



## COUNTY ADMINISTRATOR'S OFFICE

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C. H. HUCKELBERRY  
County Administrator

September 14, 2007

Jeanine Derby  
Forest Supervisor  
Coronado National Forest  
300 West Congress  
Tucson, Arizona 85701

**Re: Rosemont Mine Plan of Operations July 11, 2007 - Review for Completeness**

Dear Ms. Derby:

Augusta Resources Corporation (Augusta) submitted a revised Mine Plan of Operations (MPO) for the proposed Rosemont Mine to the Forest Service on July 11, 2007. As the Forest Service was tasked with evaluating the completeness of the first MPO submitted on July 31, 2006, it is again tasked with evaluating this revised plan. A complete plan would provide sufficient detail to evaluate the proposal and alternatives to the proposal, as well as to describe how the proposal will meet environmental requirements of the Forest Service. Such details are necessary for the development of an Environmental Impact Statement, which will be required as part of the National Environmental Policy Act (NEPA) process.

In the letter accompanying the MPO, Mr. Sturgess states that this MPO provides sufficient detail for agencies and the interested public to evaluate the proposal and therefore it is time to begin the NEPA process. After review by several County departments with expertise in the areas of hydrology, air quality, transportation, archeology, and ecology, we disagree. Specific comments from the departments are attached. Staff cite several key areas where the MPO is lacking sufficient detail. The memorandum from the Regional Flood Control District alone, sites 32 specific reasons why the MPO ought to be found incomplete.

Several technical documents are cited in the MPO, but were not made available for the County's review until this week, and some have still not been made available. These are listed in the attached memorandums from the County's Regional Flood Control District and

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Department of Environmental Quality. If the public and affected agencies are to be given the opportunity to evaluate and comment on this proposed mine, it is essential that Augusta and the Forest Service find a way to make such information available and timely. Our recommendation is that such information be placed on the Forest Service web site.

Although Augusta's efforts to acquire a water source for mine operations from another basin, and replenish that water source with CAP water, may reduce impacts to Cienega Creek from a water supply perspective, these efforts do not eliminate the impacts of the proposed mine pit, impoundments, and other drainage alterations upon Cienega Creek, its tributaries, and the Cienega watershed. Both the mile-wide pit itself and the proposed dam will reduce flows to Cienega Creek and its tributaries, which will with no doubt have direct impacts to both the sensitive riparian habitat in Cienega Creek and its tributaries, and water supply to Tucson residents. Furthermore, there are no assurances that CAP water will be available for the term of mine operations. If there comes a time when CAP water is not available, the proposed mine will further reduce water levels in an area already extremely over drafted.

We continue to believe that locating a mine of this size so close to an urban county of 1 million people is entirely inappropriate. At a minimum, common sense should dictate that the health and safety issues associated with such a proposal should negate approval. On the Cienega Corridor side of the proposed project, a key source of drinking water for the Tucson Basin should not be threatened by a pit and a dam that will surely reduce the amount of water available, and place a real risk to water quality if the dam should break releasing contaminated water. On the Green Valley side, residents should not have to drink CAP water of a lower quality than that of natural groundwater, in order to accommodate a mine. Moreover, residents and visitors to Tucson should not have to share roads with trucks carrying dangerous chemicals to and from the mine. Neither should residents or tourists have to face the impacts associated with huge haul trucks coming and leaving the mine along Scenic Route 83 every 15 minutes, 24 hours a day, for 20 years. These comments do not even begin to address the negative impacts the proposed mine would have on the economy of Tucson, primarily to tourism and recreation, due impacts on important plant and wildlife habitats and scenic viewsheds.

In summary, we have found this revised plan to be incomplete in several areas, and ask that the Forest Service request additional details in the areas specified so that agencies and the public can adequately review the proposed mine during the NEPA process. As a cooperating agency, we look forward to providing the Forest Service with additional expertise during this process. Julia Fonseca, Environmental Planning Manger for the Flood Control District, will be the County's Cooperative Agency representative. As you saw in the report forwarded to you regarding the hydrological impacts associated with the proposed pit on the flow of groundwater recharge, the County is more than willing to

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commit time and resources to analyzing this proposed mine. However, these are the types of studies that the Forest Service should be requesting of the applicant.

Thank you again for this opportunity to comment, and for the opportunity to join you as a cooperating agency in review of this proposal.

Sincerely,



C.H. Huckelberry  
County Administrator

CHH/dr

Attachment

- c: The Honorable Chairman and Members, Pima County Board of Supervisors
- Beverly Everson, Forest Service Geologist
- James Sturgess, Augusta Resource Corporation
- Suzanne Shields, Director, Flood Control District
- Julia Fonseca, Environmental Planning Manager, Flood Control District
- Nicole Fyffe, Executive Assistant to the County Administrator



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# MEMORANDUM

## Water Resources

### Regional Flood Control District

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**DATE:** August 27, 2007

**TO:** Nicole Fyffe, Executive Assistant  
County Administrator's Office

**FROM:** Julia Fonseca  
Environmental Planning Manager

**SUBJECT: Rosemont Mine**

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The U. S. Forest Service must determine whether Augusta's mining plan of operations (MPO) should be considered complete or incomplete. A complete MPO would provide all of the information about the project proposal necessary to go forward and describe environmental impacts and analyze alternatives for the Environmental Impact Statement required by the National Environmental Policy Act. A complete plan would also fully describe all measures to be taken to meet the Forest Service requirements for environmental protection, including mitigation. This plan, as reviewed by District staff, does not meet these completeness tests.

The mining plan of operations should also be considered incomplete due to lack of timely access to critical documents referred to in the initial mine plan of operations dated July 11, 2007, incomplete description of the proposed facilities in the MPO, and failure to conform with Forest Service policies regarding information needed to analyze water supplies potentially derived or affecting Forest land. An incomplete determination based on the initial July 11, 2007 filing will give Rosemont additional time to file additional documents.

#### **District's Review of the Proposed Rosemont Mine Plan of Operations Hampered**

Regional Flood Control District (District) staff has reviewed the Rosemont Project Mine Plan of Operations (MPO) prepared for Augusta Resource Corporation by Westland Resources, Inc. dated July 11, 2007. Additional materials received in August (July 25, 2007 Electrical Power Supply and Water Supply Supplement) by the County Administrator's Office were also reviewed.

The District's review of the Plan of Operations was hampered by lack of document availability. Certain documents cited seem likely to be germane to the completeness review. Information cited in the MPO but not available on the company's website nor as hard copies as of August 17, 2007 include:

Tetra Tech (2007a) Geochemical testing program.  
Tetra Tech (2007e) Groundwater Protection Plan  
Tetra Tech (2007g) Site water management plan  
Tetra Tech (2007h) Viewshed Analysis  
Westland (2007) Biological Resources and Mitigation Concept: Rosemont Project

If the Forest Service will rely upon Augusta to provide the documents for public review on Augusta's website, then it is important that the documents be posted timely. Over one month has elapsed since posting of the Executive Summary and the posting of these supporting documents on the website.

**Plan of Operations Incomplete**

The mining plan of operations is incomplete and thus does not provide sufficient basis to understand impacts and evaluate alternatives for the EIS.

1. The MPO does not disclose sufficient information about how the proposed mine will intercept and alter surface flows and the down stream riparian habitat.
2. The plan does not provide sufficient information about dewatering of the large deep pit to evaluate impacts upon the subsurface groundwater flow regime.
3. The MPO does not disclose where production wells would be sited within the Cienega basin or where or how much would be produced.
4. The MPO does not disclose how existing wells and surface water rights would be deployed.
5. The plan does not provide any information about proposed CAP pipeline and replenishment scenarios for mine supply water in the Upper Santa Cruz River Basin, though these are being debated in the public media. The location and ownership of proposed recharge basins is completely unclear, so it is impossible to understand groundwater impacts that will result from the activity. Augusta's statements in the media about their lack of financial interest in these project components are not sufficient basis for the Forest Service to consider the pipeline and recharge basins as being outside the scope of the mining plan of operations' required disclosures. Such facilities may in fact be necessary mitigation components for the proposed wellfield near Sahuarita.
6. The location of Augusta's parcel 303-60-1410 is shown, but exact range of activities on that site is not specified other than a wellfield. Are any other mine-related activities to be conducted on that site?
7. MPO does not state whether production wells will or will not be operated to recover stored CAP.
8. The circumstances under which the long-term storage credits will be extinguished are not stated. If the credits are not extinguished, they may be sold and used to justify additional pumping elsewhere in the Tucson AMA. If they are extinguished, they may recovered as CAP at the mine's production wells. State statutes also provide an option for designation of storage credits, as non-recoverable contributions to the aquifer. Impacts cannot be analyzed without understanding the circumstances under which any of the credits will be extinguished.
9. The MPO does not disclose the disposition of the grazing leases during the term of operation.
10. The MPO does not disclose the range of variability for the term (duration) of the operational components (e.g. the stormwater dam, the millsites, etc), nor for closure activities. Postponing the date of commencement and completion can have profound environmental impacts. Most copper mines have had a significantly longer term than the 15 to 19 years that Augusta has variously stated.
11. The plan does not describe location of acceleration/deceleration lanes on SR 83, or timing of construction.
12. Plan does not describe changes needed at rail yard in Vail, Arizona required for this project.
13. The reclamation plan appears incomplete. For instance, will the poles and transmission lines be dismantled and removed following the closure of the mine? (pg. 39-40) Will the power line route be re-vegetated?
14. Whether all reclamation cap materials are derived on site is unclear. Will offsite areas be denuded for additional topsoil? Will sludge or other organic waste be imported?
15. Location of the additional, offsite processing steps is not disclosed, e.g. smelting.

16. Rates and locations of concurrent reclamation are not fully disclosed.
17. The disposition of other ore bodies is not disclosed. Would this MPO rule out the development of the other ore bodies or is the intent to expand?
18. Disposition of existing adits, shafts etc. is not stated. Are these features rehabilitated before or after commencement of the mining place, destroyed, left in place?
19. How will the limestone be used or treated for acid neutralization and will any be used for cement?
20. Pit lake characteristics or treatment is not addressed.
21. Water management of springs buried under the tailings is not addressed.
22. Circumstances under which capacity of the compliance point impoundment would be increased are not disclosed.
23. Direction of travel for outgoing concentrate, incoming sulfuric acid, etc. is not specified.
24. Will the project include upgrades to the port of Tucson facilities, or any other sites not currently described in the Plan but owned by the project proponents?
25. Local sources of pebble lime are not described. Is the source within the project boundary, or outside it?
26. It is unclear if the only fence is the 4-strand barbed wire fence mentioned in the access plan for the "active mine site".
27. Exact location of Potentially Acid Generating material is not specified, nor mitigation identified to sufficient detail for an EIS, or for the mine waste management plan. Isolation is mentioned, but no description is provided.
28. Hydrogeologic and geochemical modeling data for pit are not available, but are planned. These may alter how the pit is managed.
29. Groundwater protection plan design is not completed due to ongoing geochemical modeling.
30. Pollutant management area is not yet defined because models are incomplete and facilities are not fully planned.
31. Physical dust controls are not specified; instead there is a list of potential measures.
32. What is the mitigation to CLS lands (pg 90)?

#### **MPO fails to conform to Forest Service Groundwater Policy**

The following information will be required to determine if a proposal to use water is consistent with Forest Service policy and plans, could impact National Forest resources, or could adversely affect adjacent water supplies.

**Water Needs.** The quantity of water the proponent is currently seeking from NFS lands and the purpose of use of such water must be identified. If the proponent anticipates increased water needs in the future, such needs should also be quantified.

**Infrastructure.** All anticipated facilities such as roads, power lines, pipelines, water storage tanks, and pumps that could ultimately be needed to produce and convey water from the site must be identified.

**Potential To Affect Forest Resources From Drilling Activities.** Drilling activities themselves can negatively impact Forest Resources. In instances where considerable disturbance may result from the drilling process itself, the proponent must demonstrate that there is a reasonable likelihood of successfully completing any water wells. Applicants should provide the rationale used to locate any proposed well(s).

This should include both hydrologic and geologic information. An inventory of all existing wells in the vicinity along with any available information such as driller's logs, well depths, well yields, water quality information, geophysical logs and well construction details should be provided. In addition, information regarding favorable geologic conditions such as known water bearing formations (including location, aerial extent, lithology and hydrologic characteristics) or favorable structural features should be identified.

**Potential To Affect Forest Resources From Pumping Ground Water.** To determine potential impacts to Forest resources in the vicinity, an inventory of key resources should be compiled. Information that may be required includes:

- The location of potentially affected surface water resources including all streams, springs, and seeps.
- The location and description of riparian vegetation. Any known Threatened and Endangered species.
- Pertinent geologic information. This should include a map of the area identifying surface geology and any known subsurface formations and structural features. Hydrologic characteristics of the target aquifers such as transmissivity and storability should also be included, if known.
- Pertinent hydrologic information. Any available information regarding water table or piezometric surface elevations including known seasonal fluctuations, direction and rate of ground water flow, recharge and discharge areas, surface water flow characteristics including volumes and peaks throughout the year, location of gaining and losing reaches of streams, and water quality should be provided.
- Potential to Affect Existing Water Supplies. In order to determine potential impacts to adjacent water supplies both on and off-Forest, wells, springs and other sources of water supply in the vicinity should be identified. Well yields, spring discharges and quantities of water used should be provided.

### **MPO Impacts Analysis**

Below are additional comments regarding impacts analysis which will be required under the National Environmental Policy Act. We request that the Forest Service consider these comments in the scoping for the EIS.

#### **Visual impacts**

1. The mining project will affect State Route 83, a designated scenic highway. How will the proposed SR 83 widening effect the scenic route? How will invasive species be addressed during and after roadway construction? How will the widening project impacts be mitigated? How visible will the mining project be from SR 83, including the mitigation berm? Will this project affect the scenic highway designation?
2. The mine facility is exempt from the Pima County lighting code, however, nearby observatories are dependent on dark skies. The rural setting of the Rosemont area is characterized by dark skies, unpolluted with artificial lighting sources. Every attempt should be made to comply with the Pima County lighting code.
3. The definition of "reclaimed" needs to be defined. By the end of the project, the "reclamation" berm will be the primary visual impact of the mine. This reclamation berm is also the viewshed protection facility. What the Plan of Operations is calling the ultimate reclamation surface (perimeter berm and tailings pile) makes no attempt at mimicking natural topography. A screening berm shielding the mine and mining facilities does not constitute reclamation. The Plan of Operations should include an alternative that includes a valid a reclamation plan in terms of re-contouring, re-shaping and re-vegetating land to its approximate original appearance.

4. Current plans do not call for dismantling the dam or filling in the pit at closure. An alternatives analysis should consider these options.
5. Invasive species control should be expanded to any newly constructed roadway, power and water line corridors, and other cleared and graded sites created for mining operations. Control measures for noxious species should be expanded to include invasive species not considered "noxious."
6. Viewshed analysis visuals are not clear (Figures 3-2 through 3-5).

#### Hydrologic Impacts

This proposed large mining project will affect both ground and surface water. The overall plan does not go into enough detail to indicate how impacts of the proposed mine will affect interception of surface flows and the down stream riparian habitat. In addition, the plan does not outline what the effects of digging a large deep pit will have on the subsurface groundwater flow regime. A 3D flow model is needed to evaluate the effect of the mine activities will have on the subsurface flow and downgradient subsurface flow. Finally, the plan does not go into enough detail regarding the different replenishment scenarios for mine supply water in the Upper Santa Cruz River Basin.

The best way to consider the effects of a large project such as the Rosemont Mine on the hydrology of the area, both groundwater and surface water, is to consider the existing water balance of the area and the magnitude of changes that may be caused by the proposed mine. The changes include drawdown away from the mine, discharge to the washes and springs, and groundwater flow to downstream aquifers. These changes will now have to be evaluated with surface and groundwater models that evaluate pre- and post-mining effects. Specific comments follow:

P.42, Para 2: First, the Cienega Basin has never been known to yield large amounts of water for mine production in the quantities proposed at Rosemont. Granted, there is a more sensitive ecosystem in place with perennial flow in Cienega Creek. However, large groundwater reserves have not been proven or established in the Cienega Basin. Most wells are low volume suitable for stock tanks and small municipal development. Augusta has stated that they are seeking water from west of the site because of sensitivity to the Cienega Basin. Maybe large quantities of water were just not available. Therefore, the next logical place to look for mine supply water is the abundant upper Santa Cruz Basin that can produce 5000-7000AF/yr needed to process ore. Second, unless CAP is used directly by Rosemont, the impacts of the mine will be experienced in the Green Valley/Sahuarita area. Community Water Company (CWC) has indicated in a 7/25/07 public meeting that Augusta is willing to help fund a 20" pipeline to move CAP from the current terminus south to an area near Duval Mine Road and the Santa Cruz River either to recharge in basins or the Santa Cruz River. Compared to the native groundwater in the area, CAP is typically twice the TDS content. Recharge to the Santa Cruz River or basins will cause an increase in mineralized content of the native groundwater. Direct use of CAP by Rosemont would insure that no impact to the Green Valley/ Sahuarita area is made. Currently ASARCO mine has agreed to use up to 10,000AF of CAP at their Pima Mine Road Facility, thereby reducing drawdown of the water table in the area and actually allowing for a net water balance recovery in the area.

P.43, Para 3: As written the CAP recharge will and is occurring over 25 miles downgradient of the area of hydrologic impact. The proposed recovery wells in east Sahuarita are in an area where groundwater declines are 1-2 feet per year. Extraction of an additional 5000 AF/yr will result in additional decline in the area where replenishment is needed for an already extremely over drafted area, predominantly (86%) by the mines and FICO.

P. 45, Recharge Plan: A total of 88% (4400 AF) was recharge in an area over 25 miles downgradient of the area of hydrologic impact. In addition, Augusta for Rosemont has not considered direct use of CAP. If Rosemont is committed to lessening impacts of the mine in the Upper Santa Cruz Basin, then direct use of CAP is the only alternative. Finally, what if CAP is not available for recharge or direct use in the future? Then the burden of mine supply production will be bourn by declines in the basin and other water users.

P.46, 2.9 Surface Water Management: Figure 2-11 shows the Site Water Management Conditions, Year 0. The table inset shows the 2-year, 24-hour runoff estimate at 406 AF and 530 cfs at the compliance point dam. Figure 2-12 shows the Site Water Management Year 10 Conditions. The 2-year, 24-hour runoff estimate at the compliance dam diminishes to 147 AF and 139 cfs, 36% and 26% respectively of the volumes in year 0. Thus, 269 AF in this type of storm would never reach the down stream portion of the Cienega Basin watershed due to interception from closed systems such as the open pit, heap leach facility and the plant site. Smaller and larger storms will also result in diminished flows to the Cienega Basin. The significantly diminished flows may result in die back of shallow sub flow or soil moisture dependent meso-riparian vegetation along the narrow thin alluvial tributaries to Cienega Creek. How much storm flow, that would otherwise flow unimpeded to the Cienega watershed, on an annual basis, is estimated to be intercepted by the mine activities and structures? This modeling exercise needs to be presented to show the annual reduction in storm flows and the subsequent loss of surface water to the Cienega watershed. Ultimately, what impact will these reduced flows have on the perennial status of Cienega Creek.?

P. 67, Groundwater Protection Plan: This section is very brief and incomplete. I tried to obtain the Tetra Tech (2007e) Groundwater Protection Plan to review more details. It was not available on Augusta's web site. Questions that need to be answered include: How will mineralized process water be contained and disposed of without contaminating surface and groundwater? Eventually process water will become too mineralized to recycle. Will it be evaporated? If so, how will the solid residues be disposed of to not contaminate surface and groundwater?

JF/yo

Cc: Suzanne Shields, Director and Chief Engineer  
Chris Cawein, Deputy Director  
Tamara Jorde, Special Staff Assistant, Director's Office  
Thomas Helfrich, Water Resources Division Manager  
Frank Postillion, Chief Hydrologist  
Neva Connolly, Senior Planner



# MEMORANDUM

**DATE:** August 29, 2007

**TO:** Nicole Fyffe  
Executive Assistant to the Co. Administrator

**FROM:** Chase Waddell *Chase Waddell*  
Environmental Analyst, PDEQ

**THRU:** Ursula Kramer *UK*  
Director, PDEQ

**RE:** PDEQ Comments on Augusta Resource Corporation's Rosemont Project Mine Plan of Operations

A review of Augusta Resource Corporation's proposed Mine Plan of Operations for the Rosemont Project (RP), dated July 11, 2007, was conducted by PDEQ. The review included evaluation of the entire Mine Plan of Operations proper (the plan), and the Electrical Power Supply and Water Supply Supplement submitted July 25, 2007. PDEQ comments follow and have been placed under the same paragraph heading as the original material from the plan. PDEQ regulations address primarily the fugitive dust emissions from the operations, but the comments below are more comprehensive and encompass broader environmental issues. The submitted plan does address many environmental issues in addition to the PDEQ regulatory requirements.

There are references to several studies and supporting documents throughout the plan that were not provided to PDEQ for review along with the plan. Without these documents, a thorough assessment of RP's realistic environmental impacts cannot be completed either by PDEQ or other government reviewers. A list of documents that would have been necessary for a complete review is given at the end of this report.

We are available to answer questions on the comments and for discussion on the submitted documents and would be interested in participating in any further review or discussions on this project.

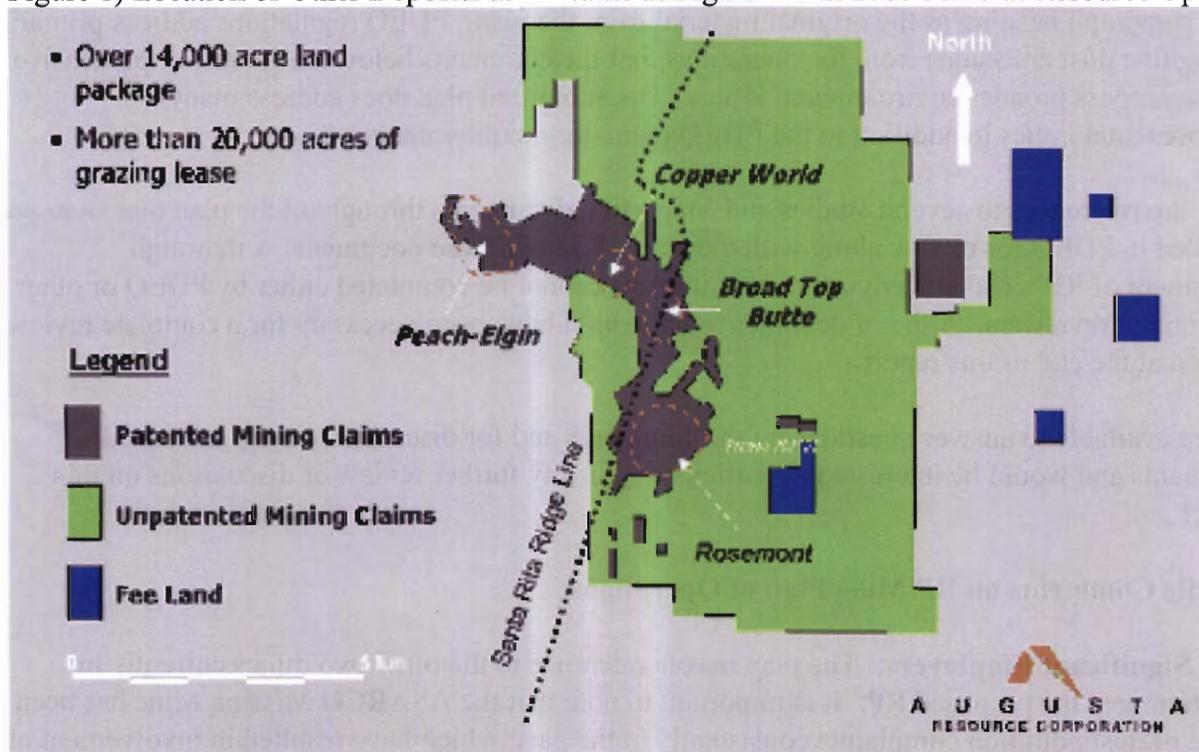
## **Specific Comments on RP Mine Plan of Operations**

**1.5.2. Significant Employers:** The plan makes reference to the other two mines currently in operation near the proposed RP. It is important to note that the ASARCO Mission Mine has been a source of dust pollution complaints consistently in the past; which have resulted in involvement of the Governor and the United States Environmental Protection Agency.

**2.1.1 Open Pit Plans:** The RP open pit configuration is stated to ultimately be "about 6,500 ft across north to south, 6,000 ft across east to west, and will be about 1,800 to 2,900 ft deep." It is understood exact pit configuration cannot be determined now due to the fluctuation in metal prices and precise information on the distribution of mineral reserves. However, PDEQ would like to see some limitations on pit size included in the document so that a guarantee is given on the allowable extent of the pit.

Review of the 2007 Mineral Resource Update for the Rosemont Project, dated April 26, 2007, revealed the presence of a total of 4 deposits on the Rosemont Property. They included the Rosemont Deposit, which ARC has planned to extract, the Broadtop Butte Deposit to the north of Rosemont, the Copper World Mine to the north and west, and the Peach-Elgin Deposit to the north and west. All three of the other deposits lie partially or completely over the ridgeline of the Santa Rita Mountains (see Figure 1 below.) Development of these potential resources in the future would lead to visual and physical impacts not addressed in the plan. In order to consider this version of the plan complete, PDEQ would need some statement incorporated that these deposits specifically will *NOT* be developed in the future, regardless of economic incentive. Incorporation of such intentions in the closure planning of the mine will be necessary to prevent sale of the other deposits to mining interests in the future. The recent complaint filed by ASARCO contesting ARC's ownership of the mine testifies to other firms' interest in the Santa Rita Range (<http://biz.yahoo.com/iw/070824/0294999.html>).

Figure 1) Location of Other Deposits at RP same as Figure 6-2 in 2007 Mineral Resource Update.



(<http://www.mineweb.net/mineweb/view/mineweb/en/page19565?oid=22349&sn=Detail>)

**2.1.6 Waste Rock:** Acid rock drainage is stated to be minimized by the presence of limestone and skarn in the waste rock piles (due to their buffering capacity.) However, this statement requires significantly more information associated with it to gauge if it is a realistically feasible idea. Necessary considerations include infiltration rate of water through the rock piles, and exact mineral content to evaluate the acid balance of the system. Whereas conceptually acid generation can be controlled by the presence of buffering minerals, the presence of such minerals does not guarantee

acid control (especially when tailings are planned to be added to the waste rock storage piles.) More detailed analysis should be included to consider the plan complete.

**2.1.7 Mine Equipment:** PDEQ would like to commend and encourage the proposed use of an electric trolley-assist system for trucks in the pit. Such an effort would help reduce air pollution and fuel consumption at the mine. The plan states that ARC will investigate the possibility of using such a system, but does not guarantee the facility will use it. A decision on the system should be made to consider the plan complete. Power consumption at the facility by such a system will significantly impact other aspects of the plan, including the power transmission requirements. However, ARC should be encouraged to pursue implementation of such a system.

In the listing of proposed mining equipment, three water trucks are proposed. This number of trucks may or may not be adequate for use in dust control at the facility. Supporting arguments for the choice and adequacy of the choice will need to be included in the plan to consider the plan complete.

PDEQ would also like to commend the proposed use of water from the pit dewatering system to control dust as a water conservation technique.

**2.1.8 Mine Staffing:** In order for the plan to be considered complete, PDEQ would require a more detailed explanation of the structure of the environmental staff to be utilized and the authorities of such staff members in the mining operations. As the plan stands now, there is only the mention that out of "about 45 people" that will comprise mine supervision and technical/support personnel, some will be dedicated to environmental and safety issues. This is not enough information for any reviewer to gauge the ability of ARC to manage their environmental responsibilities.

**2.2.1 Process Overview:** Description of mineral processing is consistent with general copper mining practices, but no specific information concerning the type of equipment has been included. This may not be necessary from an initial impact review, but it will be necessary to gauge whether or not the pollution control devices selected are properly sized and capable of handling the load that ARC plans to use them for. More detailed information on control equipment (such as the capacities of the wet scrubbers and their design) and the proposed size of the other equipment will be necessary to do a complete analysis of the plan.

**2.2.2 Sulfide Ore Processing:** Several steps of the ore processing involve the generation of an effluent stream. ARC has proposed to recycle process water during sulfide ore processing, but no specifics about the system are available. Greater detail about the system should be made available in order to gauge the feasibility of recirculation, and address issues where discharge from the system will potentially be necessary (such as salt accumulation in the recycled waste water due to evaporative losses.)

**2.2.2.3 Grinding:** A complete schematic of the actual layout of grinding equipment and conveyor belts will be necessary to identify potential sources of air pollution and evaluate the adequacy of

proposed air pollution controls for dust emissions. PDEQ does not think the plan is complete without a more specific analysis.

**2.2.3 Oxide Processing:** The design of the heap leach system must be included with the plan submission for analysis of possible environmental impacts. A report is referenced (Tetra Tech (2007f)) in the plan that contains the design parameters. This report should be supplied along with the plan. Likewise, design and controls for all ponds associated with the heap leach system must be included with the plan to evaluate the efficacy of the design and identify potential shortfalls.

The methods employed with leaching must be expanded upon to complete the plan. For instance, will environmentally friendly microbial leaching be used? Has this alternative, and its associated economic and environmental benefits, even been considered in the design of heap leach system?

And, like the sulfide ore processing, the plan claims to recycle all process water from the leaching/SX/EW system and prevent discharge. Consideration for discharge due to salt accumulation and other eventualities must be included to consider the plan complete.

**2.2.4.1 Fresh Water:** The design of the water delivery pipeline, recharge and pumping facility is provided in more detail in the Electrical Power Supply and Water Supply Supplement. However, what are still missing from both of these documents are the design considerations for the type and number of pumping engines/motors. In order to prevent a significant source of air pollution in the region, ARC should use a system of only electric motors to power the pumping field and all booster stations. If combustion engines are planned for use as backups or any to be used as primary power (strongly recommended against), then the plan is not complete without such information and the limitations of operation of such engines planned by ARC.

**2.3.1 Waste Rock and Mill Tailings Management:** Assessment of the potential to generate acid rock drainage at the proposed mine and ARC's management strategy is referenced as detailed in a report not included with the plan (Tetra Tech 2007a.) Whereas the plan generally sounds progressive and environmentally responsible, none of the aspects of the plan can be adequately reviewed and evaluated without the details of initial analysis.

**2.3.2.4 Collection and Treatment of Waste Rock Drainage:** Plans for control of drainage from the waste rock storage area is progressive. However, further details of any analysis performed with regard to the issue will need to be provided to assess the adequacy of the planned controls. Issues that must be addressed include the design of the sediment pond—is it lined, what load of sediment has it been sized for, will it remain useable for the life of the mine, has it been sized properly for intense rain events, etc.? The report referenced in the plan that deals with some of these issues should be included with the plan for full review (Tetra Tech 2007g.).

**2.3.3 Tailings Dry-Stack Facility Design:** The plans for dry-stack tailings operations seem enticing and include some very progressive elements for control of both air and water pollution. However, verification of certain assumptions and statements can only be accomplished through review of the more thorough analyses that lead to any such conclusions. The report referenced with respect to these operations should be included with submission of the plan for complete review (Vector 2006).

**2.7 Electrical Power Supply:** Will ARC be funding, partially or wholly, an expansion of the electrical services necessary to support the mine functions? The facility will draw a significant amount of power. Upgrades to infrastructure to accommodate such an increase should be offset with funds from the mine.

**2.10 Transportation:** ARC plans to carry out all transportation to and from the mine using heavy trucks. From Table 6, Trip Data, of the plan one can see that the proposed rate of truck traffic is estimated at 582 heavy truck trips into and out of the facility every week. Transportation of the copper concentrate (main product) alone will necessitate 56 trips per day 365 days a year. If the schedule is assumed constant, as the mine is planned for 24 hour operations, the mine will generate 1 heavy loaded truck on SR-83 every fifteen minutes for the next 20 years simply to move their salable product.

Traffic from the mine will travel along SR-83, SR-82, I-10, I-19 and other thoroughfares in the region. The impact of such traffic will undoubtedly be felt in terms of congestions, increased wear and damage to roadways and supporting structures (with the increased associated costs of repair,) and air pollution from the predominantly diesel fleet. Not to mention, increased air pollution from increased traffic on the surrounding railways.

In order for this plan to be considered complete, ARC would need to provide analysis of the impact of this frantic shipping traffic and provide an analysis of how the impacts will be abated, both financially and environmentally.

**2.10.2 Sulfuric Acid:** The transportation of tanker trucks filled with concentrated sulfuric acid poses its own transportation security concerns. The plan includes estimations of H<sub>2</sub>SO<sub>4</sub> consumption at 73,190 tons of acid per year. This will be satisfied by delivery of 9 trucks full of acid per day to the mine. Those 9 trucks per day will have to travel, with their extremely hazardous cargo, along the main thoroughfares of the region and through the population centers, as well. The plan should not be considered complete until some kind of safety and response plan is outlined for the increased risk of hazardous waste spills along the regular shipping routes.

This particular concern for acid consumption provides one of the strongest arguments for the use of microbial leaching techniques that reduce the need for exogenous acid use. ARC should supply a cost benefit analysis of employing environmentally friendly microbial leaching at the facility in order for the plan to be considered complete.

Memo to N. Fyffe  
RE: Rosemont Project Mine Plan of Operations  
August 29, 2007  
Page Six

**3.2.2 Dust Control Measures:** The dust control measures outlined in the plan are adequate if properly sized and placed, and if the emission sources are adequately attended to. A detailed schematic of the proposed facility would provide reviewers with an opportunity to gauge the adequacy of chosen dust control measures. The plan should not be considered complete without such a schematic and more detailed information. Early planning and proactive efforts in the design phase will be highly beneficial with respect to dust control. It will also be desirable to pay particular attention to this issue, as dust will be the primary air pollutant of concern from the facility. More than anything else, dust control will require an extensive and rigorous operations and maintenance plan to assure adequacy—such a plan should be included in more detail for full review.

## **Reports Necessary for Complete Review**

- 1) Tetra Tech 2007a. "Baseline Geochemical Characterization."
- 2) Tetra Tech 2007b. "Dry Tailings Facility Design Report."
- 3) Tetra Tech 2007e. "Groundwater Protection Plan."
- 4) Tetra Tech 2007f. "Leaching Facility Design Report."
- 5) Tetra Tech 2007g. "Site Water Management Plan."
- 6) Tetra Tech 2007h. Viewshed Analysis. Technical Memorandum prepared for Augusta Resource Corporation, dated June 29, 2007.
- 7) Tetra Tech 2007i. "Waste Management Plan."
- 8) Vector Arizona. 2006. "Rosemont Tailings Siting Study." Technical Report, May 26, 2006.



**MEMORANDUM**  
**PUBLIC WORKS - DEVELOPMENT SERVICES**

PLANNING DIVISION

ENVIRONMENTAL PLANNING



**DATE:** August 22, 2007

**TO:** Nicole Fyffe, Executive Assistant to the County Administrator

**FROM:** Sherry Ruther, Environmental Planning Manager

**SUBJECT:** **July 11, 2007 Rosemont Mining Plan of Operation (MPO) –  
Completeness Review**

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As requested, review of the above-referenced MPO largely focused on assessing its completeness in providing information sufficient necessary to initiate the Environmental Impact Statement (EIS) and more specifically is there adequate disclosure of potential effects to Pima County residents. My review suggests there is insufficient presentation/discussion regarding potential impacts to local communities and services. What discussion is provided in the MPO regarding impacts to the social environment does not establish a foundation from which corresponding sections in the EIS can be informed.

Discussions of population demographics need to be expanded to include potential influences the project is likely to have on development patterns and use of private property within the project's sphere of influence as well as potential impacts to the area's access to community services. Pertinent points would include:

- Where are mine employees likely to reside?
- What's the potential for the trend of unregulated development to change?
- Is the project likely to deter development on private properties in certain areas within the sphere of influence?
- Is the project likely to induce changes in land uses within the sphere of influence that are not currently envisioned?
- What are the potential impacts to the sustainability of County services and expenditure of County resources, especially if the trend for unregulated development is exacerbated?

cc: Carmine DeBonis, Development Services - Director  
Arlan Colton, Planning Director  
Chris Poirier, Administrative Project Manager  
Manabendra Changkakoti, Comprehensive Plan Administrator



# MEMORANDUM



Department of Transportation  
*Traffic Engineering Division*

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**DATE:** 08/23/07  
**TO:** Priscilla Cornelio  
**FROM:** Mo Farhat  
**SUBJECT:** Rosemont Plan of Operations – Review of Traffic and Transportation Issues.

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Enclosed is the review of the Rosemont Plan of Operations by TED. The review was done based on the minimal related traffic/transportation documents and data provided by Augusta Resource Corporation, consultant/owner, for this large mining project.

It is noticeable that no analysis was presented evaluating any anticipated impact, from a traffic stand, on roadways in the area. Except for a proposed 8"x11" design of an access road for the mine, nothing was mentioned about any other local roads, trails, and private accesses that could be impacted directly or indirectly.

Please let me know if you have any questions related to the attached review comments.

Thank you.

Enclosures

cc: Ben Goff  
Albert Letzkus

Rosemont Mine Plan of Operations  
Augusta Resource Corporation

Review Comments  
Pima County Department of Transportation  
Traffic Engineering Division  
Mo Farhat August 23, 2007

1. The documents reviewed had minimum discussion and/or evaluation to traffic and transportation issues impacted by this project. The documents contain a proposed design for an access road but nothing was said about other existing accesses in the area (if any).
2. A report that solely addresses traffic and transportation issues is needed to clarify anticipated impact of the new project on the local roads especially Pima County Roads for the nearby communities.

In addition to new needed road and/or access, the report should evaluate the conditions of existing roadways and any other accesses and evaluate any impact that would be caused by future changes in traffic pattern and new transportation conditions.

3. The report should discuss type of vehicle used, weight, and loading capacity for those vehicles traveling on jurisdictional roads such as Pima County roads. The discussion should present tables of anticipated trips to and from the proposed facility such as truck trips and car trips including a regional map for trip distribution (what percentage goes in what direction).
4. A list of all Pima County roadways, trails, accesses, bridges shall be provided disclosing possible usage, impact, and any planned improvement. Pima County advance approval is required prior to any planned usage of the above listed accesses.
5. A design speed for the access road, that is planned to connect SR 83 to the facility, needs to be evaluated and decided based on roadway related factors and characteristics concerning safety of the public using the road. The design geometry of the new road will be based, among other factors, on the selected design speed.

6. Provide a standard blue print plans (1"=40' scale) for any new needed road, including the access road, or an exiting road that needs some improvements. The plans shall include all pertinent sheets such as civil plan, pavement plan, drainage plan, striping and signing plan, etc.
7. The plans, at least those pertain to Pima County roads, should include project description and other pertinent general notes
8. The 4 feet shoulder area suggested for the new access road by the proposed design does not meet County standard which is 8 feet shoulder 4 feet of which are paved. Based on the selected design speed and the anticipated volume, a required clear zone (including shoulder area) can be found in the Roadside Design Manual.

A certain lateral distance is required for traffic devices in the shoulder area. A 4 feet shoulder will not accommodate the needed lateral distance.

9. The Pima County signing and striping standards shall be applied for new to be constructed roads or for existing to be improved roads and/or accesses.
10. The signing and striping plans should show adequate striping pattern needed and all pertinent regulatory, warning, delineators, hazard markers, etc.
11. The headwalls of any box culverts shall be outside the clear zone. Delineation and/or hazard Markers shall present be installed at these box culverts and at other locations as deemed needed.
12. Proposed construction of box culverts and the modification by means of redirecting the path of washes in the area may need to be reviewed by Pima County Flood Control District.
13. Locations where natural steep slopes exist and is not traversable or extension of box culvert is geometrically unattainable, barriers such as guardrails may have to be installed to protect employees, visitors, etc.

14. The use and/or the improvement of existing County roads (be it dirt road, bridge, trail, etc.) for commercial hauling and heavy loads equipments would require County review and permission in advance of the usage of such roads.

## Nicole Fyffe

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**From:** Linda Mayro  
**Sent:** Wednesday, September 05, 2007 1:39 PM  
**To:** Nicole Fyffe  
**Subject:** Rosemont comments

**Importance:** High

Nicole -- In reading the plan of operations, there is little for me to comment on specifically since the technical and engineering issues are really the focus. That said, I do have the following general recommendations that should be considered as part of the NEPA and NHPA compliance process:

### Cultural Resources Plan:

1. The entirety of the Rosemont project area, including off-site roads, powerlines, and water lines, etc needs to be completely resurveyed to identify all cultural resources (prehistoric sites, historic sites, buildings, homesteads, objects, structures, and traditional cultural places) that may be affected by the proposed mining.

2. Because the mine will have a large areal impact, assessment of site significance and site impacts needs to be addressed at the landscape level.

3. An ethnographic study should be conducted well in advance so that effects to the living cultural traditions and practices of the Tohono O'odham and other groups can be assessed, understood, and whether there are any measures to mitigate these impacts.

4. The cumulative of impacts to cultural resources, the cultural landscape, and living people must be fully considered.

5. Appropriate and effective mitigation measures must be developed to lessen these impacts wherever possible

6. Should the mine be approved, Augusta Resource Corporation should be required to purchase lands of equivalent acreage and natural and cultural value as mitigation land for preservation purposes and retire mineral rights and other potential for disturbance.

September 12, 2007

**Project Information Review**  
Rosemont Copper Project  
Augusta Resource Corporation

To: Nicole Fyffe  
Executive Assistant to the County Administrator

From: Jeff Kreamer  
Program Manager, NRP&R

Nicole,

I have reviewed the Reclamation and Closure Plan for the Rosemont Copper Project, (July, 2007). The following comments or concerns are based on information provided by Augusta Resources in the R&C Plan, or other information supplemental to the Mine Plan of Operations prepared for the US Forest Service. The information reviewed is complex in nature, and would require a nearly full time effort to review in detail. As a result, all comments contained herein, are based on a cursory level review of project data.

Also included are observations and comments based on my personal knowledge of the historic copper deposits of Arizona, and nearly thirty years as an active US Mineral Surveyor. In some cases, my comments are opinions serving as "food for thought".

Although I am personally opposed to mining in this area of significant ecological and historic value, I will remain objective and mindful of the fact that Augusta has the legal rights necessary for the development of this mineral resource, subject to meeting regulatory conditions.

My observations cover different issues that can be grouped as follows:

1. Historical considerations, and the validity of discovery.
  2. The current mining industry in Arizona.
  3. Water quality protection.
  4. Importance of mitigation monitoring and environmental assurances (bonding).
- 
1. The Rosemont – Helvetia District is an historic mining district composed of several small mines that operated from the 1890's, through the 1950's. After this productive period, the area was controlled by larger companies that held their properties until copper prices reached a level to warrant additional exploration

and verification of a larger discovery of economic minerals. Over the decades, many mining properties within this region were held and/or sold for speculation reasons. Examples include the 3R Mine, and Red Mountain Deposit in the Patagonia Mountains. North of Rosemont, and in the area of Corona De Tucson, lies the Cuprite Deposit, which is too deep for economic development. Most of these deposits including Rosemont, were considered “teaser districts”, which are ideal for speculation. Considering the decades of exploration, and assessment work necessary to maintain the unpatented mining claims, I am surprised at the quantity and grade of the ore body recently defined by Augusta. The discovery of a viable economic deposit is critical, and triggers the rights to pursue mining operations under the Mining Law of 1872. It also sets the stage for establishing a value should the owners decide to sell the property rather than initiate mining activity.

2. Much of the current mining activity in Arizona is being conducted by small companies with limited assets, individual entrepreneurs’, and foreign based companies such as Augusta Resources. This is a dramatic change from recent decades where mining activity was dominated by large American Companies such as Phelps Dodge, Kennecott, or ASARCo. Environmental mitigation plans must be constructed to insure that operating companies have the financial resources to cover all compliance issues.
3. The single largest environmental concern I have with the Rosemont Plan of Operations, is Water Quality Protection. The methods chosen for ore processing involve high grade sulfide concentration and heap leaching of oxide ore. Both methods can result in significant storm and ground water contamination if there are design and engineering flaws. In addition, the long term possibility of acid rock drainage through the inert rock buttress may increase with time. Acid rock leaching of old mine dumps has contributed to base metal contamination of Sonoita Creek, and other seasonal streams around Patagonia. Storm water issues are based on 100 year, or other levels of storm events. Anomalous storm events can and do occur, and may lead to unexpected degradation of protective caps and buttresses.
4. The Reclamation and Mitigation Plan will be executed concurrently with mining operations. This will lead to an incremental bonding approach, and phased release of bond moneys as compliance measures are met. Care must be taken to insure adequate compliance monitoring throughout the life of the project. The potential for acid drainage and other environmental problems long after mining ceases, should be considered in the bond requirement. The determination of bonding amounts and conditions, must include input from all interested parties. Participation in this process is an important role for Pima County staff. Careful

review of post mining and reclamation use of the property is also important to insure that plans, such as perimeter fencing, does not impact area wildlife.

It is not possible to fully examine all the details of this mining plan on short notice. As a result, some issues such as mining viability are simply assumed as correct. Given the history of this deposit, I do have concerns over the level of geologic evidence. Since Augusta has requested additional drilling work, I would like to know if a viable mineral deposit has in fact been proved.

I put this together with some haste. Please let me know if you have questions. I am also forwarding to you, a detail report by the EPA titled "Cost Of Remediation At Mine Sites" (Jan, 1997). This report gives you some idea of the types of environmental problems that have occurred at mines across America. Many are similar to the type of mining operation planned for Rosemont.

Thank You

Jeff Kreamer