USDA Forest Service Tonto National Forest Arizona

February 16, 2023

## **Process Memorandum to File**

Assessment of Cutter Basin Issues

This document is deliberative and is prepared by the third-party contractor in compliance with the National Environmental Policy Act and other laws, regulations, and policies to document ongoing process and analysis steps. This document does not take the place of any Line Officer's decision space related to this project.

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### Purpose of Process Memorandum

Concerns about the Cutter Basin were first raised to the Forest Service by the San Carlos Apache Tribe in comments on the Draft EIS (DEIS). These are reproduced below in part:

The Tribe has deep concerns about allowing Resolution Copper to overdraw groundwater resources in Pinal County. One of the only remaining groundwater resources accessible to users in Pinal County is in the Tribe's Cutter Basin. The United States has a long and troubled history of reallocating resources promised to tribes when demand is high and off-reservation supplies are low. The Tribe fears that allowing Resolution Copper to withdraw billions of gallons of groundwater will create a decades-long regional water imbalance. This imbalance, in turn, will place the Tribe's own water resources at risk due to inexorable and unmet demand and dwindling supply. (San Carlos Apache Tribe comment letter dated December 23, 2019, p. 25-26)

Subsidence will have an effect on precipitation on the Reservation. The San Carlos Apache mineral strip and the San Carlos Apache Cutter Basin are two locations which will be affected by any change in precipitation which will result from the collapse and subsidence of any portion of the mountain range. The San Carlos Apache mineral strip is located on the west side of the Gila River below Coolidge Dam. The Cutter Basin is located between the San Carlos River and the western San Carlos Apache Reservation boundary near Globe, AZ, approximately 20 miles east of the mine site. The water supply and recharge for the Cutter Basin is primarily from two sources: the first and greatest source is precipitation on the Pinal Mountains through the snowmelt and rainfall entering the mountain front recharge zone and moving to the northeast into the Cutter Basin. The other source of the recharge is the surface precipitation falling on the headwaters of Ranch Creek and Goodwin Wash on the San Carlos Reservation and the infiltration of that surface flow into the Cutter Basin. The water in the Cutter Basin west of the San Carlos boundary is the water supply for the City of Globe, which has municipal wells lined up running north and south along the western boundary of the San Carlos Reservation overlying the Cutter Basin. The groundwater in the Cutter Basin is also a primary source of water presently, and in the future, for the San Carlos Apache Tribe. It is high quality compared to other sources of water for both the City of Globe and the San Carlos Apache Tribe. The rights to the groundwater in the Cutter Basin and the surface water overlying the Cutter Basin within the San Carlos Apache Reservation were adjudicated in 1999 in case number W 1-4, In re the General Adjudication of All Rights to Use Water in the Gila River System and Source.

Pursuant to an agreement related to that adjudication, the City of Globe may pump up to 2,500 acre-feet of water per year from the City of Globe municipal wells located on the west side of the western boundary of the San Carlos Reservation. The Tribe has the exclusive right to use both surface water and groundwater within the Reservation under the San Carlos Apache Settlement Act, Pub. L. No. 102-575, 106 Stat. 4740 (October 30, 1992) and the San Carlos Apache Tribe Water Rights Settlement Agreement dated March 30, 1999. A decrease in precipitation on that portion of the watershed which supplies the recharge of both surface and groundwater for the Cutter Basin would dramatically threaten the San Carlos Apache Tribe's

vested rights to surface water and groundwater, which water rights are held in trust by the United States. (San Carlos Apache Tribe comment letter dated December 23, 2019, p. 40-41)

The DEIS comment response focused on two aspects of these comments. The first aspect concerned water use in Pinal County and regional water use, which was answered by response-to-comment WT4 "Comments on water scarcity and competing water uses". The second aspect concerned potential impacts to precipitation caused by the subsidence crater, which was answered by response-to-comment WT89 "Reduction in precipitation from subsidence". These responses, along with the full San Carlos comment letter, were contained in Appendix R of the January 2021 rescinded FEIS.

After tribal consultation was re-initiated in 2022, further discussions with the San Carlos Apache Tribe clarified the concerns raised in these comments. Specifically, the Forest Service now understands that the concerns aren't about <u>direct</u> impacts on the Cutter Basin by Resolution Copper dewatering (at the mine site) or water supply pumping (at the Desert Wellfield). These direct impacts clearly do not extend physically far enough to impact the Cutter Basin. Rather, the Forest Service understands the concern is about the potential for cascading regional indirect effects. If Resolution Copper pumping affects nearby water users, those water users could look for other replacement water sources in the region. This could potentially cascade regionally until the City of Globe or mining companies with supply wells in the Cutter Basin increase their pumping.

In June 2022, the Forest Service received a technical review of the January 2021 rescinded FEIS analysis of water resources, conducted by three water resource specialists with the Bureau of Land Management (BLM). This review was requested as part of re-initiation of tribal consultation. The BLM reviewers reiterated the concern over the Cutter Basin and added that impacts to water quality could also drive regional water users to seek other supplies.

The purpose of this process memorandum is to assess the potential for these indirect impacts to occur, for inclusion in the FEIS when republished.

### **Key Process Steps**

- The Forest Service received the San Carlos Apache Tribe comment letter on the DEIS on December 23, 2019. This letter was processed for comments and was included in its entirety in Appendix R of the January 2021 rescinded FEIS, along with the Forest Service responses.
- The BLM report was received in June 2022 (Project Record #0005882). The Forest Service prepared responses to the comments raised in the report, which are being included as an appendix with the republished FEIS.
- Partially in response to the BLM report, the Forest Service requested additional information from Resolution Copper during a meeting on September 16, 2022 (Project Record #0005883). This information was received on November 8, 2022 (Montgomery & Associates 2022a; Project Record #0005884).
- In response to the BLM report and refined understanding of the tribal concerns, the Forest Service reviewed this information, compiled additional information, and conducted the

analysis of water supplies in the Cutter Basin contained in this process memorandum. This analysis will be summarized in the republished FEIS.

### **Overview of Cutter Basin**

The Cutter Basin is not an officially recognized groundwater basin, but is a common term used to describe an area roughly encompassed by the Gilson Wash subwatershed (see figure 1). This area is part of the wider Safford Groundwater Basin, a basin officially designated by the Arizona Department of Water Resources. The Cutter Basin is highly similar to other basins in the area (including Dripping Springs Wash). The aquifer consists of deep permeable basin-fill sediments—primarily the Quaternary/Tertiary Gila Conglomerate—underlain by less-permeable Precambrian igneous and sedimentary bedrock.

Much of the Cutter Basin lies within the boundaries of the San Carlos Apache Reservation. However, a portion of the Basin extends west of the reservation boundary. Almost a dozen large-capacity water supply wells have been installed by the City of Globe and by mining companies in this area of the Basin immediately adjacent to the San Carlos Apache Reservation. This area is often referred to as the Cutter Wellfield. The registered production wells adjacent to the reservation boundary are summarized in Table 1. Four of these wells have useful geologic logs, which have been included as Attachment 1 to this process memo.

Well Registration ID	Owner	Depth of Well (feet)	Depth to Water (feet below ground surface)	Pumping Capacity (gallons per minute)	Geologic Driller Log Included in Attachment 1?
55-611120	City of Globe	922	540	700	No
55-218417	City of Globe	1,120	702	225	Yes
55-526251	City of Globe	1,142	654	700	Yes
55-611117	City of Globe	1,150	547	1,500	Yes
55-218634	City of Globe	n/a	n/a	n/a	No
55-611121	City of Globe	1,050	560	500	No
55-609989	City of Globe	880	610	800	No
55-609990	City of Globe	2,513	546	885	Yes
55-609987	Freeport- McMoRan Miami	1,180	620	752	No
55-609988	Cyprus Miami Mining	1,207	640	800	No

**Table 1.** Summary of Registered Supply Wells in the Cutter Basin, Adjacent to the San Carlos Indian

 Reservation

n/a – Information not available



Figure 1. Location of Cutter Basin/Gilson Wash subwatershed (excerpted from Montgomery & Associates 2022a)

Detailed well logs in the vicinity of these water supply wells indicate that the Gila Conglomerate has a thickness of over 1,800 feet (see Attachment 1). The supply wells generally extend from about 900 to 1,200 feet and clearly draw water from the Gila Conglomerate, which is the primary basin fill material in the Cutter Basin. Very little water level information exists within the boundaries of the San Carlos Apache Reservation, but a long-term water level monitoring location has been tracked by the Arizona Department of Water Resources in the immediate vicinity of the Cutter Wellfield (Groundwater Site Inventory ID 332128110432101) and shows that between 1990 and 2020 groundwater levels have exhibited a long-term consistent decline of around 140 feet or about 4 to 5 feet per year. This suggests that groundwater extraction from the Cutter Wellfield exceeds basin recharge. This long-term drawdown very likely extends into the portion of the Cutter Basin below the San Carlos Apache Reservation as well.

### Potential Impact to Regional Water Supplies from Resolution Copper Water Use

The NEPA team recognizes the specific issue at hand is valid and needs to be analyzed: specifically that if Resolution Copper were to impact regional water users, those regional impacts could ultimately cascade to affect City of Globe water supplies, or the water supplies of other large water users (mines) in the area, and that this could in turn result in increased pumping from the Cutter Basin, as indicated by the San Carlos Apache Tribe and repeated by the BLM reviewers.

The starting point for assessing the potential for these cascading effects is the physical impact of Resolution Copper's water use. The impact of Resolution Copper's water use on water supplies in the area is analyzed in both the January 2021 rescinded FEIS and the republished FEIS (see specifically section 3.7.1, table 3.7.1.4).

The nearest water supply to the mine site—Top-of-the-World—does have the potential to be impacted by the dewatering pumping at the mine site, coupled with the geologic changes wrought by the block-caving. While the base case modeling does not indicate drawdown greater than 10 feet at Top-of-the-World, about 20% of the sensitivity modeling runs indicate drawdown greater than 10 feet could occur, leading the FEIS analysis to conclude that: "Additional drawdown due to block caving is anticipated for water supply wells in this area, except for those completed solely in alluvium or shallow fracture systems. Impacts could include loss of well capacity, the need to deepen wells, the need to modify pump equipment, or increased pumping costs."

This appears to be the type of impact to a regional water supply that potentially could cascade and indirectly cause greater pumping from the Cutter Basin. However, the FEIS analysis continues to note that this potential impact to these regional water users is addressed by mitigation. Specifically, measure FW-WR-01 in Appendix R of the FEIS is a Forest-Service required mitigation related to groundwater-dependent ecosystems and public supply wells. If drawdown related to the mine affects the Top-of-the-World supply wells, Resolution Copper has committed to deepen or replace the wells, or if that proves ineffective, provide an alternative water supply to impacted water users in Top-of-the-World.

Note that the U.S. Environmental Protection Agency (USEPA) informally commented on this particular mitigation measure in March 2021 after the January 2021 FEIS had been rescinded (Project Record #0005778). USEPA expressed concerns over the clarity of trigger mechanisms for the Resolution Copper mitigation plan. In response, the Forest Service requested changes to the mitigation measure, and a revised measure was provided to the Forest Service on December 8, 2022 (Montgomery & Associates, 2022b; Project Record #0005885). The original measure triggered mitigation only if yet-to-be-determined analysis showed that impacts were proven to be caused by Resolution Copper. The revised measure assumes mitigation will occur if clear triggers are met. The potential remains for analysis to show that impacts are due to another cause and not attributable to Resolution Copper, but the starting position is that mitigation will occur.

The potential impacts from Resolution Copper's drawdown are anticipated to be mitigated by required measure FS-WR-01. There would be no motive for Top-of-the-World residents to obtain water from the Cutter Basin, or another nearby source.

The next closest regional water user to the mine site is the Town of Superior, west of the Resolution Copper mining area. Potable water is supplied to the Town of Superior by Arizona Water Company and is imported into the area via pipeline from the East Salt River Valley. However, the FEIS concludes that other production wells in the Superior area that are not tied to the Arizona Water Company system could be impacted by mine drawdown. The analysis estimates 10 to 30 feet of drawdown could occur in these wells. However, in a similar manner to Top-of-the-World, any potential impacts would be mitigated by Resolution Copper via measure FS-WR-01, and there would be no motive for Superior water users to obtain water from the Cutter Basin, or another nearby source.

Aside from Top-of-the-World and the Town of Superior/Superior Basin water users, the next closest regional water user to the mine site is the Pinto Valley Mine. The mine is located approximately 2 to 3 miles farther east from Top-of-the-World, and is beyond the analysis area for the mine site groundwater drawdown impacts for the Resolution Copper NEPA analysis. As shown in Figure 3.7.1-3 of the FEIS, quantifiable drawdown greater than 10 feet would not reasonably extend to Pinto Valley Mine. In addition, Pinto Valley obtains most of its water supply from the Gila Conglomerate, a completely different hydrogeologic unit than those impacted by the block-caving and dewatering in the vicinity of the mine site (the Apache Leap Tuff and the Whitetail Conglomerate) (US Forest Service 2021). It would be unlikely that Resolution Copper pumping would impact Pinto Valley Mine water supplies or cause Pinto Valley Mine to seek water supplies elsewhere.

# Potential Impact to Regional Water Supplies from Water Quality Changes

The BLM reviewers also raised the possibility that changes in water quality could drive regional changes in water supply. Potential impacts on groundwater quality in the block caving area are analyzed in the FEIS (section 3.7.2, "Potential Groundwater Quality Impacts Within Block-Cave Zone").

The analysis in the FEIS is as follows:

- The best available estimates to inform post-closure water quality in the block-cave zone are the final samples from the saturated column tests (May 24, 2010). As shown in table 3.7.2-7 of the FEIS, the median concentrations from these tests for all constituents are lower than the Arizona numeric aquifer water quality standards. This suggests that long term post-closure water quality in the block-cave zone may not represent an environmental concern.
- However, the analysis further notes cautions that these samples are not perfect analogs of future conditions, for several specific reasons. The analysis notes that given these uncertainties, while encouraging, the results of the saturated column tests are not definitive.
- Regardless of the water quality, for impacts to occur the groundwater in the block-cave zone would need to migrate. The FEIS also analyzes the potential for exposure of the groundwater from the block-cave zone. The block caving causes a large cone of depression to extend from the deep groundwater system into the overlying Apache Leap Tuff. This cone of depression would need to recover before water from the block caving area moves away from the mine site. The cone of depression caused by the block caving would likely take over 1,000 years to

recover (see figure 3.7.2-4 in the FEIS) to the current water levels in the Apache Leap Tuff (see figure 3.7.1-6 in the FEIS).

As noted in the FEIS, predictions this far in the future are beyond the ability of any groundwater modeling tools to accurately quantify, though qualitatively the general modeled trends of recovery are informative. Uncertainties notwithstanding, the best available information suggests that block cave water quality may not exceed water quality standards, and that any movement of water from the block-cave zone away from the mine site is a remote occurrence. It would be unlikely that water quality changes at the mine site would reasonably cause regional water users to seek water supplies elsewhere.

### Further Regulatory Constraints

The above analysis focuses specifically on water supplies nearest the mine site (Top-of-the-World, the Town of Superior/Superior Basin water users, Pinto Valley Mine). The original San Carlos Apache Tribe comments on the DEIS focused on water users in Pinal County as well that could potentially be impacted by Resolution Copper's Desert Wellfield pumping. There are other regulatory constraints that would limit the ability of water users near the Desert Wellfield to change water use in the Cutter Basin.

The pertinent administrative boundary for regional water users in Pinal County is not the Pinal County boundary, but rather the boundary of the Phoenix Active Management Area (AMA) and Pinal AMA. The Pinal AMA extends to just east of Florence. With limited exceptions that are explicitly written into Arizona law, transportation of groundwater away from a groundwater basin is prohibited (Arizona Revised Statutes 45-544)<sup>1</sup>.

For the wider region, however, state law restricts any movement of groundwater from the Cutter Basin into the adjacent groundwater basins, including the Pinal AMA or Phoenix AMA. In addition, these areas are not adjacent or readily accessible. For instance, there are three other groundwater basins interposed between the Pinal AMA and the Cutter Basin/Safford Groundwater Basin—the Donnelly Wash Groundwater Basin, the Lower San Pedro Groundwater Basin, and the Dripping Springs Wash Groundwater Basin. Water users in Pinal County would not legally be able to pull water from the Cutter Basin/Safford Groundwater Basin, and such pumping would be physically unlikely as well.

In addition, as noted in the original San Carlos Apache Tribe comments, there are legal agreements that place restrictions on the amount of water the City of Globe is allowed to pump from the Cutter Basin (2,500 acre-feet).

### Conclusions

City of Globe and other water supply wells located adjacent to the San Carlos Apache Reservation appear to be physically impacting water resources in the area known as the Cutter Basin. For the

<sup>&</sup>lt;sup>1</sup> Note that one exception written into law that allows transfer from one groundwater basin to another is if those basins span a single water distribution system (Arizona Revised Statutes 45-544.B.4). This is pertinent to the City of Globe Cutter Basin wells, which are moving groundwater from the Safford Groundwater Basin to the Salt River Valley Groundwater Basin as part of a single distribution system.

purposes of the NEPA analysis, it is acknowledged that if cascading effects from Resolution Copper were to drive more groundwater pumping from this area, those ongoing physical impacts to San Carlos Apache Tribe groundwater resources would increase. The potential effects from Resolution Copper that theoretically could drive these cascading impacts take the form either of groundwater drawdown or groundwater quality changes. It is a legitimate exercise to examine these potential cascading effects.

The analysis contained in this process memo finds that there are no reasonable cascading effects by which the actions of Resolution Copper would increase pumping adjacent to the San Carlos Apache Tribe. With respect to drawdown, potential impacts from the block caving to regional water users would be mitigated if they occurred. There would be no motive or reason for these users to seek water supplies from adjacent areas. With respect to water quality, acknowledging the uncertainties, the best available analysis suggests water quality in the block-cave zone would not exceed water quality standards, and the potential for movement of that water away from the block-cave zone (and thus able to impact regional water supplies) is remote. Further, substantial legal restrictions exist on the ability for any regional water users to move groundwater away from adjacent groundwater basins like the Cutter Basin/Safford Groundwater Basin.

### References

Montgomery & Associates, Inc. 2022a. Cutter Basin Hydrogeologic Data Summary. November 4, 2022.

Montgomery & Associates, Inc. 2022b. Monitoring and Mitigation Plan for Groundwater Dependent Ecosystems and Water Wells. December 7, 2022.

U.S. Forest Service. 2021. Pinto Valley Mine Final Environmental Impact Statement. April.

Attachment 1

### Useful Geologic Logs from Supply Wells in the Cutter Basin