summarized in Chapter 2 of the EIS.</p>
3	Cultural Resources			<p>The AFEIS states that the project impact will be irreversible, and that the proposed mitigation measures cannot replicate the unique resources and cultural context that will be destroyed. The Coronado should continue to work in close consultation with affected tribal groups to seek mitigation measures that might more closely address the cultural resource impacts and incorporate any such mitigation identified into the EIS where feasible.</p>