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April 4, 2014

Sent via email to:
Rosemont401comments@azdeq.gov

Mr. Robert Scalamera
Project Manager
Arizona Department of Environmental Quality
Surface Water Section
1110 W. Washington Street
MC5415A-1
Phoenix, Arizona 85007

Re: Comments of the Arizona Game and Fish Department re: *Draft CWA Section Conditional State Water Quality 401 Certification for a USACE CWA 404 Individual Permit to Ms. Katherine Arnold, Rosemont Copper Company*, Public Notice/ACOE Application No. SPL-2008-00816-MB; ADEQ LTF No. 55425; 401 cert reading file rs314:005.

Dear Mr. Scalamera:

The Arizona Game and Fish Department (Department) welcomes this opportunity to submit comments to the above-described *Draft 401 Certification*. The Department submits these comments in connection with its statutory responsibilities for the protection and management of Arizona wildlife and wildlife habitat.

Comment No. 1. The *Draft 401 Certification*, Section 1.0, Authorization, certifies that the activities proposed for the Rosemont Copper Project will not violate applicable surface water quality standards in the subject waterbodies including McCleary, Scholefield, Wasp and Barrel canyons - all ephemeral tributaries to Davidson Canyon in the Santa Cruz watershed, near Greaterville, Pima County."

The final *401 Certification* should also certify that the activities proposed for the Rosemont Copper Project will not violate the applicable numeric and narrative surface water quality standards for lower Davidson Canyon and Cienega Creek Outstanding Arizona Waters (OAWs).

Comment No. 2. *Draft Certification* Section 2.0, Description of Activities Being Certified, refers to the ACOE Public Notice/Application No. SPL-2008-00816-MB for the Rosemont Copper Company.

It is not clear what activities are or are not being certified in this *Draft Certification*. ACOE Public Notice/Application No. SPL-2008-00816-MB describes heap leaching of oxide ore. The Coronado NF and Rosemont Copper has since abandoned the concept of mine-for-leach for the Rosemont Copper Project. The ACOE Notice also describes flow-through drains for the Dry Stack and waste rock facilities, which have been abandoned in favor of stormwater diversion channels. The statement in *Draft Certification* Section 2.0, "Changes have been made to the project design during the development of the Final Environmental Impact Statement that modified certain activities proposed in this Public Notice" is confusing.

Given the substantial mine design modifications made since the Corps of Engineers issued its Public Notice, the final 401 Certification should be clear and specific in describing the activities being certified, especially in view of the fact that the 401 Water Quality Certification is to be posted at the mine construction site for review by, and guidance to Rosemont contractors and subcontractors.

Comment No. 3. *Draft Certification* Section 2.0, Description of Activities Being Certified, states that the proposed Copper project will directly impact approximately 38.6 acres of Waters of the United States with the discharge of dredged/fill material as described in the Corps of Engineers Public Notice.

The Corps of Engineers has since revised its analysis, and estimates that the Rosemont Copper Project will impact 68.8 acres of Waters of the United States.

Comment No. 4. *Draft Certification* Section 3.0, Information Reviewed by ADEQ, refers to lower Davidson Canyon as a Unique Water, but not Cienega Creek.

The *Draft Certification* Section 3.0 should include a reference to ADEQ's designation of Cienega Creek as an Outstanding Arizona Water.

Comment No. 5. The *Draft Certification* at Section 3.0.2 states that ADEQ's review of Applicant's 401 certification was suspended on January 25, 2012, "pending completion of a federal action" and reinitiated on January 3, 2014 following the publication of the draft Record of Decision for the Project by the USDA Forest Service, Southwest Region.

Federal action by the Forest Service is not "complete" until the Forest Service predecisional objection process pursuant to 36 CFR 218 has been completed and a final ROD issued by the Coronado NF Responsible Official. The Forest Service Reviewing Officer is currently reviewing public Objections to the Rosemont Copper Project FEIS and Draft ROD, and will issue a decision by April 30, 2014.

The ADEQ CWA 401 Certification should be issued after the Forest Service Responsible Official signs the final ROD for the Rosemont Copper Project.

Comment No. 6. The Department appreciates the *Specific Conditions* contained in Section 5.2 of the *Draft Certification,* including *Specific Condition 5.2*, which requires Applicant to submit

to ADEQ within 180 days of the effective date of the ACOE 404 permit a state surface water mitigation program designed to maintain aquatic and riparian resources at pre-project levels in Davidson Canyon and Lower Cienega Creek in order to offset predicted reductions in post-closure stormwater runoff volume as a result of permitted mine activities.

ADEQ's *Basis for State 401 Certification Decision* explains that this surface water mitigation program, which is to be designed to "maintain aquatic and available water resources at pre-project levels in the OAW portion of Davidson Canyon to its confluence with Cienega Creek" could include a variety of strategies such as purchasing, retiring, severing and transferring of water rights on Lower Davidson Canyon; delivery of CAP water or other available water resources, and drilling wells.

The Department offers the following recommendations:

(1) The final 401 Certification should clarify that the State surface water mitigation program is to involve strategies/mitigations <u>in addition to</u> those mitigations to be required by the Corps of Engineers in connection with a CWA 404 permit; the Forest Service in connection with its Record of Decision and Mine Plan of Operations; and by the U.S. Fish and Wildlife Service in connection with any Terms and Conditions of its Biological Opinion.

(2) The schedule for implementation of the State surface water mitigation program should require Applicant to commence and substantially complete all State surface water mitigation strategies during the first (5) five years of active mining, instead of commencing or implementing the mitigations at mine closure or post-closure.

(3) The Department and key stakeholders should be consulted in the development of the State surface water mitigation program.

(4) The final 401 Certification should describe how ADEQ will monitor and enforce compliance with this program.

Comment No. 7. *Draft Certification Specific Condition* 5.2 states that "[s]hould the results of [Forest Service] required monitoring and/or revised hydrogeologic modeling (FEIS Mitigation Measures FS-BR-22, FS-BR-27, FS-GW-02, FS-SR-05) indicate that water quality in Davidson Canyon or Lower Cienega Creek is adversely affected by the activities certified herein, ADEQ may request that the COE suspend the CWA Permit and require additional mitigation.".

The Department is concerned that data are lacking for current, pre-mine baseline water quality conditions in lower Davidson Canyon, and in Cienega Creek above and below the confluence with Davidson Canyon. Specifically:

(1) Adequate baseline data in Davidson Canyon and Cienega Creek does not exist for all constituents which must be monitored by Applicant. These constituents are described in Table 8 of the *Davidson Canyon Conceptual Surface-Water Monitoring Plan* (Water & Earth Technologies, Inc. March 2012).

(2) Rosemont has sampled pre-mine stormwater runoff in Barrel, Wasp and Scholefield canyons (Table 3) and has taken a few samples in Lower Cienega Creek. Water & Earth Technologies reports that no water quality monitoring data in Davidson Canyon are found in the ADEQ water quality data repository STORETS database. Report at 5.

(3) The FEIS states that the lack of stormwater samples in Davidson Canyon or Cienega Creek prevents a comparison of modelled mine waste rock runoff to existing water quality in Davidson Canyon and Cienega Creek. FEIS at 548-9.

ADEQ's *Basis for State 401 Certification Decision* at 4 notes that "there is an overall limited amount of water quality data to perform an antidegradation review on a pollutant by pollutant basis on the OAW streams." What data are available, according to the *Draft Certification*, reflects that water quality in both Davidson Canyon and Cienega Creek meets surface water standards.

Baseline data of water quality for all mining constituents of concern is essential in order to determine if mine activities are causing or contributing to exceedances of Arizona surface water quality standards in the OAWs.

ADEQ should require Applicant to collect baseline water quality data for the OAW reaches of Davidson Canyon and Cienega Creek above and below the confluence of Davidson Canyon for all analytes and parameters listed in in Table 8 of the *Davidson Canyon Conceptual Surface Water Monitoring Plan*. As noted in the ADEQ's handbook, "Antidegradation Implementation Procedures" (Draft, April 2008) at 4-1 and 4-3, baseline water quality "is the yardstick against which degradation is measured during all future antidegradation reviews in the [water] segment" and is required for discharges to Outstanding Arizona Waters.

Comment No. 8. The *Basis for State 401 Certification Decision at* 4 states that ADEQ finds "little potential" for exceedances of surface water quality standards in mine runoff to receiving waters based, *inter alia*, 'the results of laboratory testing."

The laboratory testing conducted by Applicant of dry stack tailings and waste rock samples were conducted with reference to aquifer water quality standards, not surface water quality standards. As a result, for certain constituents the laboratory's method detection limits (MDLs) exceed the strictest applicable numeric standards applicable for all designated uses in ephemeral tributaries and OAWs Davidson Canyon or Cienega Creek. This compromises the data set and limits any conclusions that may be reached about the impacts of tailings and waste rock runoff on downstream surface water quality.

The Coronado National Forest-commissioned peer-review Technical Memorandum by SRK Consulting (*Technical Review of Infiltration, Seepage, Fate and Transport Modeling Report-Revision 1, Part 2, Geochemical Fate and Transport Modeling)*, recommended that additional comparisons of waste rock and dry stack tailings seepage be made against relevant surface water quality standards and wildlife water quality standards. The Department made the same

recommendation to the Coronado National Forest in its Comments to the Draft FEIS as far back as January 2012. This analysis was not done by Applicant.

The Department is concerned that this *Draft Certification* is based on "limited data collected to date." An applicant seeking authorization for a regulated discharge to a tributary to, or upstream of, an OAW is required to demonstrate in a permit application or in other documentation submitted to ADEQ that the regulated discharge will not degrade existing water quality in the downstream OAW. AAC R18-11-107C.

Applicant should be required to model constituents in dry stack tailings and waste rock in comparison to Arizona surface water quality standards for the most stringent designated uses for Barrel Canyon, Davidson Canyon and Cienega Creek in order to show that any potential changes in OAW water quality are short-term and temporary in nature.

If ADEQ lacks the authority under A.R.S. § 49-202(G) to require the Applicant to conduct this analysis, the Department recommends that ADEQ conduct a full antidegradation review for all constituents in dry stack tailings and waste rock and soil cover based on the studies and analyses conducted in connection with the FEIS (*see* Comments below).

Comment No. 9. *Draft Certification, Specific Conditions at Section 5.2.6* requires that dredge or fill material shall not discharge (via leaching or runoff) harmful or toxic substances into stream or wetlands. The *Basis for State 401 Certification Decision* at 5 states that seepage is not expected to occur from the tailings facility.

The FEIS at 367 claims that seepage from the project tailings will be captured by the mine pit lake. But according to Applicant's *Dry Stack Tailings Storage Facility Final Design Report Section 6.0* (AMEC 2009), the majority of the entrained seepage from the dry stack tailings will <u>not</u> be captured by the mine pit, but will flow down-gradient following groundwater pathways into the Barrel Canyon drainage for 500 years. This analysis is confirmed in *Technical Memorandum, Rosemont Area-Wide Fate and Transport and DIA Assessment* (Tetra Tech 2010) which reported the results of particle tracking to determine the extent of the pit-lake capture zone and the potential for uncaptured drain-down seepage to flow down-gradient. The *Technical Memorandum* at 5-6 concludes that 74% of the Dry Stack Tailings Facility is outside the predicted pit capture zone, and uncaptured drain-down seepage is expected to recharge the aquifer and "[has] the potential to impact down-gradient groundwater quality" for 500 years. *Technical Memorandum* at 7.

The *Technical Memorandum* at 7 further summarizes the expected water quality from dry stack tailings drain-down in Table 4, which reflects concentrations of magnesium, sulfates, total dissolved solids, molybdenum and selenium in the dry stack tailings drain-down in excess of background groundwater levels.

Figure 6-2 of the *Regional Groundwater Flow Model, Rosemont Copper Project* (Tetra Tech, 2010b) shows the groundwater flow from the dry stack tailing facility is eastward along Barrel Canyon into the Davidson Canyon drainage. The tailings seepage equals approximately 13 acre-feet a year. FEIS at 380.

The model grid for the dry stack tailings seepage fate and transport analysis conducted by Applicant in *Infiltration, Seepage, Fate and Transport Modeling Report, Revision 2* was limited to the configuration of the dry stack tailings facility and did not extend off-site.

The FEIS text in *Seeps, Springs and Riparian Areas* text at 473 further states that in the event tailings seepage were to appear in Barrel Canyon, applicable surface water quality standards for dissolved silver, dissolved cadmium, total and dissolved lead, dissolved mercury, and total selenium would be exceeded. These heavy metals pose risks to wildlife, and in the case of selenium, bioaccumulates in the wildlife food chain.

The Department respectfully recommends a full antidegradation review for all mine-related constituents in the Dry Stack tailings leachate against applicable numeric surface water quality standards and the most stringent standard for designated uses in Barrel and Davidson canyons and Cienega Creek. A full review is warranted where the potential for degradation from a single discharge over time exists. "Antidegradation Implementation Procedures" at 3-15. This analysis should include estimated reductions of the available assimilative capacity of the OAWs under long-term drawdown and drought conditions.

The *Certification* should impose additional controls, conditions or mitigation measures to prevent dry stack tailings seepage from migrating offsite. Because the estimated drain-down rate for the dry stack tailings facility is 500 years, the mitigation measures should include provisions for long-term funding or management of this predicted leachate plume. There is no provision in the FEIS or the APP for long-term post-closure monitoring or corrective actions by Applicant.

Comment No. 10. The *Draft Certification* does not appear to address the potential for mine discharges to affect surface water narrative standards for OAWs Davidson Canyon and Cienega Creek.

A.A.C. R18-11-108(A) states that a surface water shall not contain pollutants in amounts or combinations that: (1) settle to form bottom deposits that inhibit the habitation, growth, or propagation of aquatic life; (5) are toxic to humans, animals, plants or other organisms; (6) cause the growth of algae; . . . (8) change the color of the surface water from natural background levels.

A.A.C. R18-11-108(E) requires that a wadeable, perennial stream shall support and maintain a community of organisms having a taxa richness, species composition, tolerance, and functional organization comparable to that of a stream with reference conditions in Arizona.

The *Technical Memorandum, Rosemont Area-Wide Fate and Transport and DIA Assessment* (Tetra Tech 2010), Table 4, prepared in connection with the FEIS, projects concentrations of sulfates leaching from the dry stack tailings facility up to 559 mg/l and total dissolved solids at 810 mg/l, compared to the 400 mg/l background concentrations.

AACR 18-11-107.01.C.4 states that a discharge regulated under a § 404 permit that may affect existing water quality of an OAW requires an individual § 401 water quality certification to

ensure that existing water quality is maintained and protected and any water quality impacts are temporary.

ADEQ should conduct a Tier 3 antidegradation review of all predicted mine hazardous substances and pollutants as against both narrative and numeric standards for downstream OAWs. The dry stack tailings will discharge sulfates, TDS, and possibly other mine metals, into the Barrel Canyon drainage for 500 years.

Comment No. 11. The FEIS, relied upon by ADEQ in its *Draft Certification*, contains contradictory conclusions of the potential effects of mine constituents in modelled waste rock runoff on surface water quality of downstream OAWs.

The FEIS, Chapter 3 at 553 in the FEIS states that ". . . the only potential effect on the Outstanding Arizona Waters in Lower Davidson Canyon and Lower Cienega Creek would be the result of a decrease in [stormwater] runoff . . ." Table 108 at 511 states that "some constituents may be elevated in stormwater . . . [o]therwise, no predicted changes that would affect Outstanding Arizona Waters or biological characteristics under wadeable, perennial standards".

These statements are contradicted by the FEIS, Chapter 3 at 549 which states that runoff from mine waste rock and soil cover is predicted to contain elevated levels of dissolved arsenic, iron, total and dissolved mercury, molybdenum, aluminum, selenium and total and dissolved sulfates and "could present antidegradation problems". The Draft ROD at 22 states that the analysis suggests that several constituents, including sulfates, molybdenum, arsenic, sodium, and mercury may be elevated in mine stormwater under all action alternatives for Lower Davidson Canyon and Cienega Creek.

Coronado National Forest Service consultant SWCA, in *Draft Memorandum, Revised Analysis of Surface Water Quality* (SWCA, August 25, 2013) (*SWCA 2013k*), attempted to conduct a screening level analysis of predicted waste rock mine runoff on existing water quality in the OAWs by applying half the laboratory detection limit against the ephemeral water quality standards in Barrel Canyon. *SWCA 2013k* concluded as a result of its screening analysis that arsenic, dissolved and total mercury, iron, dissolved selenium, molybdenum, sulfates and sodium in mine waste rock runoff and waste rock soil cover runoff is "predicted to degrade, or significantly degrade" water quality in the OAWs under a mine scenario. *SWCA 2013k* Table 6.

Cienega Creek is habitat for several riparian-dependent federally-listed and sensitive species, including the Gila chub, Gila topminnow, Longfin dace, Lowland leopard frog, and Northern Mexican gartersnake.

A full Tier 3 antidegradation review is warranted for the constituents *SWCA 2013k* predicts will degrade surface water quality of downstream OAWs.

Comment No. 12. With the abandonment by Rosemont Copper of mine-for-leach, 65 million tons of productive copper-bearing oxide ore now becomes waste rock.

SWCA 2013k reviewed the waste rock characterization Rosemont conducted for its Aquifer Protection Permit, and found copper leachate exceedances above the AW&We-acute surface water standard for Barrel Canyon in three waste rock types: arkose, bolsa and QMP limestone. SWCA 2013k at 3 and Tables 2 and 3 (Summary of Synthetic Precipitation Leaching Procedure results for waste rock samples).

Arkose waste rock contains copper oxide and is the largest component of the waste rock at the proposed Rosemont Mine. More than one-half of the waste materials consist of weathered (oxidized) and fresh (unoxidized) arkose. Mineralized oxide arkose comprises 521,476 kilotons of the waste rock, or 44.38% of the total waste rock at the site. FEIS, at 156, 166 and Table 70 at 375.

A Tier 3 antidegradation review would assist in determining whether copper-oxide bearing waste rock poses a risk to protected uses in Barrel Canyon, Davidson Canyon and Cienega Creek, which is federally-designated critical habitat for the endangered Gila chub. FEIS at 632. Copper mobilized in water is highly toxic to wildlife.

If the Arkose, Bolsa or QMP reflect the potential to leach copper, ADEQ should add as a Specific Condition a requirement that this rock be segregated and encapsulated to avoid stormwater contact.

Comment No. 13. The *Draft Certification* relies on the use of proper stormwater control measures for its finding that the proposed activities will have "no impact on the downstream OAWs". *Basis for State 401 Certification Decision* at 4.

The text of the *Draft Certification at 6* notes that to control runoff from the waste rock and dry stack tailings facilities, "Rosemont will employ sediment control structures to temporarily capture stormwater for the purpose of slowing velocities, reducing total suspended sediments, and serve as a location for sample collection for monitoring purposes, prior to releasing flows downstream".

Draft Certification, Specific Conditions at Section 5.2.12 requires "[r]etention/detention basins shall be sized to accept stormwater runoff and capture sediment prior to it entering any [Waters of the United States].

This *Specific Condition* is similar to Forest Service Mitigation Measure OA-SW-01, which requires the detention and testing of stormwater quality "prior to flowing downstream" to "address uncertainty associated with impacts to Outstanding Arizona Waters" and to reduce impacts to Gila chub and Gila topminnow.

The mine sediment control basins and compliance point dam are not designed to control all stormwater runoff from the minesite, including waste rock and soil cover runoff. The 2-acre capacity compliance point dam, downgradient of the minesite at the lower end of the Barrel Canyon, is the final water quality testing station for contaminants of concern "prior to release in the natural channel". FEIS at 470, 478. Large stormwater flows from the mine are expected to overtop and occasionally destroy the dam. FEIS at 478.

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The Rosemont Aquifer Protection Permit Application, Vol. 1, Table 5.02 at 33, "Run-off Summary at Compliance Point Dam" summarizes rainfall run-off flow and volume reporting to the compliance point dam under six scenarios, from baseline to Years 0-19 of mine operational life.

Rainfall reporting to the compliance point dam will reduce in volume as the mine expands, but the Table estimates that for a 2-year, 24-hour storm event, from 406 ac/ft in Year 0 to 229 ac/ft in Year 19 will report to the dam. For a 100-year, 24-hour storm event, from 1,258 ac/ft in Year 0 to 839 ac/ft in Year 19 is estimated to report at the dam. Clearly, the 2-acre capacity of the dam will not detain these stormwater volumes.

A full Tier 3 antidegradation review should analyze the potential for unregulated and untreated stormwater discharges to impact the OAWs during the operational life of the mine, closure and post-closure.

Comment No. 14. The *Draft Certification, Specific Conditions* Section 5.2.12 requires "retention/detention basins shall be sized to accept stormwater runoff and capture sediment prior to it entering any WUS".

The *Draft Certification, Specific Conditions* Section 5.2.19 reads: "Silt laden or turbid water resulting from activities certified herein shall be settled, filtered or otherwise treated to ensure no exceedance of, or reduction from, natural background levels of sediment occurs in any WUS" (this Specific Condition appears to be missing text).

As noted above, the Rosemont Copper stormwater detention facilities are not sized to capture all stormwater runoff from the minesite. Unsettled, unfiltered and untreated stormwater will reach downstream water bodies, including Cienega Creek, during major storm events. This stormwater runoff may carry mine constituents or suspended solids which could affect the water quality of downstream OAWs.

Applicant should be required to demonstrate how stormwater runoff will not degrade the existing water quality of the downstream OAWs and their designated Aquatic and Wildlife uses before a 401 Water Quality Certification is issued.

Comment No. 15. *Draft Certification, General Conditions Section 5.1* states: If monitoring, by ADEQ or others, indicates that water quality is adversely affected by the activities certified herein, ADEQ will notify the Corps of Engineers and request suspension of the CWA 404 permit.

The above-quoted *Condition* should be amended as follows:

If monitoring, by **Applicant, or** by ADEQ or others, indicates that water quality is adversely affected by the activities certified herein, ADEQ will notify the Corps of Engineers and request suspension of the CWA 404 permit.

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Comment No. 16. *Draft Certification, General Conditions Section 5.1* requires Applicant to provide to ADEQ a copy of the surface water monitoring results that Rosemont will provide to the Coronado NF on a quarterly basis. However, the FS Draft ROD General Stipulation #15 also requires Rosemont to report to the Coronado NF any out-of-compliance monitoring result within 72 hours. No comparable reporting requirement to ADEQ appears in the *Draft Certification.*

Applicant should be required to report non-compliant water quality data to ADEQ as well within 72 hours of receipt of laboratory data.

Thank you for your consideration of these Comments.

Jim deVos
Assistant Director, Wildlife Management Division

Cc: Marjorie Blaine, Army Corps of Engineers
Jason Brush, Wetlands Division, Environmental Protection Agency

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