Meeting Minutes

Engineering/Minerals
Tonto National Forest
Phoenix, AZ

To: Project Record

From: Donna Morey, SWCA

Re: Resolution All Things Water Working Group Meeting 1/23/2020

Attendees:

USFS: Mary Rasmussen, Lee Ann Atkinson, Eddie Gazzetti
SWCA: Chris Garrett, Donna Morey, Gabi Walser, Mike Henderson, Derek Hrubes, Nick Enos
RCM: Vicky Peacey, Jim Bulter, Greg Ghidotti, Hale Barter, Cameo Flood, Gustavo Meza-Cuadra, Tim Bayley, Mark Logsdon, Ted Eary, Chris Pantano, Janeen Duarte
USACE: Mike Langley
San Carlos Tribe: Jim Wells
ADWR: Bret Esslin
EPA: Hugo Hoffman, Hannah Daily, Alexandra Racosky, Pat Kelly
AGFD: Jim Ruff
ADEQ: Wayne Harrison

Handouts:

Agenda (1pg)
Workgroup Charter (3pg)
Overview of comments
Initial Topics to Discuss

Discussion:

ROLL CALL

INTRODUCTIONS

Welcome back to the reconvened and combined Water workgroup. There are 6 workgroup meetings scheduled for 2020 on everyone's calendars. The first few meetings will be discussions and information sharing for work recently completed by Resolution and responding to public comments. Meeting notes will be taken during all meetings for documentation. The majority of the attendees in this meeting were originally in the water modeling workgroup pre-DEIS.

Workgroup charter - The goal of the charter is to have everyone on the same page within the workgroup for expectations, goals, and deliverables. The workgroup is a larger workgroup as this allows better cross pollination between various water topics that would need responses to comments on the Draft EIS. This workgroup will tackle modeling, water quality, and topics in between. The workgroup will gather viewpoints from the entire group for consideration, but the Forest is the decision maker and will decide what approach and disclosures are made. The dissenting opinions will be gathered and documented; they have been helpful in the Forests' decision.

The Draft EIS was published in August 2019 with comments received by the public through November 7th and tribes through December 23, 2019. Comments were placed into a database and substantive comments were coded by resource. Eventually each comment will be responded to for the Final EIS, but writing those responses is not the focus of our time. This working group will provide information, discussion, rationale for the Forest's consideration in responding to the comments. Any work to be done will be undertaken if it is to respond to a provided comment. The goal is for all workgroup members to be heard, but there may be some topics that the Forest could make the decision to stop discussing if no forward movement is being made.

A fact check will be the initial step when considering comment. For example: some comments state that water use was not disclosed, when it was disclosed in the EIS documentation.

Jim W. asks that the group differentiate the difference between facts, opinions, and predictions when considering "fact." Some things may be accurate, but not a fact. The models provide predictions but are not facts as they have not occurred yet. Greg G. suggests using the term "basis" rather than fact.

Data requests are tools that will be used by the workgroup.

Deliverables will include the meeting notes, finalization of the Draft Water Modeling Memo (BGC) including new topics to add into the memo, water quality and other topics may be stand alone memo(s), and SWCA will create a process memo for the record that will discuss the proceedings of the Water working group. This will help to address comments received that an independent analysis of the hydrology was not done by the Forest.

Date of Living document can cause issues – the date on the cover will not change to assist the administrative record but will include a revision log on page 2 of the process memos. Hugo asked if the group could be notified if there was an update and consider if you could add the revision # to the cover while leaving the date the same.

Group storage of documents – previously a SharePoint site was used, considering a OneDrive account for the group to use which is easier to access for the end user. Access to the document site will be provided to this group.

Question: What is the universe of the possible responses we could expect to see in this process? Steeped in regulation by CEQ, we are generally looking for errors in information to make corrections to the document, suggested different analysis and basis for why, new information to consider, and can explain why not to make a change or analysis/change. Opinions do not need to be responded to.

OVERVIEW OF WATER RESOURCES COMMENTS

Water resources has the largest grouping of substantive comments received with about 500 of the 2,500 substantive comments. There were 30,000 letters received that coded into 5,200 separate comments of which 2,500 were substantive. These numbers do not fully account for the reports attached to the comment letters, except where the report was cited in the comment letter. The reports include: Prucha (circulated to group), Maest (available on web), 2 reports from Emerman (available on web). These other 3 reports will be released once we get to that topic. All comments are in one database: agency, tribal, and public.

Wayne H. noted that ADEQ did provide comments on water resources for the Administrative Draft EIS and those comments were all addressed, therefore no additional comments submitted on the DEIS.

Mary asks that agencies or groups here, continue to advocate for their comments/concerns as we move thru the process. In the Final EIS elected officials and Agency comments must be included and responded to in entirety, so no chance they will be missed.

GENERAL TOPICS

- Water Scarcity: water scarcity, drought, Pinal County report released during the DEIS comment period, DCP, all and cumulative water users in the basin.
    - Stresses on ESRV water supply was qualitatively discussed in DEIS cumulative section. It may change to qualitative for FEIS. Current plan is for the February meeting to cover the Desert Wellfield and ESRV modeling.
- Geothermal/Water Use:
    - concern for underrepresentation of total water use at mine. As of now, we do not envision first step will be to internally review the Emerman scenario, review and fact check, then once homework is done the information will be shared to the working group.
    - Concern for Resolution using only 10% of water that other mines in the area use. There is a kernel of truth to this concept, but the "why" is the key difference that needs to be fully fleshed out internally before rolling out to the working group.
- Mitigation or Monitoring: Including 404 compensatory and Riparian mitigations, asks about impacts to wells or them going dry, and preventing or monitoring/repairing water quality contamination issues. The Forest needs to fully understand this issue that spans multiple resources before discussing with the group.
- Riparian Impacts: areas of interest, how GDES were defined and how to address impacts. These topics are likely slated for the April working group meeting to allow for basics on modeling and water quality information sharing before discussing these impacts.
- Water Quality Analysis: at mine site, at tailings storage facility, tailing safety, and other water quality impacts. Initial discussion likely in March, which is when new information will be available.
- Mine Site Groundwater model: includes 27 comments and the Prucha report. Likely will include all of our discussion time today and could be extended throughout other workgroup meetings if needed.
- Water quality Skunk Camp: Anticipated to discuss in March
- Workgroup will not discuss some topics; they will be considered internally in the Forest with documentation and explanation added to the project record. These focus with concerns over the overall independence of the water analysis process.
- Wells/Water supplies: most comments were not actionable; most will fall under mine site modeling and how impacts are being discussed
- Water quality analysis mine site: To discuss in March on the Maest report
- Water rights: broader category including regulatory, legal, water rights – most are for internal Forest discussion

- Water quality analysis QC: this will likely be March for this workgroup
- Concerns of inappropriate model domains: first topic we will discuss today.
- Subsidence/Crater lake analysis: We will begin this discussion today, but conversation will likely continue to future meetings
- 404 permitting: Mike Langley's is managing his own workgroup for the 404-permitting process, he has received all comments.
- Baseline conditions: This will be discussed. Some comments are conceptual on the approach which has been discussed in this workgroup since initial inception years ago. The other topic regarding approach for disclosing impacts. The workgroup had decided on one approach in 2018, but in Spring 2019 the Forest decided on a simplified approach based on comments from the Cooperating Agency review of the Admin DEIS. Chris plans to do a white paper on this topic to show the group.
- ESRV Subsidence: DEIS stated there was not a clear way to tie a single well to earth fissures, but one comment suggested mudflow modeling for this. Will discuss if an appropriate approach with group in the February meeting
- Water quality: We will begin to discuss in February
- SW analysis: comments not necessarily on the Surface water analysis done for the DEIS, but how it interacts with the GW modeling
- Seepage controls: Will discuss in March

Some other one-off topics exist that are mostly internal Forest response to comments.

Hugo wants to prioritize the comments that EPA provided such as baseline conditions that may require additional fieldwork to ensure timing is not an issue if new data is needed.

BREAK – back at 10:45

KNOWN NEW INFORMATION AND REPORTS FORTHCOMING

We heard from both agencies and DEIS comments that additional data on the Skunk Camp location was warranted. Resolution will provide a summary of new data to expect. Resolution has been working at this data gathering in 2019 including a comprehensive data gathering exercise, site investigation/site characterizations, dozens of geologic and hydrologic wells, test pits, and samples for geologic, geochemical, hydrology tests, seismic testing, to understand the structure/faults, characteristics, hydrogeologic properties. This is being submitted to the Forest by Resolution.

- Depth to water, water quality short term testing in one tech memo with a separate tech memo on longer term pump testing - submitted to the Forest by Resolution.
- Quarterly water quality data in wells as well as water quality along the Gila River to add to the existing Gila River database information already available. There is a full year worth gathered at a location by Resolution and longer frames in the database.
- Question – did the subsurface characterization and properties of the collected data change the understanding or the design of Skunk Camp?
    - No, it did not, separate tech memo submitted by Resolution to discuss this matter
- The new information is being entered into a model at Skunk Camp and will be useful in preparation for NEPA and the APP permitting process that will need to occur in the future. The

work is still ongoing and has not been submitted yet. Resolution plans to present this information in March with technical report submitted after that.

- Land Status changes: Resolution owns the private property within the footprint of the TSF. ASLD and Resolution are the only landowners in the TSF project footprint now.
- Resolution has placed some additional wells and is continuing to add wells in the immediate downgradient area. As part of their quarterly groundwater sampling program there are a number of wells downgradient in addition to 15 additional springs outside of the footprint. The summary of this information has not been submitted yet by Resolution.
    - Question: Would the wells being installed downgradient be eventual monitoring wells?
        - Yes, they are being installed to be POC wells for the APP process. These wells will also ensure the seepage controls are placed in the right spots during design.
- Will the 15 springs just discussed be added to the GDE inventory?
    - The last version of Seeps & Springs 2.0 covered the mine site and Superior basin. M&A doesn't believe these 15 springs near Skunk Camp would be GDEs as they are higher in elevation. Mary would like the Spring information available even if they are not GDEs.
- Baseline water quality information - M&A submitted Q4 samples to the lab, once information has been provided back from the lab, a stand-alone memo on the Baseline will be created.
- Reclamation/closure – A future submittal being prepared would include Reclamation plans. A Store & Release closure cover design would speak to new information Hugo is seeking. Resolution's goal is to minimize the amount of seepage that needs to be managed post closure.
- ADWR public model for ESRV. ADWR has been heavily involved with this model being done by Resolution, based on existing model framework with updated information, to ensure all users are included for disclosure – Resolution expects to submit in February.
- No new information on mine site GW model has been gatherer, nor will be unless specifically asked as a data request during this working group

The working group will receive these reports on the action item list.

Question: For the ADWR model, Is the scope and future analysis already decided and not part of purview of this group?

Yes and no, comments were received by agencies with request to move forward on modeling, so that modeling effort has been moving forward to further disclose LTSC, Assured Water Certificates, and ASLD growth range for Superstition Vistas. The information will be provided to this group where relevant, but some decisions are already made such as what users to add per ADWR for the cumulative modeling effort.

Some of the data gathering that has been ongoing was done at request by agencies, assumed needed per the DEIS (Skunk Camp information needed), or in preparation of upcoming permits (APP)

OPEN DISCUSSION WITH FRAMEWORK

Chris envisioned 3 general topics to begin discussions today and request data from Resolution as needed.

Model Domains

1. Mine site model – WSP

2. ESRV – ADWR
3. Skunk Camp Water quality model from DEIS – mixing cell model

- Received suggestion that information is missing since not all modeled together.
    - There are clear hydrological boundaries between these models, stresses vary greatly between models and there would be only a small connection between the models. The larger you make the model the hard it is to make it accurate and increase additional uncertainty and less ability to be confident with results. Group does not want to lose the resolution that is in current model as a tradeoff to larger model. Jim Wells asked if there is a model that can be bigger with small telescoping points for the areas we are concerned with?
    - There are no impacts extending to the boundaries on the Mine site or TSF model to suggest there would be impacts outside the boundaries to incorporate with other models.
    - The domain for Desert Wellfield modeling is the same as previously done for the ESRV model. The ESRV model is a basin fill model in its assumptions, M&A would not want to match the bedrock flow (east of ESRV) to the no flow of the basin ESRV model. For this discussion we will assume the impacts are low or nonexistent.
        - Jim wells agrees Skunk Camp and Mine Site models do not need to be joined together, but ESRV model and Mine Site model should be considered as ESRV model has impacts at boundary.
    - Different way at looking at this comment: other commenters brought up concern of other geographic locations such as Queen Valley water supply and Queen Valley water rights being impacted from the project.
        - Surface water recharge from overflow over the blocks at WRD would not impact from groundwater modeling.
        - Hydrologic boundaries are a key component and standard practice when setting up a model.
    - How can we determine if there is an effect – modeled or narratively – impacts to Queen Valley? There is anticipated 3% reduction of SW flows at Whitlow Ranch Dam.
    - Can we document the ESRV has no bearing on QV/QC? Key is to explain a conceptual model for QV and what they would experience. Difference of hydraulic conditions between bedrock and basin fill. Hale noted the drawdown would not change even if you added in the bedrock on the SRV model.
- Discussion Item #12 – Predictions of Mine Drawdowns are Impacted by the Model Boundary Condition
    - The model has a no flow not a GHB boundary to discuss the 1' drawdown – this was a modeling decision since there were very low flow. We can't take that approach for ESRV as that is a No Flow, not a GHB boundary.
    - What about Globe, Miami, San Carlos, and general extension of extending to Salt and Black river?
        - There are many other stresses on the system to the north and east (multiple mines). The Pinal Mountains are also no flow zones between Resolution and those stresses. These other areas are too far away, too speculative with stresses

such as Morenci, Safford, and other mines; a pump station on the Black River for Freeport that would be big stresses but no information available to use.

- Could add to EIS that the deep aquifers are not connected. The group agrees a conceptual model/narrative description is a helpful response. Jim Wells has heard that more of his clients are concerned with cumulative impacts from mine – the concern that water use from mine would deplete Desert Wellfield then the mine would pull water from the reservation as the government has taken from the tribes before.
- Can add to EIS the regulatory rationale for what can be done as well as not allowed for pumping is important.

BREAK

Jim Ruff would like to see a map that shows all water model boundaries, the geologic boundaries for no flow, and what the GW impact is at model boundary within a single map. A cross section showing the aquitard idea would be helpful as well.

Actionable conclusion on this topic: better conceptual discussion on what is inhibiting flow to discuss it.

SUBSIDENCE LAKE

Handout provided includes the rationale used for the DEIS; it was speculative to have a lake form and therefore not included. The graphic and table from handout were included in the DEIS, it shows the levels of anticipated subsidence, water recovery, and exposure pathways. Questions we asked included: How likely is recovering water level to rise to where subsidence drops to? Are there other exposure pathways besides the subsidence crater? The EIS discloses poor water quality in the pit area, but even at 1,000 years there is still 200 feet difference between the deepest sensitivity run for subsidence and the lowest exposure point.

Are there arguments that have been raised which inform a reason to reevaluate our decision?

- Is this model even capable of providing reliable results? WSP noted the hydraulic conductivity was already subjected to 5x the magnitude of the surround rock (100' per day). If you use a number past 100' per day the numerical model no longer matches.
- Could the recovery happen faster? WSP stated this was as far as you can take this model, more importantly the group already decided you shouldn't take the model further than 200 years.
- Was a sensitivity run done to address this? The diagonal line on the graphic shown is the base case.
- Do we know the rock parameters could more water enter to create a lake? Are we creating a "new" type of rock in the fracture zone? Even if a lake occurred in the future the area is regionally a sink. It has been documented and is expected to be bad water quality and there would be impacts. There is long term pump test information from dewatering that show the rock holds water and doesn't let go of it. WSP notes there is not a boundary condition in the model, but a high conductivity high storage unit that is dictated by the surrounding rock. Sources of water feeding into the pit lake included runoff, evaporation, and precipitation. If

there was a 1-foot deep lake, there would be large amounts of evaporation and still below exposure points.

- Jim thinks the timeline should be geologic in nature. Can we better explain the uncertainties and if any extreme cases that far in the future? What if the error bars have a curve that is 10x steeper? Greg says you would need a different model to run enough time for error bars. Could instead add a disclosure that very far in the future and based on lots of uncertainty a lake may eventually form. The value added from considering a lake could inform monitoring in the future. Hugo doesn't think the error bars on the final result preclude you from making a quantitative note. The group had previously considered an open pit then model as it is the material coming into the pit as another option. The model already incorporates high and low sensitivity for subsidence, could add high and low sensitivity modeling for water levels as well to the graphic.
- Is there case law or regulations for "reasonably foreseeable? Prucha comments note we are not using the right model? If a lake existing then you need to consider the evaporation, changes on water rights, and exposure of the lake. Jim Wells feels there is a bias to disclosing the best of a range in the EIS when it comes to uncertainty. In reading ch 3 – the working group looked at the pieces to form a pit lake, the groundwater model best case of what we expect with known information. The uncertainties are tied to the model limitations, and yes, it is a possibility and it would be over 1,000 years before it would form. Pit Lake models are a tool used my agencies and has been used as a regulatory model in Nevada and successfully litigated cases. The tool is accepted, but what is being speculated is that all things will stay the same for 2,000 years: not considering future mines, industry, climate change, and that is where the speculation comes in.
- Maest notes the saturated column tests show a flush when water rebounds. This water would be exposed if a subsidence lake were to form, but this is not in anyone's lifetime. Group agrees there would be poor water quality, the timing is the concern. The EIS addressed GDEs as quantified within 200 years of present and then qualitative discussion after that timing. Jim Wells asked if the group could consider that the lake "would" occur and add caveat that the size of lake, what it would look like, or how long it could take to form is not able to be quantified.
- Would sensitivity runs help determine change to water table and water recovery angle? Modelers feel the storage capacity is the parameter most likely to change.
- Additional thoughts on language of uncertainty: Jim Wells would like to also discuss for the public when a model becomes so uncertain it is of no use; that we do not have the tools to know for sure; and it is not reasonably foreseeable to know all other intervening things that can happen outside the project (other projects, climate change, etc.).
    - The model is a tool, it has sideboards on it as well as uncertainty. Uncertainty in model versus uncertainty in model parameters.
- APP view on long-term closure and active/passive containment: If uncertainty is there, then ADEQ will have difficulty with passive closure strategy. The East Plant site would also have stormwater controls and would need an APP (either separate or combined with TSF). ADEQ is interested in timelines and demonstrations of control.
    - Resolution and ADEQ to continue talking outside of this working group.

- Prucha comments that the use of drain cells is inappropriate for river reaches as streams can gain, not just lose.
    - Pebble & Rosemont used something different and did not account for streambed recharge which under simulates heads or reduction in hydraulic conductivity.
    - Resolution modelers note that if more recharge is allowed, then the model is less conservative. This model shows the worst impact and outcome and actuals should be a better outcome. The approach taken already shows more impact to GDEs than the approach Prucha suggests. Modeling more robust physics requires more parameters, we do not have better parameters nor able to obtain. The current model already incorporates different recharge rates in springs to provide some feedback mechanism back into the groundwater. Resolution action item to include crafting a response to why they would not change the model package for group review. Water working group feels the Surface Water stream flow is better suited as being modeled under Hamish Weatherly's work already done for DEIS.
        - Modelers know California is starting to use different sophisticated models for GW/SW interaction. These require a much larger number of parameters and allows uncertainties into the model with this many variables. Modelers are confident with the information they do have as inputs to the existing model.
    - EPA does not suggest rerunning the model, but to add discussion of the uncertainties in the decision already made and why.
    - A streamflow package would require knowing heads, which we do not have. A sensitivity run was done to dial back recharge by 50%, so this should account for variance to recharge.
        - EPA asks if the modelers could take a small area of the model with good data that is calibrated and run the model with both packages to see if there is reason to consider the topic further? Or could you strike drain cells and replace with SFR cells?
            - This does not model the entire system but does help form a response to comments with a test case. It does not feel appropriate to change the model to account for a streamflow package as it adds so many more uncertainties.

BREAK

2 more topics to discuss

- Discussion Item #9 – Predictive Uncertainty Analysis / Predictive Sensitivity Analysis
    - This project team did sensitivity analysis to modify individual parameters to see how they can affect a project/model. The other option is to look at equal probability model (Monte Carlo) and how things would differ, output of a probability distribution model.
    - The areas where there is abundant data, you will have the most confidence.
    - No Space Monte Carlo modeling creates many similar calibrations and runs the model into the future. It is used in academic circles and is hard to describe to the public.
        - This is a newer model and would be precedence setting, only used for about 8 years at this point. Jim Wells has only seen sensitivity analyses, not NCMC.

- Sensitivity runs were done at a magnitude to 50% for non-log parameters where Monte Carlo varies multiple parameters on each run rather than 1 parameter per run.
- It is typical to use Monte Carlo on 3 variable systems for gold deposits. Monte Carlo does give ability to quantify. Mark Williamson cautions the use of "conservative" but rather discuss what we mean. Monte Carlo would not allow that use as it changes various parameters and we do not know if one is more conservative than another in that case.
- Prucha did not have reasonable suggestions to make the existing model better.

Prucha has criticism of the modeling to lead to more certain outcomes? Do any of them seem feasible or have a possible outcome?

- Instead calibrate to the GDE or near the GDE, not the model as a whole? This would be at the expense of other areas, the model was calibrated to Devils Canyon as best as possible.
- Model was calibrated to quantify head. Flows within Devil's Canyon was discussed in a qualitative manner.
- Is there anything else that can be calibrated? Flows at Whitlow Ranch Dam was calibrated/benchmarked, could that be used as the other parameter to quantify? Flows were not ignored, heads were the one used for statistical calibration, and flows reviewed and on par with water coming out of drains which was done qualitatively and generally match the baseflows. The earlier Water Model working group did discuss this topic and decided to look at wetted areas/flows and did that qualitatively/conceptually, not quantitatively.

- There will be a request to get Resolution modeling team's written responses to Prucha comments/criticisms. The responses from Resolution would be distributed for the Water Working Group for the next meeting. BGC draft memo had already looked at the sufficience of the model and this might be useful for background information for previous discussions on parameters to consider.

Topics for next meeting will be ESRV, stormwater, and continuation of today's conversations.

Please anticipate that future meetings will be all day meetings.

WRAP UP ROUND ROBIN (not added if no comment to add)

Mary R – very productive day

Gustavo MC – Looks forward to reviewing the public comments and the BGC Memo

Jim W – feels disadvantaged for having not read the public comments yet.

Forest response - Not all 500 comments will not come at once, want to be focused and considerate of the groups time for addressing these topics. The group did receive the subsidence for today's conversation. Resolution and their subcontractors only have access to the ones that were posted publicly on the AZMRC website.

Hugo H - has a better feeling of empathy for everyone in the group and has learned a lot today. Will continue to advocate for the EPA submitted comments and others as appropriate.

Jim R – This was a good kick off meeting. The comment about GW/SW interactions is important to AGFD. Will we eventually get to a monitoring plan?

Forest response – Yes we will discuss a monitoring plan, but not sure which meeting yet, anticipate April or May.

Bret E – This was a productive meeting and glad everyone was able to make it

Eddie G – looking forward to the future meetings and furthering the discussions.

Action Items:

1. WR-1 (ALL): Provide resumes and quals for project record
2. WR-2 (SWCA): Produce "Proceedings" process memo to document all data requests, data submittals, and workgroup actions (pre-DEIS and post-DEIS)
3. WR-3 (SWCA): commit to sending the meeting notes prior to the next meeting
4. WR-4 (SWCA): notify the group of substantial updates to documents (i.e. process memo living docs)
5. WR-5 (SWCA): provide access to a SharePoint site to members of the workgroup and provide the technical reports and BGC report
6. WR-6 (RCM): Updated water qual, water data for long term around mine site/springs, water level, stream length (approx. 2016 – 2019) likely raw database not a report, (early March)
7. WR-7 (RCM): Summary & data for water quality, water level database for Skunk Camp & Gila River – report or database (early March) includes wells downgradient & other springs
8. WR-8 (RCM): Skunk Camp modeling presentation – March 26 Water working group
9. WR-9 (RCM): Springs Inventory 3.0 (April)
10. WR-10 (RCM): Closure and reclamation information, cover design – not ready yet/optional for this working group, but will be included for Closure working group
11. WR-11 (RCM): ESRV cumulative effects modeling (early February) include presentation in February
12. WR-12 (RCM): pull well records and other information for QV and think of ways to model the impacts
13. WR-13 (RCM): RCM to get written responses to Prucha comments/criticisms from Resolution modeling team. Those would be distributed to the Water working group so we can better discuss in the next meeting.
14. WR-14 (SWCA/BGC): Screen thru Prucha report/comments and respond with previous background information from the BGC draft model review document

Engineering/Minerals
Tonto National Forest
Phoenix, AZ

Agenda

To: Attendees, Project File
From: Donna Morey, SWCA
CC:
Date: 1/23/2020

Re: Resolution Copper Mine – Water Resources Workgroup - 1/23/2020

1. Welcome and introductions

2. Overall workgroup approach and logistics

3. Overview of comments received on DEIS
    a. Primary commenters on water issues
    b. General topics of comments

4. Known new information and reports or forthcoming information/reports
    a. Timing of work already completed
    b. Discussion of potential baseline data needs and timing (i.e., baseline water quality data)

5. Open discussion

6. Next Steps
    a. Transmittal of water comments and new information/reports
    b. Schedule of topics for next meetings

Water Resources Workgroup

Expansion of Workgroup

During preparation of the Draft EIS, two separate workgroups were formed to assist the Tonto National Forest with analysis of water issues:

- Groundwater Modeling Workgroup (September 2017 through roughly March 2019)
- Geochemistry/Water Quality Workgroup (November 2016 through roughly December 2018)

In order to assist the Tonto National Forest with assessing public comments on the August 2019 Draft EIS, we have combined these workgroups into a single Water Resources Workgroup. Topics to be tackled by this workgroup may include diverse topics such as surface water modeling, groundwater modeling at the mine site, groundwater modeling at the Skunk Camp alternative, water quality analysis, and assessing riparian impacts. Depending on the monthly topics (provided in agenda prior to meeting) not all specialists may be needed at each meeting.

Workgroup Approach and Sideboards

In August 2019 we published the Draft EIS, we have now received all public and agency comments on the analysis, and we are now on the road to the Final EIS.

NEPA regulations (40 CFR 1503.4) require that we assess and consider all comments received on the Draft EIS. *The purpose of reconvening and expanding the Water Resources workgroup is to assist the Forest Service and the NEPA team in determining the appropriate responses to water-related comments.*

We will respect every comment provided and will give it due consideration. For the purposes of the reconvened Water Resources workgroup there are several sideboards to keep in mind as we do this.

1. Some water-related comments may not be provided to the workgroup for evaluation, if they are more appropriately handled within the agency (i.e., decisions involving NEPA process or scope of analysis, legal interpretations) or by a different group or process (i.e., mitigation discussions).

2. The Forest Service has a valid rationale for the analyses that appeared in the Draft EIS, and we've documented that rationale in the project record. <u>If this weren't the case, we would not have published a Draft EIS</u>. Our default position is that the decisions made and rationale documented for the Draft EIS remain appropriate, <u>unless reconsidered in response to a specific comment or new information</u>. Put more simply, we are not reopening the analysis solely for the sake of reopening it.

3. As a general rule, the first step in responding to a comment will be to conduct a fact-check. We've noted that there are a substantial number of comments that at first blush appear to be based on demonstrably incorrect information, partial information (i.e., review of DEIS, but not background materials), or information clearly taken out of context.

4. A comment that simply disagrees with the approach used in the Draft EIS, but provides no actionable reason or critique, is likely not strong enough to warrant reopening the analysis. We need something concrete to which we can respond.

5. As with the previous workgroup efforts, the final decisions lie with the Forest Service. Consensus is desirable, but we aren't seeking it. Rather, our goal is to ensure that a wide variety of professional viewpoints are heard in order to inform the decisions made by the Forest Service.

6. We are currently planning on six months of monthly meetings. Each meeting will likely cover multiple topics. The order of these topics will be decided by the Forest Service, with an eye towards the most efficient use of time.

Team Members and Roles:

Third-Party NEPA Team

Chris Garrett (SWCA). Role: Coordination and facilitation of working group; coordination of internal and external parties; strategic guidance.

Donna Morey (SWCA). Role: Administrative/logistical support from PM team.

Gabi Walser (BGC). Role: Technical modeling expertise; ensure modeling work is compatible with hydrologic interpretations.

Mark Williamson (Geochemical Solutions). Role: Geochemistry and water quality expertise.

Nick Enos (BGC). Role: Strategic guidance and general technical expertise.

Derek Hrubes (BGC). Role: General technical expertise and management.

Hamish Weatherly (BGC). Role: Surface water and surface water modeling expertise.

Forest Service

Mary Rasmussen (Tonto National Forest). Role: Strategic guidance; ensuring work conforms with Forest Service overall approaches, decisions, and strategies.

Edward Gazzetti (Forest Service). Role: Water resources and modeling expertise.

Judd Sampson (Tonto National Forest). Role: Strategic guidance; minerals and geology expertise.

Lee Ann Atkinson (Tonto National Forest). Role: Strategic guidance; minerals and geology expertise.

Resolution Copper

Vicky Peacey (Resolution Copper). Role: Proponent representative and point of contact.

Cameo Flood (Tetra Tech). Role: Proponent technical and regulatory expertise.

Jim Butler (Parsons, Behle, and Latimer). Role: Proponent regulatory expertise.

Greg Ghidotti (Resolution Copper). Role: Proponent technical and water resources expertise.

Todd Keay (Montgomery & Associates). Role: Water resources expertise.

Tim Bayley (Montgomery & Associates). Role: Water resources and groundwater modeling expertise.

Gustavo Mesa-Cuadro (WSP). Role: Groundwater modeling expertise.

Ted Eary (Enchemica). Role: Geochemistry and water quality expertise.

Chris Pantano (WSP). Role: Groundwater modeling expertise.

Chris Gregory (Montgomery & Associates). Role: Water resources and groundwater modeling expertise.

Kate Patterson (Klohn Crippen Berger). Role: Facility design and site investigation.

Derek Groenendyk (Montgomery & Associates). Role: Water resources and groundwater modeling expertise.
Hale Barter (Montgomery & Associates). Role: Water resources and groundwater modeling expertise.

Other Agencies/Entities
USEPA (Hugo Hoffman; Pat Kelly; Hannah Dailey). Role: Water resources expertise; cooperating agency.
ADWR (Bret Esslin). Role: Water resources expertise; cooperating agency.
AGFD (Jim Ruff). Role: Water resources expertise; cooperating agency.
San Carlos Apache Tribe (Jim Wells). Role: Water resources expertise.
ADEQ (Wayne Harrison). Role: Water resources expertise; cooperating agency.

Workgroup Goals/Deliverables:

1. Review and discuss pertinent public comments. Make recommendations for whether or how to address comments by revised analysis, supplemental analysis, or revised documentation.

2. Review new or revised modeling work by RCM. Identify data or analysis necessary to understand and vet the modeling efforts.

3. For the mine site groundwater model, the review and conclusions prior to the DEIS were captured in the draft document titled "Review of Numerical Groundwater Model Construction and Approach (Mining and Subsidence Area)" (BGC, November 2018). This document will be finalized to capture any additional changes or investigations in response to comments.

4. Separate documentation in the form of tech memos or process memos will likely be produced to capture the review and conclusions of stand-alone issues, such as: the Desert Wellfield groundwater model, surface water analysis, and geochemistry/water quality.

5. The mechanical details of the workgroup proceedings will be captured in a document titled "Process Memo - Summary of Proceedings of Water Resources Workgroup". This document will capture the dates of all meetings, correspondence, data requests and subsequent responses, and identify locations where documents and data can be found in the project record. Similar information for the two pre-DEIS workgroups will also be contained in this document.

6. Eventually responses to comments will be prepared for all substantive public comments received and provided with the Final EIS. The workgroup may be asked to assist with or review these responses to comments.

7. Workgroup meetings and calls will be captured in meeting notes for the project record, including any presentation slides and handouts.

OVERVIEW OF

WATER RESOURCES COMMENTS

- A total of 495 unique, nominally substantive comments were identified related to water resources.

- This count does not include four pertinent stand-alone reports, although the comments refer to the findings in these reports:
    - Prucha: "Review of Hydrologic Impacts In the Draft Environmental Impact Statement Resolution Copper Project and Land Exchange, August 2019", October 9, 2019
    - Emerman: "Potential Impact of Geothermal Water on the Financial Success of the Resolution Copper Mine, Arizona", September 14, 2018 [Also need to see cover letter from Emerman dated October 20, 2019]
    - Emerman: "Projected Consumption of Electricity and Water by the Proposed Resolution Copper Mine, Arizona", March 11, 2019 [Also need to see cover letter from Emerman dated October 20, 2019]
    - Maest: "Review of Resolution Copper's Draft Environmental Impact Statement, August 2019: Geochemical Issues", October 30, 2019

- Comments generally fell into the following categories (some comments fall into multiple categories):

Topic	**Approx. # of Comments**
Water scarcity or need for improved analysis of cumulative effects	101
Concerns over geothermal water and underrepresentation of total water use	71
Mitigation or monitoring	60
Riparian impacts	41
Water quality analysis-general or other	41
Mine site groundwater model	27
Water quality analysis-Skunk Camp	25
Concerns over the overall independence of the water analysis process	23
Water supply/wells	19
Water quality analysis-mine site	12
Water rights/legal framework	12
Water quality analysis-Queen Creek	11
Concerns of inappropriate model domains	9
Crater lake analysis	8
404 permitting	8
Baseline conditions	7
ESRV Subsidence	6

Topic	Approx. # of Comments
ESRV Model	5
Water quality-stormwater analysis	5
Surface water analysis	5
Seepage controls	4
Other topics: Lower San Pedro; tailings alternative; CAP NIA;	4

WATER RESOURCES WORKGROUP

INITIAL TOPICS TO DISCUSS – JANUARY 23, 2020

Model Domains and Geographic Extent (9 comments)

1. The models for the East Salt River Valley, the mine site (Superior Basin), and the Skunk Camp TSF are three separate models, with three separate, non-overlapping domains. Comments suggest this is inappropriate.
    - Is there a compelling technical reason that these three models should be tied together?

2. Comments identify a number of geographic locations that are not part of the modeling of groundwater loss.
    - Globe
    - Miami
    - San Carlos
    - Kearny
    - Florence
    - Queen Valley
    - Are there reasons to think that hydrologically these geographic locations would be impacted?
    - If so, what is an appropriate method of analysis?

3. Comments suggest hydrologic connections beyond the extent of Oak Flat, including "surface and groundwater contributions to the Salt and Black Rivers to the north and east of the mine site."
    - Are there reasons to think that there is a hydrologic connection to these areas?

Crater Lake Analysis (8 comments)

4. The DEIS contains this description of the rationale for why analysis of a crater lake is speculative (DEIS, p. 375-376, provided in its entirety below).
    - Do the comments (including the Prucha report) provide new information, analysis, or reasoning that would change this rationale?

    Potential for Subsidence Lake Development

    The Groundwater Modeling Workgroup recognized that three simultaneous events would take place that suggest there could be the potential for the creation of a surface lake on Oak Flat after closure of the mine:
    • The subsidence crater would develop. The base case model run indicates the subsidence crater would be about 800 feet deep. Most of the sensitivity runs of the subsidence model are similar, although one sensitivity model run reached about 1,100 feet deep (Garza-Cruz and Pierce 2018).

• Groundwater levels would rebound and rise as the aquifer equilibrates after dewatering is curtailed after closure of the mine.
• Block-caving would have created a hydraulic connection from the surface to the deep groundwater system and eliminated any intervening layers like the Whitetail Conglomerate that formerly were able to prevent or slow vertical groundwater flow.

The Groundwater Modeling Workgroup explored the potential for a subsidence lake to form. Ultimately the Forest Service determined that the presence of a subsidence lake was speculative and not reasonably foreseeable, and as such it would therefore be inappropriate to analyze in the EIS. For a subsidence lake to form, groundwater levels would have to rebound to an elevation greater than the bottom of the subsidence crater. Table 3.7.2-7 summarizes the modeled groundwater levels for the three wells within the area of the subsidence crater. The best-calibrated model indicates that after 1,000 years, groundwater levels are still at least 200 feet below the bottom of the subsidence crater, and possibly as much as 650 feet below the bottom of the subsidence crater. Relative positions of the subsidence crater and recovering groundwater levels are shown in figure 3.7.2-4.

Table 3.7.2-7 and figure 3.7.2-4 are shown on the next page.

Table 3.7.2-7. Comparison of rebounding groundwater levels and subsidence crater elevation

Well	Current Land Surface Elevation (from well schematics)	Estimated Elevation of Bottom of Subsidence Crater (based on a total crater depth of 800–1,100 feet)	Estimated Water Level Elevation at End of Mining	Estimated Water Level Elevation After 1,000 Years	Elevation of MSD One Portal	Elevation of Never Sweat Tunnel	Elevation of Umbrella Cave
DHRES-01	4,076	3,276–2,976	−2,799	2,666	2,930	3,200	2,992
DHRES-02	3,976	3,176–2,876	−2,798	2,666	2,930	3,200	2,992
DHRES-08	4,120	3,320–3,020	−2,798	2,666	2,930	3,200	2,992

Note: All elevations are given in feet above mean sea level (amsl).

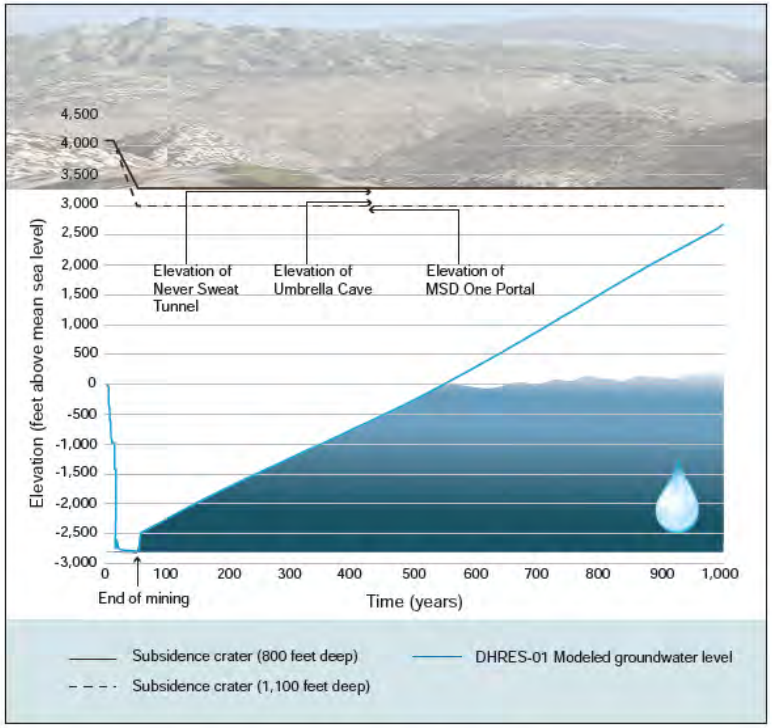

Figure 3.7.2-4. Potential for subsidence lake and other points of exposure of block-cave water

Mine-Site Groundwater Model Critiques (Prucha Report, 27 other comments)

The Prucha report contains many critiques of the mine site groundwater model, and some of these are echoed in other comments. The following represent a selected subset of criticisms raised in the Prucha report, as an initial roadmap to addressing many of the other comments on the mine site groundwater model.

5. Formation of a pit lake wasn't evaluated and is a major oversight in the DEIS
    - See item #4 above

6. Identification of GDEs is lacking
    - Item to be addressed later in workgroup, possibly April

7. A general 'industry-standard' approach to modeling hydrologic impacts is lacking. A general approach used to develop predictions via use of numerical models was never presented.
    - See BGC memo, "APPENDIX B Adherence of Groundwater Modeling Process to Professional Standards (SWCA Memo)". Does this satisfy the comment?

8. Groundwater and Surface Water models were created in virtual isolation from each other, despite clear evidence the two are coupled in key GDE locations. Evaluation of impacts to stream-aquifer flows was not assessed, partly because hydrologic modeling software selected don't have the capability of simulating this critical dynamic flow process.
    - The rationale for this modeling choice is directly addressed in the BGC memo "Dissenting Opinions" section (see section 5.7 "Direct modeling of groundwater/surface water interaction", which includes about 3 pages of explanation). The following argument from a workgroup member is quoted in this section:

        "model's lack of capability to simulate GW/SW interactions - The most important need the USFS has for the EIS analysis is the impact of the project on surface resources. The model here is not capable of modeling baseflow in Devil's Canyon and Queen Creek… This factor calls into question as to the whether the scope and capability of the model selected the subroutine packages invoked, and representation of the natural insitu system are adequately represented to the extent that should or could be based on reasonably known surface observations. USGS routinely creates MODFLOW models that include intricate surface water/groundwater interactions and result in calibrated surface water stream flow for output."
    - Does Prucha raise an issue that wasn't considered already? Does Prucha provide provide new information, analysis, or reasoning that would change this rationale?

9. A formal predictive uncertainty analysis wasn't conducted, and partly confused with a predictive sensitivity analysis.
    - Prucha suggests alternative approaches. Is there a compelling reason to use one of these approaches instead of the sensitivity analysis already conducted?

10. The WSP report fails to describe a defensible baseline 3-dimensional conceptual flow model (or future post-closure conceptualization) showing the coupled surface water-groundwater system flows in any detail, using groundwater flow arrows in each aquifer, estimated discharge (at springs, seeps, streams) and recharge areas and rates as described in various reports… Discussion of characterization and conceptualization of both surface water and groundwater flows, and flow interactions between them over the entire mine footprint is confusing, poorly presented and missing important details.
    - Does this comment reflect the use of an incorrect conceptual model, or reflect a disagreement on the level and type of description/illustration of that conceptual model?

11. A number of alternative models or packages are proposed that Prucha believes would result in better outcomes, including for fault modeling, streamflow interaction, evaporation, and recharge.
    - Streamflow interaction was directly considered by the workgroup previously and discussed above as item #8. Are there alternative approaches raised by Prucha for fault modeling, evaporation, or recharge that would lead to more accurate outcomes?

12. Predictions of mine drawdowns are impacted by the model boundary condition.
    - This possibility was considered by the workgroup, and one of the sensitivity runs looked at whether changing the boundary conditions (to no-flow conditions) affected the model results. Was this approach not sufficient to demonstrate the potential effect of the boundaries?

13. Modeling of Groundwater Fate/Transport from Mine not Considered.
    - At the mine site, both the deep groundwater system and the Apache Leap Tuff aquifer reflect a cone of depression that persists at least 1,000 years into the future. Is additional fate/transport modeling warranted to evaluate the movement of water from the block cave zone?

14. The calibration is flawed. Calibrating groundwater flow models to only hydraulic heads, which are spatially biased with higher density near the proposed mine, and sparse further from the mine is well known to produce non-unique solutions. Adequate calibration data are lacking. From 1910 to 1996, the model appears uncalibrated. Model calibration should have focused on GDEs-- calibration error (or residuals) should have been minimized at all GDEs.
    - The discussion of this question may require the outcome of other questions about whether surface/groundwater interactions, whether from springs or streams, can be directly modeled.

next mtg 2/20
3/26

Water Working Group Mtg

WELCOME
Please Sign In

Resolution Copper Project and Land Exchange
Environmental Impact Statement

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Location: SWCA Phoenix Date 1/23/2020

WELCOME
Please Sign In

Resolution Copper Project and Land Exchange
Environmental Impact Statement

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AGFD Jim Ruff	Alexandra Racosky EPA	Hannah Daily EPA
Pat Kelly EPA		

Location: SWCA Phoenix Date 1/23/2020