Rosemont FEIS Review Comments (Major Issues)

Ben Lomeli, Hydrologist 12/11/13

Chapter 3 - Groundwater Quality and Geochemistry

Introduction:

Groundwater quality in Cienega Creek can be affected by contamination conveyed via fractures of unknown depths and extent, and by the diminishment of groundwater which reduces oxygen levels and increases surface water temperatures as well as the resultant concentrations of sediments and other physical, chemical and biological parameters.

Predicted seepage and evaporation rates, as analyzed cannot dismiss the possibility that any precipitation infiltrating the waste rock or tailing, (and from the heap leach pad if the preferred alternative is not chosen), would percolate into the fractured rock aquifer and be transported via the unmapped fractures.

Methodology for Impacts Analysis:

Points of compliance for the Arizona Aquifer Water Quality Standards are not provided in this chapter of the FEIS thus, an evaluation of the expected fate and transport of any contaminants reaching groundwater is not possible by the reviewer. Concerns regarding the points of compliance were expressed in our previous comments.

Specific byproducts in tailings seepage could be discharged to the environment because there would still be groundwater movement below the pit and through the equilibrium water level (pit lake) in response to the regional groundwater gradient. The capture zone of the mine pit lake would only contain contaminants down to the equilibrium water level, but not below. Geochemical modeling should have been revised to attempt to incorporate the chemical byproducts including radon that do not have specific aquifer water quality standards, but which can have detrimental environmental impacts.

Scientific Uncertainty and Professional Disagreement:

Still just “blowing off our comments” based solely on Rosemont consultants (& FS) opinions of what they consider as “appropriate” and “sufficient”.

All of the uncertainties expressed in our previous comments remain unaddressed. They are now only mentioned in brief passing but have not been given the deserved level of emphasis and are not included in the conclusions.

Groundwater Quantity

The proposed pit is 3,000 feet deep and only about five miles from the LCNCA. All logic indicates it will eventually completely dry up all water resources on the LCNCA, as well as all springs in the Helvitia area. None of the three groundwater model runs can guarantee that there will not be such impacts over the long run. The only question is how long will it take. The answer depends on actual conductivity which is largely unknown because of the many unmapped fractures that are potential quick conduits of flow. BLM is charged with protection of the LCNCA in perpetuity.

Changes from the Draft Environmental Impact Statement:

I was NOT invited to attend the October 2012 meeting as described in the FEIS as a cooperating agency.

> *"A final groundwater meeting was held in 31 October 2012 that consisted of Coronado-contracted groundwater modeling specialists, Forest 32 Service resource specialists, the Forest Service decision maker, Rosemont Copper's groundwater 33 modelers, and Federal* ***cooperating agencies*** *(Garrett 2012d)."*

So, who if anyone from BLM attended? Why?

Page 3:

> *"With respect to the groundwater analysis, the Coronado determined that the hydrogeologic framework that forms the basis for the models is reasonable and supported by available evidence and that* ***no evidence suggests that a regionally connected karst system exists*** *that would form a direct connection between the open mine pit and distant waters such as Cienega Creek."*

Karst systems are not the only geologic formation with possible direct connections between the pit and the creek. Fractures in consolidated rock **of any origin** can provide direct connections to the creek and act as quick conduits of groundwater flow.

Issues, Cause and Effect Relationships of Concern

Cause and Effect Relationships:

Page 4:

This statement (below) provides accurate general disclosure of groundwater impacts, but fails to address and emphasize the long-term implications to water resources in the Upper Cienega Creek (LCNCA):

> *"During active mining, water from the mine pit would be actively pumped, which would cause drawdown in the regional aquifer. This drawdown would cause impacts on wells, springs, streams, and riparian areas. After final reclamation and closure, a mine pit lake would form that would lose water through evaporation. The water lost to evaporation would be partially offset by groundwater flowing into the mine pit lake, perpetuating the aquifer drawdown caused by the mine pit dewatering."*

Thresholds of Concern:

Pages 6 & 7:

The statements (below) provide an accurate description of the model's limit of certainty; however, it has been used to determine impacts to Cienega Creek's **base flow which is only inches deep**.

> *"The groundwater modeling experts contracted by the Coronado determined that the reasonable* ***limit of certainty of the groundwater models is the 5- to 10-foot drawdown*** *contour (Ugorets et al. 2012a). Within this contour, the groundwater models would be able to reasonably predict changes to wells, springs, and streams. Changes below this threshold are beyond the capabilities of the models to accurately predict."*

And:

> *"Changes below this threshold are beyond the capabilities of the models to accurately predict."*

And:

> *"While drawdown of less than 5 feet could cause impacts to springs and surface waters, natural variability in groundwater levels is already causing changes of this magnitude in the vicinity of sensitive surface waters in the analysis area."*

The 5-drawdown contour is NOT appropriate just because "*natural variability in groundwater levels is already causing changes of this magnitude in the vicinity of sensitive surface waters in the analysis area."* Obviously then, the wells are not right next to the creek, because the creek's perennial base-flow water levels are only inches deep and do NOT vary by 5 feet, or it would not be perennial. "*in the vicinity of* " has not been defined and specific well locations have not been provided.

Scientific Uncertainty and Professional Disagreement:

All peer review was conducted by two Rosemont consultants, (MWH and SRK Consulting). Same limited "think tank".

Page 8:

> "Additional peer review and criticism were also provided by Forest Service specialists and **several cooperating agencies**."

Was BLM invited? Who if anyone from BLM attended? Why was I not made aware of any of this?

Mining Industry modeling standards are inadequate and inappropriate for evaluating impacts to distant minuscule surface waters.

Potential Limitations and Current Usability of Model:

Page 26:

> *"Full peer review and revisions have been completed and have found the model to be acceptable (Ugorets 2011)."*

Was BLM part of the "full peer review"? Who if anyone from BLM attended? Why was I not made aware of any of this?

The following two statements do provide disclosure, but fail to address and emphasize the long-term implications to water resources in the Upper Cienega Creek (LCNCA):

> *"It is recognized that while pumpage in the basin was not able to be quantified and modeled, pumpage in the basin is increasing, and lack of modeling of this pumpage could affect future predictions.*
>
> *"It is recognized that while much of the Cienega Basin was included in the model domain, the purpose of this model was to analyze impacts from dewatering of the mine pit; therefore, the model may not be appropriate for use elsewhere in the basin without additional revision."*

Impacts Resulting from the Mine in the Davidson Canyon/Cienega Basin:

All results presented are based on the same inadequate models. Many questionable assumptions, limitations and uncertainties remain. The possibility of complete LCNCA dry-out cannot be dismissed or eliminated.

Mitigation:

The best mitigation is to have the pit sealed and reburied so it does not become a permanent evaporation lake acting as a huge groundwater sink. Any water right purchases outside of the Upper Cienega Creek basin are totally ineffective efforts for mitigation of the impacts to water resources in the LCNCA. $2 million dollars does not begin to cover the long-term impacts to the LCNCA.