ADEQ 401 Certification

According to the 401 certification (February 3, 2015), ADEQ's review is "limited to actual fill activities proposed in the section 404 application, as modified by the FEIS and ROD, that are being conducted within the OHWM and impacts, **as a direct result of these fill activities, on downstream waters, including Davidson Canyon and Cienega Creek**." ADEQ goes on to state, "As part of the certification process, ADEQ may impose controls, conditions or mitigation measures, **on indirect discharges that occur upstream of or to tributaries of an OAW to maintain and protect existing water quality in a downstream OAW."** p.2

According to ADEQ, the draft antidegradation procedures state that new or expanded discharges upstream of an OAW are prohibited where the proposed discharge would degrade existing water quality of the downstream OAW. p. 3

In addition to the analysis conducted to date regarding Tier 3 degradation, there are other key issues:

- **New Data** - Discharges of contaminants from the proposed Rosemont Mine will degrade the water quality of the OAW's in Davidson Canyon and Cienega Creek. New data from ongoing isotopic analyses of base flows in the Cienega Basin by researchers at U of A support the conclusion that base flow in Davidson Canyon is supported by deep, "old" groundwater originating from bedrock fractures in the mountain front aquifer. Contributions to base flow from this water source will be reduced due to groundwater drawdown and reversals from construction of the mining pit.
- **Assimilative Capacity will be significantly reduced** -
    - Heavy metals to receiving waters are additive arguing against the ability of the water to attenuate metals;
    - The project will reduce stormwater contributions to Davidson Canyon by 30-40%;
    - The analysis did not consider the known orthographic effects (i.e, higher rainfall at higher location where the mine will be located), therefore the contribution of water to the watershed is greater than estimated;
    - Groundwater drawdown from the pit will reduce baseflow reducing assimilative capacity;
    - A loss in the physical extent of waters in the OAW reduces assimilative capacity;

- **Distribution of Heavy Metals** - Research has shown in arid systems, characterized by large episodic stream flows, that heavy metals can be transported great distances downstream from mines;
    - Heavy metals such as dissolved silver can disassociate depending on environmental factors such as pH, temperature and harness and become bioavailable.
    - Mercury can convert to methyl mercury in an anoxic environment. The OAW at in Davidson Canyon supports wetlands characterized by hydric soils periodically devoid of oxygen.

- **ADEQ's evaluation of water quality data is incomplete** -

- ADEQ compared the predicted stormwater runoff from the mine to Barrel Canyon and did not use the data collected in 2014 from Davidson Canyon at the OAW;
- Predicted water quality runoff from waste rock and soil cover exceeds the water quality of Davidson Canyon for many constituents: total lead, dissolved lead, total mercury, dissolved mercury, total molybdenum, dissolved molybdenum, total selenium total sulfate, and total sodium. Degrading water quality is a violation of WQS;
- ADEQ did not address water quality exceedences with respect to runoff from soil cover;
- The 401certification decision only discusses dissolved silver as exceeding WQS in Barrel Canyon. 16 of the 18 lab samples were not used because the detection limits were above the WQS. Remaining samples were inappropriately averaged and weighted. Error in averaging and weighting samples is discussed below.
- ADEQ relied heavily on water hardness at receiving water to discount violations of WQS. Hardness was inappropriately averaged in the receiving water. Individual data shows harness ranging from 44 mg/l to 2800 mg/l based on a given sample date. Water hardness in Davidson Canyon was lower ranging from 120-300.
- Hardness is not considered when assessing total metals. WQS were also exceeded for some total metals;

- **Compliance point dam** will accumulate sediments with metals. The dam will be breached during higher stream flows that will deliver heavier concentrations of stored metals downstream.
- **Changes in the geomorphology** of Davidson Canyon will occur due to a 32.4% reduction in sediment delivery from the mine site. This will result in sediment scour and/or aggradation and with changes in TSS concentrations;
- **Surface Water Mitigation Plan** - The SWMP relies on voluntary monitoring which will not prevent the contamination of downstream waters;
  - The surface model used as a predictive tool to quantify changes in surface water runoff from the mine has not been developed; and
  - Rosemont Copper Company has not secured a reliable, verified water supply to mitigate reduction in surface flow caused by the mine.

EPA Analysis for your consideration:

Reduction in Sediment Delivery Will Cause Unacceptable Adverse Impacts to Waters in Barrel and Davidson Canyons and Lower Cienega Creek[1]

At post mine conditions, the Rosemont Mine project will reduce sediment delivery by 32.4% from the project site, and by approximately 4% at the Davidson Canyon outlet.[2] These estimates were made based on average annual sediment delivery. Contrary to the conclusions made by the USFS, reduction in sediment delivery to downstream waters will result in unacceptable adverse impacts to waters, including ONRWs.[3]

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[1] See Guidelines, Subpart B (40 CFR 230.11(c)).
[2] FEIS, Table 104 and DEIS, Table 87.
[3] FEIS, p. 466- 467. The USFS concluded no change in the geomorphology of the channel is expected to occur as a result of the proposed Rosemont mine. Their analysis evaluated average annual sediment delivery, underestimating

Polyakov *et al.* (2010) analyzed 34 years of precipitation, runoff, and sediment data from 8 watersheds in Arizona.[4] They found that runoff amount and runoff peak rate were the most important factor for explaining variation in sediment yield. Typical of ephemeral systems, large flows can move great quantities of sediment, and even smaller rainfall events can have notable contributions to sediment yield.[5] Material accumulated during drier periods is released downstream during large, infrequent storms.[6]

In addition, sediment is transported in suspension as well as bed load. Sediment may travel in suspension at steeper slopes (*e.g.,* Rosemont mine site) and as bed-load at shallower slopes downstream.[7] Levick *et. al.* (2008) states, *Ultimately, as headwater streams equilibrate to the new flow regime and their importance as a sediment source declines, channel entrenchment will likely shift further and further downstream. The cumulative effect of many entrenching channels is a significant increase in sediment load in downstream waters.*[8]

Reductions in sediment delivery from the Rosemont Mine will degrade water quality by geomorphologically altering the stream bed, creating soil scour in some downstream areas and aggradation in others. Total suspended sediment will be increased in surface water flows in some reaches. Aggradation and scour will result in the filling and scouring of pools and riffles used by fish and other aquatic organisms. Elevated levels of suspended sediment or moderate-to-high turbidity will likely have significant adverse effects on aquatic organisms in Davidson Canyon Wash and Cienega Creek.

It has been suggested by the USFS that the presence of downstream bedrock grade control structures will prevent streambed degradation, and sediment transport capacity of flowing water will be maintained despite construction of the Rosemont Mine.[9] Although grade control structures may limit the upstream propagation of down-cutting, they do not correct downstream degradation. Downstream flows will adjust to new equilibrium conditions by increasing sediment discharge downstream of the grade control structure, thus increasing channel scour. This condition currently exists at Pantano dam on Cienega Creek where, to date, there is ten feet of scour below the dam.

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sediment delivery during high intensity storm events, where runoff amounts and peak rates are key factors in sediment delivery. In addition, they did not use sediment transport models given the difficulty of applying models to ephemeral systems. The USFS' Patterson and Annandale (2012) technical memorandum made no reference to historic and recent flow data at the USGS gage data in Barrel Creek at time of survey nor did it include any survey of Davidson Canyon Wash during their two day observational field visit. See technical reports cited (Zeller 2010a, 2010b, 2012) and Technical Memorandum from Patterson and Annandale, Golder Associates, to Chris Garrett, SWCA Environmental Consultants, 2012.

[4] Polyakov, V.O., Nearing, M.A., Nichols, M.H, Scott, R.L., Stone, J.J., and McClaran, M.O., 2010. Long-term runoff and sediment yield from small semiarid watersheds in southern Arizona, Water Resource.Res. 46, W09512.

[5] Ibid.

[6] Ibid. Levick *et al.* 2008.

[7] Letter from C.H. Huckelberry, County Administrator to ADEQ dated April 4, 2014.

[8] Ibid, Levick *et al.* 2008. p. 34.

[9] FEIS, p. 466

Discharge of Contaminants From the Rosemont Mine Will Cause Unacceptable Adverse Impacts to Waters in Barrel and Davidson Canyons and Lower Cienega Creek[10]

Reduction in sediment transport, reduction in storm flow and the predicted runoff of mine contaminants from the proposed Rosemont Mine will degrade water quality resulting in significant degradation to downstream waters, including ONRWs.

The Rosemont Mine, covering over 4,750 acres, will convert headwater streams which currently serve as sources of freshwater dilution into sources of pollution. This pollution, in the form of heavy metals and other constituents, will run off the mine site and degrade the water quality of downstream waters. The USFS speculates that the contamination coming off the mine will attenuate as it travels downstream to Davidson Canyon ONRW, but this is not case. In fact, contaminated mine runoff is additive; increasing concentrations of heavy metals to existing downstream waters and worsening water quality. Concentrations of heavy metals will increase more so, with the diversion of 30-40% of the stormwater that normally flows off of the site during the life of the mine.

In the FEIS, the USFS stated that a screening-level analysis of runoff from waste rock indicated two constituents may be elevated in mine runoff at levels that could present antidegradation problems: total and dissolved molybdenum, and total and dissolved sulfate.[11] In the analysis of soil cover runoff, dissolved arsenic, dissolved iron, and dissolved sodium could present antidegradation problems.[12] Dissolved and total mercury is substantially higher than the water quality of downstream waters indicating a potential for degradation from stormwater interacting with soil cover.[13]

Based on our analysis of the water quality data, stormwater runoff from the mine's waste rock and soil cover contaminated with lead, mercury, molybdenum, selenium, silver, sodium and sulfate will degrade the water quality of Barrel Canyon, Davidson Canyon and Cienega Creek. As shown in Table 2, the water quality of predicted runoff from waste rock and soil cover exceeds the water quality of downstream waters. Mine runoff containing metals such as lead (dissolved) and mercury (dissolved and total) are predicted to be 1-2 orders of magnitude greater than the water quality of Davidson Canyon, an ONRW.[14]

EPA believes compliance point dams will exacerbate the unacceptable downstream water quality impacts. These dams will likely release contaminated runoff in concentrations exceeding predicted stormwater runoff water quality as shown in Table 2. Each dam would be approximately 6 feet tall and approximately 100-200 feet wide with a storage capacity of 2 acre-feet. The dam allows for the settling of sediment, detains stormwater temporarily and is the final onsite location where stormwater will be monitored.[15] During storm events, water that has been

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[10] See Guidelines, Subpart B (40 CFR 230.11(d)).
[11] FEIS, p. 549.
[12] Ibid.
[13] Ibid. Most waste rock samples contained mercury concentrations below detection limit and therefore were not incorporated into the analysis (the detection limit is higher than surface water standard). One legitimate sample had a very high concentration of mercury (0.03 mg/L).
[14] Runoff from heavy metals, including mercury runoff, is significantly underestimated due to averaging of test samples.
[15] FEIS, p. 46-47.

in contact with waste rock and soil cover, would be temporarily impounded and slowly released through the porous rock-fill dam. Large storm events may overtop or destroy the dam and proceed downstream.[16] It is anticipated that localized storm events will blow out these storage zones resulting in discharges of concentrated sediment and water-soluble metals contaminating downstream waters.

Studies analyzing the patterns of storage, transfer and sediment-associated metal dilution in arid systems reveal the presence of metal contaminants downstream of mine sites. Ciszewski (2001) discusses high magnitude flood events on metal contamination patterns in surface bottom sediments. Sediment associated metals accumulate in the river during periods of low discharge and are resuspended and transported during flood events especially during higher-magnitude floods where the risk of metal mobilization increases.[17] This study comports with Navarro *et al.* (2008) which found metal transfer from mines is strongly influenced by a semi-arid climate with heavy rainfall during short rainy seasons contributing largely to the dispersion of pollutants over an extensive area.[18]

Riverbank dessication and the lack of vegetation in ephemeral channels during the dry season make these areas vulnerable to oxidation and transport during the wet season. Remobilization of metals within slack water channel environments via evaporation or during seasonal flooding presents a potential risk to remnant aquatic biota that utilize this aquatic resource.[19]

Heavy metals can cause significant harm to human health and the environment. Heavy metal contamination from the mine is persistent, impairs aquatic life use, and cannot be easily mitigated or removed from stream channels. In particular, a heavy metal such as mercury, can bioaccumulate, biomagnify in aquatic food chains causing significant toxicity in the aquatic environment.[20,21] Mobilization of mercury in an aqueous phase can be influenced by many processes primarily precipitation and dissolution of solids, complex formation and redox reactions. In semi-arid environments, dissolution of mercury and metal-sulfate salts results in their transport during episodic high intensity storm events. According to Navarro *et al.* (2008), this is likely the case for other heavy metals such as iron, lead and zinc.[22]

Uptake of selenium by biota causes toxicity in aquatic organisms. Several studies have concluded that selenium expresses its' toxicity in mammals, birds and fish primarily through the food chain, with bioaccumulation of selenium in aquatic plants and invertebrates leading to toxicological

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[16] Ibid.
[17] Ciszewski, D., 2001. Flood-related changes in heavy metal concentrations within sediments of the Biala Przemsza River. Geomorphology 40: 205-218.
[18] Navarro, M.C., Perez-Sirvent, C., Martinex-Sanchez, M.J., Vidal, J., Tovar, P.J., Bech, J., 2008. Abandoned mine sites as a source of contamination by heavy metal: a case study in a semi-arid zone. Journal of Geochemical Exploration 96:183-193.
[19] Taylor, M.P., Hudson-Edwards, K.A., 2008. The dispersal and storage of sediment-associated metals in an arid river system: The Leichhardt River, Mount Isa, Queensland, Australia. Environmental Pollution 152:193-204.
[20] Navarro, A., 2008. Review of characteristics of mercury speciation and mobility from areas of mercury mining in semi-arid environments. Rev. Environ Sci Biotechnol pp. 287-306.
[21] U.S. Environmental Protection Agency. 1997. Mercury study report to Congress: An ecological assessment for anthropogenic mercury emissions in the United States. Vol. 6. EPA-452/R-97-008. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards and Office of Research and Development. December.
[22] Ibid. Navarro *et al.* 2008.

impact and change in aquatic communities.[23] Maier *et al.* (1998) as cited in Hamilton (2004) found that short pulse precipitation events can quickly load selenium into an aquatic environment where it can remain in the ecosystem.[24]

Downstream contamination of surface waters underestimated. We believe impacts to downstream water quality resulting from the Rosemont Mine will be greater than estimated by USFS. Although Rosemont Copper Company proposes a number of design and mitigation measures to try to prevent release of mine influenced waters, the hydrological and geochemical analysis presented by the USFS underestimates the level of contamination to downstream waters including ONRWs, if the Rosemont Mine is constructed:[25,26]

- ***Infiltration and seepage***. While the mine is designed to retain runoff from the tailings facility, uncertainty remains regarding seepage of contaminants to downstream waters from both the tailings facility and the waste rock storage area. A technical review of the infiltration and seepage models by SRK Consulting found that estimates of infiltration and seepage in dry stack tailings facility have the potential to be underestimated annually or seasonally owing to the use of <u>average daily precipitation</u> in the model given that rain occurs year round with greater daily amounts during the winter months and late summer "monsoon" season.[27,28] In addition, SRK Consulting states, *SRK's experience shows that field construction errors are another source of seepage that is greater than expected or modeled* (pp. 2-4). A study by Kempton and Atkins (2000) found evaporation in unvegetated rock slows dramatically as the surface dries and only the top few centimeters in waste rock or pit benches are dry enough to slow oxidation.[29] Given that sulfide

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[23] Hamilton, S., 2004. Review of selenium toxicity in the aquatic food chain. Science of the Total Environment 326: 1-31.

[24] Ibid.

[25] A study on the predicted and actual water quality of 25 hard rock mines found 24% exhibited inadequacies in hydrologic characterization, 44% in geochemical characterization, 64% exhibited failures in mitigation (16% of the mines had ineffective waste rock mixing and segregation). Kuipers, J.R. Maest, A.S., MacHardy, K.A., Lawson, G. 2006. Comparison of Predicted and Actual Water Quality at Hardrock Mines: The reliability of predictions in Environmental Impact Statements.

[26] A 2012 study on 14 of 16 currently operating U.S. copper mines found 100% experienced pipeline spills or accidental releases, 92% had water collection and treatment systems fail, 28% had partial tailings impoundment failures and 64% had tailing spills. U.S. Copper Porphyry Mines: The track record of water quality impacts resulting from pipeline spills, tailings failures and water collection and treatment failures. Gestring. B. Earthworks. July 2012.

[27] SRK Consulting. Hoag, P.G., M. Sieber, J. Rasmussen. Memo to Chris Garrett, SWCA dated July 18, 2012. Rosemont Copper DEIS – Response to EPA Geochemistry Comments – Final.

[28] In a June 2012 Infiltration, Seepage, Fate and Transport Modeling Report by Tetra Tech, additional seepage and infiltration models were developed. In this analysis, average climate conditions were still used for the dry stack tailings facility. For the waste rock storage area, daily measured climate conditions utilizing rainfall data at the University of Arizona (UA) Tucson Meteorological Station (2,440' elevation) were used in the model. At a higher elevation of 5,350', the Rosemont Mine is susceptible to greater rainfall amounts and intensity due to the orthographic effects. Therefore, the UA daily climate measurements are not comparable. Pima County Regional Flood Control District (PCRFCD) found the storm water analysis unacceptable and provides detailed comments on the problems associated with using precipitation values not representative of the site (letter to ADEQ from PCRFCD dated February 2, 2012 regarding the Draft Aquifer Protection Permit).

[29] Kempton, H., Atkins, D., 2000. Delayed environmental impacts from mining in semi-arid environments. In Proceedings from the Fifth International Conference on Acid Rock Drainage 2:1299-1308. May 20-24, Denver, Colorado. Published by Society for Mining, Metallurgy, and Exploration, Inc.

oxidation in waste rock is typically limited by oxygen transport and higher moisture content reduces the diffusivity of oxygen, it is suggested that sulfide oxidation rates in mine waste may be faster in dryer climates than in wet.[30]

- ***Averaging of waste rock types and sample results.*** Samples analyzing mine runoff were averaged by waste rock type and weighted based on the percentage of each waste rock type to be present in the waste rock facility. These values do not reflect the upper and lower bounds of metal concentrations that would occur in runoff from the mine site.[31] For example, according to the FEIS, predicted waste rock runoff for copper is 0.0085 mg/L, yet individual samples range from ND – 0.3 mg/L. Davidson Canyon stormwater water quality for copper ranges from 0.0029-0.017 mg/L. Therefore, some samples were over 17x greater than the highest concentration found in Davidson Canyon. In addition, the weighted average represents the mine over the entire life. However, a storm event resulting in significant runoff can occur at any given time throughout the project life. Depending upon what waste rock material is exposed in the waste rock pile, or other disturbed areas at the time of such an event, runoff water quality would be reflective of the rock types exposed, rather than the overall weighted average within the pit. Therefore, degradation of water quality downstream of the mine has the potential to be significantly greater than is presented in the FEIS and SIR for any given storm event.[32,33]
- ***Ability to segregate waste rock.*** Rosemont Mine is proposing to segregate waste rock to mitigate the exceedance of the water quality standard for silver. There is great uncertainty in the ability to effectively segregate waste rock, particularly singular constituents. It is often dependent on whether the constituent is distinct (*i.e.,* clear boundaries) in the waste rock and whether the operator, based on methodology, is effective and committed to segregation.[34]
- ***Assumption that attenuation reduce downstream contamination***. The USFS predicted the water quality of mine runoff would be attenuated based on: 1) the assumption that the mine area covers 14% of the watershed; and 2) the remaining undisturbed portion of the watershed would attenuate contaminants contained in mine influenced runoff before reaching downstream ONRWs. These assumptions are incorrect. The impacts of the mine are not proportional to the catchment area. In addition, the analysis leading to this assumption does not take into account the spatial and temporal nature of precipitation in the region or the additive effect of mine pollutants in downstream waters.[35]

The Rosemont Mine Will Result in a Violation of Water Quality Standards in Barrel and Davidson Canyons and Lower Cienega Creek, Including the ONRWs

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[30] Ibid.
[31] Draft Memorandum Revised Analysis of Surface Water. Chris Garrett, SWCA. August 25, 2013 http://www.rosemonteis.us/files/references/045677.pdf
[32] FEIS, p. 472. For both the SPLP and MWMP samples analyzed, there were instances where laboratory detection limits were greater than the surface water quality standard (*e.g.*, silver).
[33]*The result is that actual water quality is literally always different than predicted, with the general expectation that it is generally consistent.* Mark A. Williamson, PhD, Geochemical Solutions, LLC to Kathy Arnold, Rosemont Copper Company dated December 23, 2011. *Perspectives on Uncertainty in Water Quality Predictions.*
[34] SIR, p. 34.
[35] SIR, p. 135.

EPA has determined that contamination from the Rosemont Mine will lower existing water quality in Davidson Canyon and Cienega Creek ONRWs. Designated as Tier 3 waters, lowering of water quality is prohibited and therefore in violation of State Water Quality Standards.[36] Violation of water quality standards is also prohibited under EPA's Guidelines (40 CFR 230.10(b)). EPA has discussed the analysis of the Rosemont Mine's impact on water quality with the Corps and ADEQ since 2012, concluding the state's CWA §401 certification lacks sufficient specific preventative actions to safeguard the water quality of Tier 3 waters in the Cienega Creek watershed.[37] We recognize there are water quality aspects which may be outside the scope of the state's §401 review. These aspects must be considered in determining compliance with the Guidelines. In Mingo Logan v. EPA, the court ruled that under 401, *the CWA has identified state requirements as a floor that must be met, not a limit on federal authority*.[38] The ruling goes on to state there is nothing in the statute that forecloses EPA from imposing stricter requirements than those required by the state standards.[39]

Our determination of significant degradation to the existing water quality of the ONRWs is based upon the following considerations:

- Change in ambient concentrations predicted at the appropriate critical flow condition(s);
- Change in pollutant loadings;
- Reduction in available assimilative capacity;
- Nature, persistence and potential effects; and
- Potential for cumulative effects.

As shown in Table 2, mine runoff consisting of heavy metals such as mercury, lead, molybedenum, selenium and silver as well as sulfate will be released in concentrations exceeding the stormwater quality for Davidson Canyon ONRW. These heavy metals and other constituents will be transported downstream through stormwater and lower the water quality of Davidson Canyon and Cienega Creek in violation of water quality standards.[40] Changes in stream hydrogeomorphology from the mine will result in increases in total dissolved solids, suspended sediments, lowering of oxygen and increases in temperature from declining pool levels resulting lower water quality in lower Cienega Creek, in violation of water quality standards.[41] In the

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[36] Federal antidegradation policy prohibits any degradation of Tier 3 waters, regardless of economic or social development needs (40 CFR 131.2(a)). Arizona's antidegradation rules reinforce this prohibition (ACC R118-11-107). Minor, short-term impacts are considered if they do not interfere with the character of the ONRW. The temporary exception is limited to an impact of 6 months or less. If constructed, the Rosemont Mine will cause persistent, permanent significant impact to the biological, chemical and physical integrity of the ONRWs.

[37] ADEQ issued the §401 CWA certification to Hudbay on February 3, 2015. See EPA letter to ADEQ dated April 7, 2014 and EPA letter to the Corps dated April 14, 2015 regarding the mine's ability to comply with §401 CWA.

[38] Mingo Logan Coal Company v. U.S. Environmental Protection Agency. Memorandum Opinion, U.S. District Court for the District of Columbia. September 30, 2014. p. 56.

[39] This ruling is consistent with the August 15, 1979 legal opinion of the Office of General Counsel on the designation and protection of ONRW. They concluded, "if a State voluntarily designates an ONRW, EPA can take whatever action is necessary (against point sources) to protect the ONRW."

[40] Designated uses in the OAW section for Davidson Canyon include Aquatic and Wildlife (ephemeral) and Partial Body Contact. The designated uses in the OAW section for lower Cienega Creek are Aquatic and Wildlife (warm water) and Partial Body Contact. http://www.azdeq.gov/environ/water/standards/download/SWQ_Standards-1-09-unofficial.pdf

[41] The Arizona Water Quality Standards narrative biological criteria (WQS) (R118-11-108) for lower Cienega Creek is: A wadeable, perennial stream shall support and maintain a community of organisms having a taxa

amended Biological Opinion, the FWS analyzed the effect of the Rosemont Mine on water quality examining the significant relationship between reductions in stream flow, increases in temperature, and decreases in dissolved oxygen. The FWS concluded that reduced stream flow in lower Cienega Creek, *will increase the incidence of poorer water quality that adversely affects aquatic life in Pima County, CCNP.*[42]

Accordingly, Section 131.12(a)(1) of the antidegradation policy is not satisfied with regard to fills in wetlands or other waters if the discharge results in "significant degradation" to the aquatic ecosystem as defined under Section 230.10(c) of the 404(b)(1) Guidelines.[43]

Mitigation Proposed for the Rosemont Mine Will not Prevent Water Quality Degradation of ONRWs

The State's Certification relies on a requirement for Rosemont Mine to develop a Surface Water Mitigation Plan (SWMP).[44] The SWMP lacks detailed measures demonstrating Rosemont Mine's ability to arrest and reverse the heavy metal contamination in stormwater which will degrade downstream water quality. In summary:

- The SWMP relies on voluntary monitoring which will not prevent the contamination of downstream waters;
- The surface model used as a predictive tool to quantify changes in surface water runoff from the mine has not been developed; and
- Rosemont Copper Company has not demonstrated a measurable water supply and delivery to mitigate reduction in surface flow caused by the mine.[45]

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richness, species composition, tolerance, and functional organization comparable to that of a stream with reference conditions in Arizona. ADEQ doesn't have a temperature WQS, but temperature is a pollutant and the designated use of A&Ww must be protected. Raising a temperature to a level that harms the organisms in the waterbody would be in violation of the standard.

[42] Amended Biological Opinion dated April 28, 2016. p. 48.

[43]See. Questions and Answers on: Antidegradation, Question #13, EPA, Office of Water Regulations and Standards, August 1985.

[44] CWA§401 Certification, Specific Condition dated February 3, 2015, #1, p. 6

[45] See EPA letter to the Corps dated April 14, 2015. A predictive tool is highly questionable given the asynchronous nature of precipitation in the semi-arid region and in consideration of climate change and drought.