REVIEW OF PREDICTED IMPACTS TO AQUATIC HABITAT IN CIENEGA CREEK AND EMPIRE GULCH

Prepared for: Rosemont Copper Company

Prepared by: WestLand Resources, Inc.

Date: January 15, 2015

Project No.: 1049.66

The analyses presented by SWCA (2013), and included in the Final Environmental Impact Statement for the Rosemont Copper Project (the Project), attempted to translate predictions of groundwater drawdown as a result of the Project to effects on the aquatic habitat of Empire Gulch and Upper Cienega Creek. These analyses were interpreted by the U. S. Fish and Wildlife Services (USFWS) as evidence that there may be effects to aquatic species as a result of the Project that were not contemplated by the Final Biological Opinion (BiOp). The analyses presented by SWCA (2013) were subsequently used to justify, in part, USFWS' request for re-initiation of the Section 7 consultation for the Project. After review of SWCA (2013), it is clear that the results of this analysis are based in large part on erroneous assumptions, are highly speculative, and are not supported by the best available scientific data. It appears that SWCA (2013) was intended to present a "worst case" scenario for the purpose of the U.S. Forest Service's analysis of effects under the National Environmental Policy Act (NEPA) rather than effects that are reasonably certain to occur. Rosemont (2014a,b,c) provide a detailed discussion of the shortcomings of SWCA's (2013) analysis and indicate that the conclusions supplied by SWCA (2013) are too speculative to be useful in the Section 7 consultation for the Project (Rosemont 2014c is provided as ***Attachment A*** to this document).

New analyses completed after the publication of the Final BiOp indicate that the likely effects of groundwater drawdown on Upper Cienega Creek (Rosemont 2014a,b,c, SWCA 2014) and Empire Gulch (HydroLogic 2014, SWCA 2014) as a result of the Project are considerably less severe than the "worst case" scenario presented by SWCA (2013). Despite the erroneous assumptions and conceptual flaws in SWCA (2014), discussed by WestLand (2014a) (provided as ***Attachment B*** to this document), SWCA (2014) concludes that potential impacts to Upper Cienega Creek and Empire Gulch are anticipated to be considerably less severe than the results presented by SWCA (2013). Rosemont (2014a,b,c) use an alternative approach than that of SWCA (2013, 2014) to provide an estimate of the probability of Upper Cienega Creek drying over the next 1,026 years, and suggest that groundwater drawdown caused by the Project will have minimal effects to aquatic habitat. Criticisms by Myers (2014) of this approach are invalid and suggest a general misunderstanding of the statistics used by Rosemont (2014a,b,c) (WestLand 2014b provided as ***Attachment C*** to this document).

HUDBAY

January 28, 2015

Coronado National Forest
300 West Congress Street
Tucson, AZ 85701

Attn: Jim Upchurch, Forest Supervisor

Dear Mr. Upchurch:

In your letter dated January 16, 2015, you requested that Hudbay share any additional information with you that you should have in preparation of the SBA or SIR. Late last week, I was able to share water quality and water level data that we continue to collect as well as a link for Ranid (2012-2014) and Bat (2012-2013) survey reports for the years indicated. Your letter also requested we provide analysis of air emissions using updated emissions factors provided by Caterpillar which I shared earlier today.

After the meetings regarding hydrologic data and analysis in June 2014 and after reviewing additional information provided by some of the meeting attendees, Hudbay wanted to be sure that you had our technical analysis for your review during the SIR process. Attached you will find two memoranda that review the information presented and provide some critiques of the analysis for your consideration. Because some of the analysis (specifically the Powell document referenced) was provided to ADEQ during the 401 Certification process, I am providing a copy of this information to that department as well.

Please let me know if you have any questions regarding the information provided.

Sincerely,

Katherine Ann Arnold, P.E.
Director of Environment

Attachment: *WestLand Resources, Inc., Review of Predicted Impacts to Aquatic Habitat in Cienega Creek and Empire Gulch dated 15Jan2015*
Hydro-Logic, Review of Powell and others, 2014 report dated 27Jan2015

cc: Mindy Vogel, Coronado National Forest
Melissa Polm, SWCA
Linda Taunt, ADEQ

Doc. No. 009/15-15.3.1

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Powell et al. (2014) published new analyses of potential effects of groundwater drawdown along Lower Cienega Creek following the completion of the BiOp. These analyses, however, are affected by mathematical errors and inappropriate statistical modeling, as discussed by WestLand (2014c) (provided as ***Attachment D*** to this document). Despite these errors, the results of Powell et al. (2014) largely support the conclusions of previous analyses of potential effects to Lower Cienega Creek that were incorporated into the BiOp, including WestLand (2012). Criticisms by Myers (2014) and Powell et al. (2014) of some of the analyses supplied by WestLand (2012), on which the BiOp relies in part, contain misrepresentations of the data presented by WestLand (2012) and suggest a general misunderstanding of the statistical modeling used by WestLand (2014b,c).

The analyses presented in ***Attachments A-D*** indicate that information presented following the completion of the BiOp provides no new data to suggest that there are effects to listed species not contemplated by the BiOp that are reasonably certain to occur. To our knowledge, there is no new information that was generated by the Hydrology Working Group convened by the U.S. Forest Service that would reduce the high degree of uncertainty in the predictions of effects to species hundreds of years into the future or suggest that species or critical habitat will be affected in a manner or to an extent not considered in the BiOp.

Attachments:
- Attachment A. Revised Review of SWCA Model and an Alternative Approach to Inform the Effects of Groundwater Drawdown on Cienega Creek
- Attachment B. Review of SWCA (2014), "Refined Approach to Streamflow Predictions"
- Attachment C. Response to Myers (2014) "Review of Surface Water/Groundwater Relations Memoranda in the Cienega Creek Watershed"
- Attachment D. Review of Powell et al (2014): Impacts of the Rosemont Mine on Hydrology and Threatened and Endangered Species of Cienega Creek Natural Preserve, Pima County, Arizona,

LITERATURE CITED

Hydro-Logic, LLC. 2014. Simulated Empire Gulch Spring flow and stream flows based on the Tetra Tech (2010) groundwater flow model. Prepared for Rosemont Copper Company, June 27.

Myers, T. 2014. Review of Surface Water/Groundwater Relations Memoranda in the Cienega Creek Watershed. Reno, Nevada. June 25.

Powell, B., L. Orchard, J. Fonseca, and F. Postillion. 2014. Impacts of the Rosemont Mine on hydrology and threatened and endangered species of the Cienega Creek Natural Preserve. Pima County, Arizona, July 14, 2014.

Rosemont. 2014a. Review of SWCA Model and an Alternative Approach to inform the effects of groundwater drawdown on Cienega Creek. Prepared for Coronado National Forest. June 6, 2014.

_____. 2014b. Revised Review of SWCA Model and an Alternative Approach to inform the effects of groundwater drawdown on Cienega Creek. Prepared for Coronado National Forest. June 6, 2014 (revised June 27, 2014).

_____. 2014c. Revised Review of SWCA Model and an Alternative Approach to inform the effects of groundwater drawdown on Cienega Creek. Prepared for Coronado National Forest. June 6, 2014 (revised January 15, 2014).

SWCA, 2013. Review of Available Depth of Flow Information on Cienega Creek and Empire Gulch and Protocol for Estimating Impacts to Streamflow. SWCA Memorandum to File, by Chris Garrett. October 30, 2013.

_____. 2014. Refined Approach to Streamflow Predictions. SWCA Memorandum to File, by Chris Garrett. July 22, 2014.

WestLand Resources, Inc. (WestLand). 2012. Rosemont Copper Project: Potential Effects of the Rosemont Copper Project on Lower Cienega Creek. Report to Rosemont Copper Company, Tucson, Arizona.

WestLand 2014a. Review of SWCA (2014), “Refined Approach to Streamflow Predictions”. Prepared for Rosemont Copper Company. November

_____. 2014b. Response to Myers (2014), “Review of Surface Water/Groundwater Relations Memoranda in the Cienega Creek Watershed”. Prepared for Rosemont Copper Company. November.

_____. 2014c. Review of Powell et al. (2014), “Impacts of the Rosemont Mine on hydrology and threatened and endangered species of the Cienega Creek Natural Preserve. Pima County, Arizona, July 14, 2014”. November.

ATTACHMENT A

REVISED REVIEW OF SWCA MODEL AND AN ALTERNATIVE APPROACH TO INFORM THE EFFECTS OF GROUNDWATER DRAWDOWN ON CIENEGA CREEK

Prepared for: Coronado National Forest

Prepared by: Rosemont Copper Company

Date: June 6, 2014 (revised January 15, 2015)

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REVIEW OF SWCA (2014), "REFINED APPROACH TO STREAMFLOW PREDICTIONS"

Prepared for: Rosemont Copper Company

Prepared by: WestLand Resources, Inc.

Date: January 15, 2014

Project No.: 1049.66

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As part of the analyses presented in the Final Environmental Impact Statement (FEIS) for the Rosemont Copper Project (the Project), the U.S. Forest Service and their third-party contractor, SWCA, developed a model to estimate the impacts to surface water resources in Upper Cienega Creek and its tributaries resulting from the modeled groundwater drawdown associated with the Rosemont Project (SWCA 2013). In a review of the many assumptions associated with this model, Rosemont (2014a,b,c) demonstrate that these assumptions are not supported by the available data and are highly speculative. In fact, the results of SWCA (2013) are so sensitive to these assumptions that they are simply a consequence of those assumptions, and therefore largely uninformative in the analysis of the potential effects of the Project on Upper Cienega Creek. It appears that SWCA (2013) was intended to present a "worst case" scenario for

ATTACHMENT C

RESPONSE TO MYERS (2014), "REVIEW OF SURFACE WATER/GROUNDWATER RELATIONS MEMORANDA IN THE CIENEGA CREEK WATERSHED"

Prepared for: Rosemont Copper Company

Prepared by: WestLand Resources, Inc.

Date: January 15, 2015

Project No.: 1049.66

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REVIEW OF POWELL ET AL. (2014), "IMPACTS OF THE ROSEMONT MINE ON HYDROLOGY AND THREATENED AND ENDANGERED SPEICES OF CIENEGA CREEK NATURAL PRESERVE, PIMA COUNTY, ARIZONA, JULY 14, 2014"

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