

Comments on: Draft Environmental Impact Statement for the Rosemont Copper Project

A Proposed Mining Operation
Coronado National Forest
Pima County, Arizona

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These comments relate to the Rosemont Site Water Management Update. This plan is referred to in the DEIS (pages 345- 348) and is presented in detail in Tetra Tech reports available in 5 Volumes that are accessible from the DEIS Reference list (note that the link to Vol. 4 is broken). The plan addresses two requirements: All runoff from the processing facilities and the pit area must be contained on-site, and other runoff from the project area must be diverted around potential pollution sources as it flows toward the “point of compliance” dam.

ISSUES RELATED TO SITE WATER MANAGEMENT UPDATE

1 - Retention and diversion structures in the plan have been designed using NOAA Atlas 14¹ and also the NOAA Probable Maximum Precipitation Estimates². Runoff has been calculated in a variety of ways, primarily for 24-hour events as defined at different return intervals in the NOAA Atlas. Some event periods have been aggregated into a one hour period. These approaches maximize the peak flow estimates but result in short durations for heavy runoff from the site (duration and volume both affect the integrity of the engineered containment structures). Heaviest rains at the project site are most likely during summer convective storms (the monsoon period thunderstorms) or during summer and fall when decaying tropical storms can affect southeastern Arizona. The most important events are those that produce heavy rains, and associated runoff and floods, over a period of several days. **It does not appear that this character of rainfall – i.e., a close sequence of individually important, but non-critical events, accumulating to produce a very significant event at the site - has been adequately addressed in the runoff calculations.**

The local events of late July during 2006 illustrate the important impacts of extended periods of heavy storms. During the last 4 days of the month heavy rainfall produced by thunderstorms fell on the Catalina Mountains (see <http://rfcd.pima.gov/reports/debrisflow2006/> which is titled “July 31, 2006 Flood and Debris Flow Event”). The rains totaled 5 to 11 inches at different gages during the four days and runoff increased each day as ground conditions reached total saturation. The National Weather Service estimated that the four days of heavy rainfall was a 1000-year event. The USGS estimated that the magnitude of debris flows with the event had not occurred in the Catalina Mountains for at least 2000 years.

2 - The Tetra Tech reports essentially declare that annual rainfall at the site is approximately 18 inches. Other guidance indicates that the site rainfall might be as high as 24 inches. The nearest station with long-term rainfall data (Santa Rita Research Station) has annual rainfall of approximately 22 inches. The Tetra Tech decision that site rainfall was 18 inches/year was based upon: only one complete calendar year of rainfall data observed at the site (2008); stream flow data from USGS gage 09484580 (Barrel Canyon at Highway 83) for only 17 years (1962-1977 and 2011); and annual rainfall similar to the single year of data at the site is observed at Nogales (which is in a quite different terrain setting).

In fact, there are no long-term data available to determine accurately the mean annual precipitation at the project area. **Keeping the annual precipitation on the low side of the possible range may serve to**

minimize the forecast impacts of mine operations that decrease annual runoff into Barrel and Davidson Canyons. The effect of the Rosemont Copper Mine on downstream water resources can not be accurately predicted given the uncertainty of the project area’s actual meteorology (daily and long-term weather).

3 - The Tucson National Weather Service began operating a state-of-art Doppler weather radar at a site located on the Empire Mountains in 1995. This radar is located just **8 miles southwest** of the weather station at the Rosemont mine site. Routine products that are available, from NCDC, for this radar include radar-estimated precipitation accumulations and rainfall intensity rates. Apparently these data have never been acquired or examined relative to rainfall and intense storms at the Rosemont project area. **This is a serious omission, given the scarcity of quantitative weather data near the project area.**

4 - Data from NOAA Atlas 14 used by Tetra Tech were extracted for the latitude/longitude of the USGS Barrel Canyon stream gage (off the project area and at a lower, drier elevation). The project area has steeply sloping terrain and the annual rainfall is probably greatest at the highest elevations. **The west to east gradient in annual rainfall across the site has not been documented or considered in any of the project’s engineering plans.** As an example, consider that data from the NOAA Atlas indicate that the 24-hour, 500-year maximum rainfall event is 5.30 inches at the Barrel Canyon gage location, but is 6.30 inches at the center of the proposed mine pit – a difference of almost 20 percent.

5 – In a summer 2010 Technical Review of the “Site Water Management Update”, Golder and Associates identified six “Red Flag” issues and five “Potential Fatal Flaw” issues in the plan. These are shown below in Golder’s Table 3:

TABLE 3	
RED FLAGS AND POTENTIAL FATAL FLAWS	
Red Flags	Using smaller precipitation depth (18in) to calculate average annual runoff instead of NRCS recommended depth (24in)
	No volume check calculations using monsoon precipitation conditions (maximum saturation event)
	No calculations presented for pit diversion channel and pit stormwater pond
	Methodology used for sediment yield calculations should be reviewed as it is believed to be inappropriate
	Lack of drainage from perimeter containment areas
	Lack of detail for sediment control designs during operations
Potential Fatal Flaw	Storage on top of benches is unusual for long-term closure
	Down chutes on both tailings facility and waste rock can lead to failure as riprap lining may be inappropriate
	Flow-through drains: potential long-term difficulties with maintenance and retaining discharge capacity
	Water storage on top of tailings facility and waste rock dump is unusual for long-term closure
	Specific sediment yield is the same for pre- and post-mining conditions, which appears to be incorrect

The two engineering firms have debated these issues since the summer of 2010 and the exchanges were continuing this past summer. Essentially, it appears that the two firms have agreed to disagree and no changes

have apparently been made to the Site Water Management Update Volumes. In Golder's April 2011 review of "Rosemont Site Water Management Update Review Responses" it was noted (see Table 1 in this document which lists 13 critical issues) that 7 of the critical issues had been partially addressed, and that 4 critical issues had yet to be addressed. Rosemont Copper and Tetra Tech have stated that some of these issues will eventually be considered **when the final site water management plans are made and also that Best Management Practices will be used after operations have begun.**

TECHNICAL EXCHANGES BETWEEN GOLDER AND ROSEMONT/TETRA TECH

http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5313368.pdf

Golder Associates Technical Memorandum dated July 23, 2010 – "Rosemont Copper Project – Technical Review of Site Water Management Update." This was reissued August 5, 2010 with an additional Table requested by Tetra Tech – link not available.

<http://www.rosemonteis.us/files/technical-reports/013789.pdf>

Tetra Tech Technical Memorandum dated November 30, 2010 – "Rosemont Site Water Management Update Review Responses."

<http://www.rosemonteis.us/files/technical-reports/015019.pdf>

Golder Associates Technical Memorandum dated April 5, 2011 – "Rosemont Copper Project Review of 'Rosemont Site Water Management Update Review Responses.'" "

<http://www.rosemonteis.us/files/technical-reports/015018.pdf>

Rosemont Copper Technical Memorandum dated May 6, 2011 – "Response to Golder Comments."

<http://www.rosemonteis.us/files/technical-reports/015305.pdf>

Rosemont Copper Memoranda of June 8, 2011 and June 27, 2011 – regarding response to Golder comments on drop chutes and transmittal of technical responses by email only.

6 - Golder's concern that many aspects of the Update plans assume an overly-optimistic, rapid re-vegetation and root-structure stabilization of disturbed slopes has not been addressed seriously by Rosemont or Tetra Tech. While there is a test plot on-site, definitive results regarding re-vegetation will not be likely for several years.

There appear to be very serious engineering issues and the exchanges are too recent for careful assessment. It would be most prudent to have an independent expert review both the Tetra Tech five-volume Site Water Management Update and all of the technical arguments presented by Tetra Tech and Golder Associates in their exchanges.

REFERENCES

http://www.nws.noaa.gov/oh/hdsc/PF_documents/Atlas14_Volume1.pdf 1 - NOAA Atlas 14 "Precipitation-Frequency Atlas of the United States" Volume 1 Version 4.0: Semiarid Southwest (Arizona, Southeast California, Nevada, New Mexico, Utah), 2004 revised 2006, 261 pp.

http://www.nws.noaa.gov/oh/hdsc/PMP_documents/HMR49.pdf 2 - NOAA Hydrometeorological Report No. 49 "Probable Maximum Precipitation Estimates, Colorado River and Great Basin Drainages," reprinted 1984, 176 pp.