

Memorandum

To: File

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From: Chris Garrett, SWCA

Date: February 18, 2015

Re: Review of Generic Groundwater Modeling Files from USGS

As part of coordination activities with other federal agencies between May and November 2014, various methods of analysis were discussed and reviewed that might be applicable to analyzing impacts to aquatic systems due to the Rosemont Copper project. Of specific concern were impacts from small amounts of drawdown on streamflow in Cienega Creek and Empire Gulch.

Dr. Stan Leake of the U.S. Geological Survey suggested using a simplified, generic groundwater model to help describe the theoretical relationship between drawdown in the aquifer and resulting changes in streamflow. On June 17, 2014, Dr. Leake provided several MODFLOW modeling files for review.

The following files were obtained and reviewed:

- GEN1.BA6. This is the basic package for the modeling run, describing a single layer model, with 151 rows and 51 columns, and 2 stress periods.
- GEN1.DIS. This is the discretization package for the modeling run, defining the top and bottom elevations of the model cells.
- GEN1.LPF. This is the layer property flow package for the modeling run, describing the hydraulic properties to use in the model.
- GEN1.LST. This is the listing file, describing output from a modeling run..
- GEN1.OC. This is the output control file for the modeling run.
- GEN1.PCG. This is the solver package for the modeling run.

- GEN1.STR. This is the streamflow package for the modeling run, describing the hydraulic and geometric properties for a stream traversing the model domain.
- GEN1.WEL. This is the well package for the modeling run, describing a single pumping well.