B. U.S. Army Corps of Engineers' Section 404(b)(1) Alternatives Analysis

CWA SECTION 404(B)(1) ALTERNATIVES ANALYSIS (SPL-2008-00816-MB)

DRAFT DELIBERATIVE WORK PRODUCT

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1. INTRODUCTION

1.1 DOCUMENT PURPOSE AND ORGANIZATION

Rosemont Copper Company (the Applicant) proposes to develop an open pit copper mine known as the Rosemont Copper Project (Project). Because portions of the Project occur on lands managed by the U.S. Forest Service, Coronado National Forest (CNF), the Applicant has submitted a Mine Plan of Operations (MPO) (WestLand, 2007) to the CNF. The CNF has deemed the MPO complete for the purpose of initiating review under the National Environmental Policy Act (NEPA) and is in the process of developing a draft Environmental Impact Statement (EIS). The U.S. Army Corps of Engineers (Corps) is a cooperating agency in the EIS development process.

In addition to the development of an EIS by the CNF, an analysis of alternatives to the proposed Project is required by the Corps to demonstrate compliance with guidelines established under the Clean Water Act (CWA), Section 404(b)(1) (40 C.F.R. §230), for avoidance and minimization of impacts to jurisdictional waters of the United States. The alternatives analysis is intended to ensure that no discharge be permitted "if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences" (40 C.F.R. §230.10(a)).

This analysis identifies a number of alternatives to accomplish the Project purpose and evaluates the practicability of each alternative as well as the expected environmental impacts of each. The formulation of alternatives to the proposed Project relies in part on the alternatives developed through the ongoing U.S. Forest Service review of the Rosemont Project MPO (WestLand, 2007).

This alternatives analysis is presented in three sections:

Section 1: *Introduction.* This section includes historical information, a description of the purpose and need for the Project, and a description of the proposed Project area.

Section 2: *Formulation of Alternatives.* Section 2 provides a description of the general approach taken in formulating alternatives, including the geographic scope of the alternatives, a description of the criteria reviewed in the analysis, the preferred alternative, and other onsite and offsite alternatives considered that could potentially satisfy the Applicant's overall Project purpose.

Section 3: *Alternatives Description.* Section 3 provides a description and evaluation of the practicability of each of the alternatives considered and the impact of each alternative on the aquatic ecosystem and on the overall environment.

1.2 PROJECT HISTORY AND BACKGROUND

The Rosemont Copper Property (Property) consists of a group of patented mining claims, unpatented mining claims, and fee land that covers most of the Rosemont Mining District and the adjacent Helvetia

Mining District within unincorporated Pima County in southeastern Arizona. Specifically, the Property is located approximately 30 miles southeast of Tucson, west of State Route 83 (SR 83), in portions of Sections 1, 2, 10–15, 22–25, 35, and 36, Township 18 South, Range 15 East, portions of Sections 1 and 2, Township 19 South, Range 15 East, portions of Sections 6–8, 14–23, and 27–33, Township 18 South, Range 16 East, and portions of Sections 4, 5, and 6, Township 19 South, Range 16 East (Figure 1). Primary access to the Property will be from Interstate 10 (I-10) to SR 83 south, then west on the Project's main access road. There is secondary access from the west for utility corridor maintenance and emergency purposes. The access and utility alignment traverses the Santa Rita Experimental Range and private properties that lie northwest of the Project.

As explained more fully below, current estimates are that the Rosemont deposit consists of 562 million tons of measured and indicated sulfide mineral reserves and an additional 180 million tons of inferred sulfide mineral resources. Additional mineralized material has been identified in association with the Broad Top Butte, Copper World, and Peach-Elgin deposits.

The core of the Property consists of 132 patented lode claims[1] that in total encompass an area of 1,969 acres. A contiguous group of 899 unpatented lode claims[2] with a total area of approximately 12,000 acres surrounds the patented claims. There are also 14 parcels of Rosemont-owned fee land grouped into six individual areas that total 911 acres on the east side of the Santa Rita Mountains. These patented claims, unpatented claims, and fee lands cover approximately 14,880 acres and, together, are referred to as the Rosemont Holdings. The aggregated Rosemont Holdings are the area considered the "site" for this 404(b)(1) analysis and will be referred to as the Project, or Project site, throughout this document.

Most of the unpatented claims are located on federal land administered by the CNF, but a limited number of claims in the northwest portion of the Property are on federal land administered by the Bureau of Land Management (BLM). The area surrounding the claims and fee properties is generally state and federal lands and undeveloped rangeland, with limited private property. The area in the vicinity of the Project is used primarily for cattle grazing, with some public use for recreational purposes.

The Property is situated mainly on the east side of the Santa Rita Mountains, although certain alternatives considered for the Project may include impacts on the west side of the range. The existing large-scale mining activities that have been ongoing in the region occur on the west side of the range, along the Interstate 19 corridor south of Tucson. Production from mines in the Helvetia District and to a lesser extent the Rosemont District occurred from the late 1800s until 1951, producing approximately 227,300

[1] A "patented lode claim" is a parcel of fee land that was conveyed by the United States government to an individual or company pursuant to the Mining Law of 1872. Generically, a "patent" is a deed issued by the United States—it is the evidence of right, title, and/or interest in a parcel of land, as first granted by the United States.

[2] An "unpatented lode claim" is a parcel of land claimed by an individual or company pursuant to the Mining Law of 1872, but which has not been patented. The owner of an unpatented lode claim does not need a patent, or a vested right to issuance of a patent, to possess and use the land for legitimate mining or milling purposes. Further, an unpatented lode claim is property in the fullest sense of the word, and the owner is not required to secure patent from the United States—so long as the owner complies with all the provisions of the Mining Law of 1872, his possessory right, for all practical purposes of ownership, is as good as though secured by a patent. See *United States v. Shumway*, 199 F.3d 1093, 1105 (9th Cir. 1999).

tons of ore. Ore production in the area ceased in 1951 and has not been resumed as of 2010, although exploration of the Rosemont deposit and (to a significantly lesser extent) the Broad Top Butte and Peach-Elgin prospects has been carried out over the ensuing years.

1.3 PURPOSE AND NEED FOR THE PROJECT

The Applicant's purpose and need for the Project is to mine and process copper sulfide ore and oxide ore from the Rosemont ore deposit for the purpose of producing copper and/or copper precursors, as well as recovering by-product metals such as silver and molybdenum, in a manner that is sensitive to the natural environment and in compliance with applicable regulations, with an economic return adequate to justify the development costs and risks associated with the construction of the mine site and associated facilities.

In accordance with the requirements of the Section 404(b)(1) guidelines, for the purpose of determining a project's water dependency, the basic Project purpose is copper mining.[3] For the purpose of developing alternatives, the Corps has determined that the overall project purpose is to develop the mineral resources associated with an ore deposit in southeastern Arizona (Pima, Pinal, Gila, Graham, Greenlee, Cochise, and Santa Cruz counties) using conventional open pit mining and sulfide (mill and concentrate) and oxide (leach and SX/EW) ore processing for the purpose of producing copper and/or copper precursors, silver, and molybdenum.[4]

1.4 PHYSICAL AND NATURAL ENVIRONMENT

The primary drainage in the Project site is Barrel Canyon, with its main tributaries being Wasp Canyon, McCleary Canyon, and Scholefield Canyon. Barrel Canyon drains into Davidson Canyon on the east side of SR 83. Several seeps and springs are present within the Project site, including Scholefield Spring (which supports a potentially jurisdictional wetland) located in the northern portion and Rosemont Spring northwest of Rosemont Camp.

Elevations on the Property range from approximately 6,824 feet above mean sea level (amsl) at Weigles Butte on the west edge of the Project site to approximately 4,500 feet at the lower end of Barrel Canyon. The ridge on the west edge of the Property constitutes the main crest of the Santa Rita Mountains. Topographically, the site consists of mountain front and rolling foothills bisected by ephemeral washes (with occasional spring flow within short reaches of McCleary Canyon) draining generally east toward Davidson Canyon, which discharges to Cienega Creek near I-10. Drainages on the west side of the Santa Rita Mountains flow generally west and northwest toward the Santa Cruz River. Underlying geologic units include metamorphic rocks and limestone on the higher ridges and conglomerate and alluvium in the lower hills.

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[3] As a general rule, the basic purpose of the project must be known to determine if the project is water dependent. Since the proposed Project does not entail discharges to special aquatic sites (see Preliminary Jurisdictional Waters Determination SPL-2008-00816-MB), the presumption that a less damaging, practicable offsite alternative exists does not apply [Army Corps of Engineers Standard Operating Procedures for the Regulatory Program, Section 12, 2009; 40 CFR part 230.10(a)(3)].

[4] See Army Corps of Engineers Standard Operating Procedures (SOP) for the Regulatory Program (2009). The Corps SOP state "the overall project purpose is used to evaluate less environmentally damaging practicable alternatives" and "must be specific enough to define the applicant's needs, but not so restrictive as to constrain the range of alternatives that must be considered under the 404(b)(1) guidelines."

Vegetation cover types within the Project site are consistent with the mapping by Brown and Lowe (1980). The two biomes present within the Project site are Madrean evergreen woodland and semidesert grassland, as described by Brown (1982). Madrean evergreen woodland covers the higher elevation parts of the Project site, generally in the western and southern areas. This community is characterized by open woodlands or savanna, with trees interspersed with grasses and forbs. Semidesert grassland covers the lower elevation parts of the Project site, primarily in the northern and eastern areas. This community is characterized by open grasslands with widely scattered shrubs and cactus. At middle elevations within the Project site, the semidesert grassland grades into the Madrean evergreen woodland in a wide transition zone. Riparian areas are present along some of the major washes within the Project site and in small patches at some of the more reliable springs (WestLand, 2010). Ephemeral flow in Barrel, McCleary, and Wasp Canyons (with occasional spring flow in short reaches of McCleary Canyon) supports areas with tree and shrub species not present on the drier upland ridges. Several springs in the Project vicinity, including Rosemont Spring, Scholefield Spring, and Figtree Spring, support a variety of trees, shrubs, and herbaceous plants not found elsewhere within the Project site.

An analysis by WestLand (2010) delineated five different classes of riparian habitat (ranging from xeroriparian to hydroriparian habitats) within the Rosemont Project area based on NDVI Display Values developed from satellite imagery, with higher NDVI Display Values indicating the presence of increased vegetation. Based on this classification system, the highest quality (read "highest vegetation density") riparian habitat was found in a relatively short, wet reach in upper McCleary Canyon and in association with Scholefield and Fig Tree Springs.

1.5 JURISDICTIONAL WATERS OF THE UNITED STATES

Per the provisions of Corps RGL 08-02 (dated June 26, 2008), the Applicant submitted a preliminary jurisdictional waters determination (PJD) to the Corps on May 29, 2009. Additional information was submitted per Corps request on July 31, 2009. Supplemental information related to Sycamore Canyon and the offsite waterline alignment was provided to the Corps on January 5, 2010, and March 1, 2010, respectively. Approval of the PJD by the Corps was provided in November 2010. Although an approved PJD does not provide a legally binding determination of jurisdiction over particular water bodies or wetlands, it is suitable for the purpose of permitting under CWA Section 404 (Corps RGL 08-02).

The total estimated area of potentially jurisdictional waters within the analyzed portion of the Project site is approximately 101.6 acres (Figure 2). Additional potential waters of the U.S. occur along the proposed utility alignments west of the Project site. The majority of the onsite potential waters of the U.S. are ephemeral, flowing only in response to storm events. Springs located within McCleary Canyon will occasionally discharge for an extended period after storm events, resulting in minor surface water flow within McCleary Canyon before the spring water infiltrates back into the ground.

Two potential special aquatic sites, as defined by the 404(b)(1) guidelines (40 CFR §230.3(q-1)), were identified on the Property. The potential special aquatic sites consist of wetlands associated with

Scholefield and Fig Tree Springs. These wetlands will not be impacted by the proposed Project, but may be impacted by one or more alternatives.

2. FORMULATION OF ALTERNATIVES

This section defines the range of the alternatives in this analysis and describes the criteria used to determine the practicability of the alternatives for the Rosemont Project. Alternatives are influenced by the distribution, function, and value of the jurisdictional waters found at the site, the nature of the project purpose, and other environmental factors. Specific criteria are described that are used to identify the least environmentally damaging practicable alternative that fulfills the Project's overall purpose.

2.1 CRITERIA FOR DETAILED ANALYSIS OF ALTERNATIVES

The following criteria have been established to determine whether an alternative is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall Project purpose, and whether it has the potential to reduce impacts to the aquatic ecosystem without causing other significant adverse environmental consequences.

2.1.1 PRACTICABILITY

The 404(b)(1) guidelines provide that "an alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes" (40 CFR 230.10). In order to determine whether an alternative to the Rosemont Project could be considered practicable, a brief discussion of the geology of copper deposits and the stages of a mine project is in order.

Although copper is a relatively common constituent of the earth's crust, concentrations of copper minerals that can be economically recovered are rare. This contrasts markedly with other types of more common mineral resources, such as coal, sand and gravel, or limestone deposits, which are considerably more abundant and widespread. To justify the substantial investment necessary to develop a copper deposit, the deposit must be of sufficient quality (grade), size (tons), and geometric configuration (e.g., depth, etc.) to allow for a sufficient financial margin after meeting operating costs to amortize the initial investment and provide a reasonable return on investment. Financing of mine development is heavily dependent on accurate reporting of the known nature of the mineral deposits, and, as a consequence, the terminology used must follow generally accepted industry standards and securities regulatory agency requirements. (Appendix A explains this in detail.)

Determining the quality, size, and geometric configuration of a deposit is an expensive and time-consuming process. A mining project begins with the exploration of a geologically favorable region. As the results of more and more exploration and evaluation become available for the region, certain areas, called prospects, are targeted as being more favorable, i.e., as having the quality, size, and configuration conducive to profitable extraction. Increasingly detailed work will show what the relative potential of each targeted area is and typically identify the highest potential target area. Continued exploration is then focused on the area with the highest potential for profitable mineral extraction because the significant

time and expense involved in the exploration process for any one operator make simultaneous evaluation of all potential mineralized areas impracticable.

The advancement of a prospect during mineral exploration may then result in the identification of an initial Mineral Resource estimate. Mineral Resources are officially defined as: "*A concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge.*"[5] Mineral Resources are subdivided in order of increasing geological confidence into inferred, indicated, and measured categories, the definitions of which are provided below.

Inferred Mineral Resource – "*that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes.*" Due to the uncertainty that may be attached to Inferred Mineral Resources, it cannot be assumed that all or any part of an Inferred Mineral Resource will be upgraded to an Indicated or Measured Mineral Resource (see below) as a result of continued exploration.

Indicated Mineral Resource – "*that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics, can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough for geological and grade continuity to be reasonably assumed.*" An Indicated Mineral Resource estimate is of sufficient quality to support a preliminary feasibility study which can serve as the basis for major development decisions.

Measured Mineral Resource – "*that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit* (i.e., feasibility [see below] can be completed). *The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from*

[5] The definitions provided in this section were all obtained from *CIM DEFINITION STANDARDS – For Mineral Resources and Mineral Reserves*, prepared by the CIM Standing Committee on Reserve Definitions and adopted by the CIM Council on December 11, 2005.

locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough to confirm both geological and grade continuity.

The next major stage of a mineral exploration project is a feasibility analysis, which incorporates mine, metallurgical, and environmental engineering to determine what part of the Mineral Resource is economically extractable, and that part is referred to as the Mineral Reserve. Mineral Reserves have been officially defined as: "*The economically mineable part of a Measured or Indicated Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified. A Mineral Reserve includes diluting materials and allowances for losses that may occur when the material is mined.*" Material that cannot be considered as part of the economic Mineral Reserves must remain as Mineral Resource for reporting purposes. Mineral Reserves are subdivided in order of increasing economic confidence into probable and proven categories, as defined below.

Probable Mineral Reserve – "*the economically mineable part of an Indicated and, in some circumstances, a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified.*"

Proven Mineral Reserve – "*the economically mineable part of a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction is justified.*" Application of the Proven Mineral Reserve category implies that the person performing the evaluation (the "Qualified Person") has the highest degree of confidence in the estimate with the consequent expectation in the minds of the readers of the report.

Once the economic feasibility study has demonstrated a given mineral project to be economically viable, the next steps include detailed engineering, environmental impact analysis, and procurement of project financing. The geological Mineral Resource and economic Mineral Reserve are largely fixed at this point, but may be updated if additional information becomes available. In such circumstances, the additional information is usually incorporated into an economic feasibility study update.

It is conceivable, however, that a feasibility study may determine that no part of a Mineral Resource is economically extractable (given existing technologies), and in that case no Mineral Reserve would be identified. Development of such an ore deposit would therefore not be "practicable" under the 404(b)(1) guidelines.

If an offsite alternative consists solely of Mineral Resources, by definition there is insufficient information to determine if extraction is feasible (the industry's term) or practicable (the 404(b)(1)

guidelines' term). It is not until the feasibility study is complete, and the Mineral Reserve identified, that it can be determined whether or not a given project is "capable of being done" in light of cost, technology, and logistics. As such, offsite projects or properties for which only a Mineral Resource has been identified cannot be considered "practicable" alternatives until a feasibility study has been completed that determines them so. It is not simply that these offsite alternatives are not "practicable"; their practicability is unknown and unknowable absent a significant (i.e., expensive and time-intensive) exploration campaign and subsequent feasibility analysis.

With this as background, we move to discussion of the specific elements of practicability identified in the guidelines: availability, cost, and logistics and technology.

2.1.1.1 Availability

In order for development on a particular site to be practicable, the subject property must be under the Applicant's control or ownership, or reasonably available for acquisition. The Corps has directed the Applicant to evaluate availability as of the date of acquisition of the Rosemont Project, in 2005.

2.1.1.2 Cost

As a publicly held corporation, the Applicant has a fiduciary duty to stockholders to provide a reasonable rate of return on investment, commensurate with the risks associated with achieving those returns. Project costs affect the practicability of alternatives, especially with respect to costs that are substantially greater than the costs normally associated with the particular type of project. The relevance to practicability determination rests not in the Applicant's individual financial standing, but primarily in the characteristics of the project and what constitutes a reasonable expense for these types of projects for the industry as a whole. The alternatives were reviewed with respect to the effect of the alternative on overall Project cost and the generation of unreasonable expenses.

Offsite alternatives present a particular challenge from the standpoint of cost. In order to determine if a particular alternative is feasible, it is necessary to estimate the costs of developing the resource and measure those costs against industry standards, which typically means cost per pound of copper produced. The challenge with many offsite mineral resources is that the extent and configuration of the resource has not been adequately defined and so there is inadequate information on the amount of copper generated (so that a cost per pound can be calculated) and/or the capital costs of developing the alternative resource are not known (e.g., the amount of overburden that must be stripped is not known).

2.1.1.3 Logistics and Technology

Development of an MPO includes several logistical considerations, including mine stability—waste rock and tailings piles must be designed so as to be stable and to meet basic safety standards. Similarly, development of an open pit is done in an incremental way that ensures that the walls of the pit remain stable so as to allow continued mining.

2.1.2 Impacts to Aquatic Ecosystem

Specific criteria used to determine whether the development of an alternative mineral resource would result in less impact to the aquatic ecosystem include estimated impacts to waters of the U.S., including wetlands. Because the Project purpose and availability considerations effectively eliminated all offsite alternatives (see below), analysis of impacts to aquatic ecosystems is not discussed here. In general, the Rosemont site itself is located at the top of the watershed and is characterized by ephemeral watercourses, with a few isolated springs and occasional spring flow within short reaches in McCleary Canyon. There are no wetlands within the footprint of the proposed Project. As a general matter then, the presumption of available alternative sites found in the 404(b)(1) guidelines is not applicable here.

2.1.3 Other Environmental Impacts

Because the Project purpose and availability considerations effectively eliminated all offsite alternatives (see below), a detailed analysis of other environmental impacts associated with alternative mineral resources is not discussed here.

With regard to onsite alternatives, in addition to potential waters of the U.S., the Rosemont Project site supports sensitive species and habitats that may be affected by one or more of the evaluated alternatives. Sensitive habitats include the five classes of riparian habitats referenced above and described in WestLand (2010). The Rosemont Project site also supports habitat features for sensitive species, including roost sites for the federally listed lesser long-nosed bat and stock tanks in which the federally listed Chiricahua leopard frog has been observed. Both Scholefield and Fig Tree Springs, and perhaps Sycamore Spring, support the giant sedge, which is listed as "sensitive" by the U.S. Forest Service. A complete analysis of a broad suite of environmental resources is provided in the CNF EIS.

2.2 Offsite Alternatives

The 404(b)(1) guidelines provide that "an alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. If it is otherwise a practicable alternative, an area not presently owned by the applicant, which could reasonably be obtained, utilized, expanded or managed in order to fulfill the basic purpose of the proposed activity may be considered" (40 C.F.R. §230.10).

The following sections provide a discussion regarding the state of the copper mining industry in Arizona in 2005, as well as an analysis of the copper mining projects that were either underway or in the planning stage at that time.

2.2.1 Status of Copper Industry in 2005

The copper industry is very important in Arizona, with an estimated direct and indirect contribution to the Arizona economy of approximately $5.5 billion in 2007, the most current year for which this information

is available (Niemuth, 2008). At the time that Augusta bought the Rosemont Property, in 2005, Arizona produced over 60 percent of the nation's copper; however, nearly 100 percent of that copper came from just 10 large mines owned by four companies (Table 1; Niemuth, 2006). Figure 3 shows these facilities as they occur within the geographic range of the alternatives.

Table 1. Arizona Copper Mine Production, 2005 (Niemuth, 2006)

Mine	Ownership	% of Arizona Production
Morenci	Phelps Dodge and Sumitomo (now Freeport-McMoRan and Sumitomo)	51.9
Ray	ASARCO	14.8
Bagdad	Phelps Dodge (now Freeport-McMoRan)	10.5
Sierrita	Phelps Dodge (now Freeport-McMoRan)	10.3
Mission	ASARCO	6.1
Silver Bell	ASARCO and Mitsui	3.0
Pinto Valley	BHP	1.2
Miami	Phelps Dodge (now Freeport-McMoRan)	1.2
Mineral Park	Mercator	0.6
Tohono	Phelps Dodge (now Freeport-McMoRan)	0.3

In 2005, the price of copper had increased 29.5 percent over the previous year due to increased domestic and international demand, and was continuing to rise (Niemuth, 2006). In that environment, the companies listed in Table 1 were evaluating opportunities for expanding and rehabilitating their operations or otherwise increasing production to take advantage of this significant increase in copper price. As such, none of the sites listed in Table 1 were available for sale at the time that Augusta purchased the Rosemont Property. None of these sites therefore offered the possibility of being an available, practicable alternative within the scope of the Rosemont Project.

2.2.2 OFFSITE ALTERNATIVES

A number of other Arizona copper mining projects were in various stages of exploration or development in 2005 (Table 2; Niemuth, 2006). The locations of these projects are shown in Figure 4, and the projects themselves are described further below.

Additional discussion of these projects is provided below. Much of the information regarding the status of these projects was derived from their respective filings with the U.S. Securities and Exchange Commission and the Canadian Securities Administrators (CSA), all of which are publicly available online. In addition to the formal filings, these companies issued news releases marking significant milestones, which were also reviewed as part of this alternatives analysis.

Table 2. Arizona Copper Projects, 2005 (Niemuth, 2006)

Project	Ownership	Size and Confidence Level	Status
Safford (Dos Pobres/San Juan)	Phelps Dodge (now Freeport-McMoRan)	538 million tons proven and probable mineral reserves	In production as of December 2007
Lone Star	Phelps Dodge (now Freeport-McMoRan)	1,600 million tons estimated mineral resources	Continuing exploration by Freeport-McMoRan
Johnson Camp	Nord	35 million tons proven and probable mineral reserves	In production
Carlota	Quadra	105.7 million tons proven and probable mineral reserves 13 million tons inferred mineral resources	In production as of December 2008
Dragoon	BHP-Billiton	Unknown	BHP terminated agreement after exploration. Sporadic exploration in area by others.
Copper Creek	Redhawk Resources	27.4 million tons measured and indicated; 158.4 million tons inferred	Continuing exploration by Redhawk Resources
Resolution	Rio Tinto and BHP-Billiton	1.64 billion tons inferred mineral resources	Continuing exploration by Resolution Copper Mining
Monitor	Teck Cominco/ General Minerals	Unknown	GMC spun off HDG in 2007. Teck dissolved relationship after completion of exploration. In 2007 CSA filing, HDG identified potential exploration targets not hit by Teck. No mention of Monitor in 2008 filing.
Markham Wash	General Minerals	Unknown	GMC spun off HDG in 2007. Teck terminated relationship in May 2008 after completion of exploration. In June 2008, HDG dropped its interest in this property.
Oracle Ridge	Oracle Ridge Mining, LLC	8.14 million tons proven and probable mineral reserves 16.57 million tons inferred mineral resources	Inactive. Proposed exploration by buyer.
Bear Canyon	Arizona Copper Corporation	Unknown	Proposed exploration by Arizona Copper Corp.

2.2.2.1 Safford (formerly Dos Pobres/San Juan)

The Safford Mine, a combination of the previous Dos Pobres and San Juan projects, is an open pit copper mine located approximately 6 miles north of Safford, Arizona. The facility is owned by Freeport-McMoRan Copper & Gold and is a mine-for-leach project, producing copper cathodes. In 2005, the Safford Mine (then owned by Phelps Dodge Corporation, which has since been acquired by Freeport-McMoRan) was still in the process of acquiring state operating permits, including the state air permit. Phelps Dodge had expended considerable effort in permitting the Safford Mine, having initiated permitting in the early 1990s and finally achieving a Record of Decision and completed land exchange with the BLM in September 2005.

Size: An estimated 538 million tons of leachable ore, at 0.40 percent copper (proven and probable mineral reserves)

Availability: There was no indication that this facility was for sale in 2005, and it was therefore not available for purchase by Augusta.

Cost: Given the efforts of the current owner to develop the mine, this project is assumed to be practicable from a cost standpoint.

Logistics and Technology: Given the efforts of the current owner to develop the mine, this project is assumed to be practicable from a logistics and technology standpoint.

Summary of Practicability: The Safford Project was not available for purchase by Augusta in 2005, so it could not be considered a practicable alternative to the Rosemont Project.

2.2.2.2 Lone Star

The Lone Star deposit is located in the same mining district as the Safford Mine and is likewise owned by Freeport-McMoRan. The public lands that may be used for the development of this potential ore body were acquired as part of the same BLM land exchange that was completed for the Safford Mine. In 2005, feasibility level analysis had not yet been completed on the Lone Star deposit, and exploratory drilling was ongoing.

The Lone Star deposit was considered as an alternative to the Dos Pobres/San Juan (now Safford) project in that project's Section 404 permitting effort. Because exploration and feasibility level analysis had not yet been completed at the Lone Star deposit at the time of the Dos Pobres/San Juan alternatives analysis (1997), development of the Lone Star deposit was determined to be logistically impracticable.

Size: Estimated 1,600 million tons of leachable mineral resources (0.38 percent copper)

Availability: Like the Safford Mine, given the level of investment that Phelps Dodge had made on this deposit by 2005, there was no indication that this deposit was available for purchase by Augusta.

Cost: Unknown. However, it is reasonable to conclude that the proximity of the Lone Star deposit to the existing Safford Mine and its associated infrastructure will allow Freeport-McMoRan to mine this deposit (once feasibility is completed) far more economically than would a separate entity such as Augusta.

Logistics and Technology: Unknown, although, again, it is anticipated that development of this mineral resource (once feasibility is completed) would be considerably more logistically feasible for Freeport-McMoRan than for a separate entity such as the Applicant.

Summary of Practicability: Given that the Lone Star project was not available for purchase by Augusta in 2005, it could not be considered a practicable alternative to the Rosemont Project. In addition, Phelps Dodge was not reporting any mineral reserves resulting from a feasibility study as of 2005. The practicability of this deposit in terms of cost, logistics, and technology therefore could not be determined, so the Lone Star deposit could not be considered a viable alternative to the Rosemont Project.

2.2.2.3 Johnson Camp

The Johnson Camp Mine is an existing open pit copper mine located approximately 65 miles east of Tucson, in Cochise County, Arizona. The facility represents the principal holding of the Nord Resources Corporation (Nord) and was placed into care and maintenance in 2003 due to weak market conditions. Despite financial and legal troubles, Nord commissioned several feasibility studies between 2000 and 2005 for resuming operations at the Johnson Camp Mine. The results of these studies suggested that the initial capital costs for restarting operations were expected to exceed 30 million dollars, necessary for the rehabilitation of solution ponds, the construction of new leach pads, the purchase and installation of crushing and conveying equipment, and the installation of infrastructure required by these modifications. Nord was seeking financing during this period in order to initiate these efforts. As of 2005, Nord was the owner of the entirety of the Johnson Camp property and the owner or holder of all associated claims.

Size: 35 million tons proven and probable (0.39 percent copper). The remaining ore body is much smaller than the Rosemont deposit.

Availability: As stated above, the mine was the principal asset of the company and there was no indication that the mine was for sale in 2005.

Cost: Unknown. Preparation of feasibility studies suggests it is practicable.

Logistics and Technology: Unknown

Summary of Practicability: Given that the Johnson Camp Mine was not available for purchase by Augusta in 2005, it could not be considered a practicable alternative to the Rosemont Project.

2.2.2.4 Carlota

The Carlota Copper project is an open pit copper mine located approximately 6 miles west of Miami, on the border of Gila and Pinal Counties, Arizona. Construction on the project had not yet commenced in 2005. Quadra Mining Ltd. (Quadra) purchased the property from Cambior Inc. (Cambior) in December 2005 for approximately 39.7 million dollars. Cambior had previously completed a feasibility study for the operation in October 2005 and obtained all the permits necessary for the mine's operation when it opted to sell the operation to Quadra. At the time of the sale, two of the previously approved permits for the

project (the state air permit and the Environmental Protection Agency National Pollutant Discharge Elimination System permit) were the subject of litigation that had the potential to affect the construction or operation of the Carlota project.

Size:	105.7 million tons measured and indicated (0.39 percent copper); 13 million tons inferred (0.29 percent copper). The ore body is much smaller than the Rosemont deposit.
Availability:	Project purchased by Quadra in 2005 and was therefore not available to Rosemont.
Cost:	Given the efforts of the current owner to develop the mine, this project is assumed to be practicable from a cost standpoint.
Logistics and Technology:	Given the efforts of the current owner to develop the mine, this project is assumed to be practicable from a logistics and technology standpoint.
Summary of Practicability:	The Carlota Copper project was not available for purchase by Augusta in 2005, so it could not be considered a practicable alternative to the Rosemont Project.

2.2.2.5 Dragoon

The Dragoon property is a copper exploration prospect near Benson, in Cochise County, Arizona. General Minerals Corporation (GMC) announced the acquisition of the rights to the Dragoon copper prospect in November 2002. In that announcement, GMC characterized the property as an exploration "prospect" and a "drill target," and indicated that a certain highly prospective portion of the property had "never been drilled." In a subsequent announcement (dated April 10, 2003) relating to the completion of geophysical studies, GMC stated that earlier drilling on the Dragoon property "indicated the presence of weak sulphide mineralization" and that its goal was a "further refinement of the target." About one year later, GMC issued a press release (dated March 5, 2004) relating to an update of its world-wide exploration activities in which it described itself as an "early stage exploration[ist]" with the ultimate goal of "identify[ing] properties with discovery potential." Interestingly, although GMC provided significant information relating to certain of its properties, it only mentioned Dragoon in passing, indicating that the property is "attracting interest from potential joint venture partners." Shortly thereafter (May 2004), GMC announced the completion of four technical reports, none of which related to Dragoon. Notwithstanding, GMC did strongly indicate at that time its strategy: "wealth creation through mineral exploration discovery and success."

In April 2005, GMC announced that it had entered into an exploration earn-in with BHP Billiton (BHP) whereby BHP agreed to make certain exploration expenditures to earn up to a 70 percent joint venture interest in the property. In this announcement, GMC continued to characterize the Dragoon property as an exploration property with portions that had never been drilled. Subsequent to entering into the earn-in joint venture, BHP initiated a drilling program at Dragoon, consisting of three to five holes of between 1,200 and 2,500 meters. Shortly thereafter, BHP withdrew from the joint venture, indicating that the

Dragoon property drilling program identified only "weakly anomalous copper and molybdenum values," which "provided insufficient incentive for [it] to continue with the project." (See GMC press release dated April 21, 2006.)

Consistently over time, GMC characterized the Dragoon property as an exploration property. None of the press releases suggested that the weakly mineralized area at Dragoon was a proven or mineable reserve, or that the property was ready for development into a mine. Indeed, over a three-and-one-half-year period, GMC never once reported a quantified resource for Dragoon (such as the tons and grade of ore). As such, it can only be concluded that the information required to make a determination of whether the Dragoon property was a viable and/or practicable alternative to the Rosemont Project was simply not known.

Size: Unknown

Availability: Unknown

Cost: Unknown

Logistics and Technology: Unknown

Summary of Practicability: As described above, the Dragoon prospect was still in the early phases of exploration in 2005 and any potential mineral reserves were unknown. As such, the practicability of this project in terms of cost, logistics, and technology could not be determined without extensive additional exploration and feasibility analysis. Subsequent exploration efforts have consistently failed to identify a viable mineral reserve. The Dragoon Copper prospect therefore could not be considered a viable alternative to the Rosemont Project.

2.2.2.6 Copper Creek

The Copper Creek property is the proposed location of an underground copper mine approximately 75 miles northeast of Tucson, in Pinal County, Arizona. Redhawk Resources, Inc. (Redhawk), purchased the 7-square-mile property in 2005 for a total acquisition cost of approximately 1.8 million dollars. This purchase represented the culmination of two years of negotiations between Redhawk and the previous owner of the project. Although located at the intersection of known porphyry copper deposits, the Copper Creek property required significant further drilling to complete scoping and feasibility studies. As of March 2006, Redhawk was still in the process of exploring the Copper Creek mineral body and was unsure if the property contained an ore reserve that was economically recoverable.

Size: Current estimates show an estimated 27.4 million tons measured and indicated mineral resources, with another 158.4 million tons inferred. The estimated mineral resource therefore is much smaller than the Rosemont deposit.

Availability: Given Redhawk's two-year involvement with the property owner, it is reasonable to conclude that the Copper Creek property was not available for purchase by Augusta in 2005.

Cost: Unknown

Logistics and Technology: Unknown

Summary of Practicability: Given that the Copper Creek property was not available for purchase by Augusta in 2005, it could not be considered a practicable alternative to the Rosemont Project. In addition, Redhawk was still in the exploration phase of the project in 2005, so that the practicability (in terms of cost, logistics, and technology) of developing the Copper Creek deposit could not be determined. Copper Creek is therefore not a viable alternative to the Rosemont Project.

2.2.2.7 Resolution

The Resolution property is the current location of an ongoing program of exploration and pre-feasibility studies for a proposed deep underground copper mine near Superior, in Pinal County, Arizona. In 2002, Rio Tinto Ltd (Rio Tinto) earned a 55 percent share of the project after spending 25 million dollars on an exploratory program, leaving BHP with a 45 percent share. In 2005, the two companies reached an agreement to accelerate exploration in the following year. At that time, the joint venture was awaiting (and continues to wait for) the passage of a land exchange introduced in the U.S. House and Senate.

Size: Current estimate of 1.64 billion tons (inferred)

Availability: At the time of Augusta's purchase of the Rosemont Property, both BHP and Rio Tinto were heavily invested in the development of the property and the outcome of the proposed federal legislation. There was no indication that the Resolution property was available for sale at this time.

Cost: Unknown. Actions of the ownership group in pursuing land exchange and development suggest that the project is practical from a cost perspective, but the ongoing exploratory drilling program suggests that information regarding known resources is currently insufficient to support a feasibility study. In addition, the capital investment requirements represented a significant obstacle to Augusta's participation in the Resolution project (see "Logistics and Technology" discussion below).

Logistics and Technology: The Resolution copper deposit is located nearly 1.5 miles below the ground surface and will require an enormous investment in infrastructure and technology to extract, making the Resolution project one of the most complex and challenging mining projects in North

America. Only a very few mining companies in the world would have the capability to develop the project, and Resolution Copper Mining is comprised of two of the largest and most well capitalized of these firms (Rio Tinto and BHP). According to the Financial Times Global 500 Rank 2005, BHP was the largest mining company in the world in 2005, with a market capitalization of $81.1 billion (as of March 31, 2005) and total annual revenues of $22.9 billion (year-end June 30, 2004). The second largest mining company was Rio Tinto, with a market capitalization of $45.2 billion (as of March 31, 2005) and total annual revenues of $11.3 billion (year-end December 31, 2004).

By comparison, during the month of March 2005, Augusta Resource Corporation's market capitalization ranged between $37 and $61 million. During the same period, Augusta Resource Corporation's revenues were essentially nil, as it did not maintain any revenue-generating mineral operations.

Given the fact that the two largest mining companies in the world joined together to advance the Resolution Copper deposit because of the significant capital required and the technological challenges associated with developing such a large and deep resource, it is apparent that Augusta Resource Corporation, with such limited financial capitalization, could not have participated in Resolution Copper.

Summary of Practicability: Given that the Resolution project was not available for purchase by Augusta in 2005, it could not be considered a practicable alternative to the Rosemont Project. In addition, the Applicant was not in a financial position to address the significant technological and logistical challenges associated with advancing the Resolution Copper project.

2.2.2.8 Monitor

The Monitor property is a copper exploration prospect near Hayden, in Pinal County, Arizona. GMC announced the acquisition of the rights to the Monitor copper prospect in January 2004. In that announcement, GMC indicated that it had "delineated an area of approximately 2 square kilometers with characteristics suggestive of an underlying porphyry copper target." A few months later, GMC issued a press release relating to an update of its world-wide exploration activities, in which it described itself as an "early stage exploration[ist]" with the ultimate goal of "identify[ing] properties with discovery potential." Interestingly, although GMC provided significant information relating to certain of its properties, it only mentioned Monitor in passing, indicating that the property is "attracting interest from potential joint venture partners." Shortly thereafter, GMC announced the completion of four technical reports, one of which related to Monitor. In that announcement, GMC strongly stated its strategy: "wealth creation through mineral exploration discovery and success." GMC concluded in the Monitor technical report that additional surface work consisting of detailed mapping and rock chip and soil sampling should be conducted, which would aid in the refinement and prioritization of various drill targets. (See Report on Monitor property, Pinal County, Arizona, Randall L. Moore, May 19, 2004.) In a June 2004 press release, GMC provided an update to the exploration activity at Monitor, indicating that it continued to be

encouraged by the results and reiterating that the property exhibited characteristics suggestive of an underlying porphyry copper occurrence.

In February 2005, GMC announced that it had entered into an exploration earn-in with Teck Cominco (Teck) whereby Teck agreed to make certain exploration expenditures to earn up to a 65 percent joint venture interest in the property. Subsequent to entering into the earn-in joint venture, Teck initiated a drilling program at Monitor, consisting of six holes of varying depths. GMC announced the results of the Teck drilling program in June 2006. Not long thereafter, Teck withdrew from the joint venture, indicating that the results of the drilling program were "inconclusive."

In 2007, GMC spun off its North American mining unit into High Desert Gold Corporation (HDG). In 2007, HDG's CSA filing indicated that Teck's drill program "has shown the possibility for high-grade structurally controlled mineralization does not exist immediately below the old workings in the Monitor area," but identified other potential exploration targets. There is no further mention of the Monitor property in HDG's subsequent securities filings or currently on its website.

Consistently over time, GMC characterized the Monitor property as an exploration property. None of the press releases or technical reports suggested that the mineralized area at Monitor was a proven or mineable reserve, or that the property was ready for development into a mine. Indeed, over a nearly three-year period, GMC never once reported a quantified resource for Monitor (such as the tons and grade of ore). As such, it can only be concluded that the information required to make a determination of whether the Monitor property was a viable and/or practicable alternative to the Rosemont Project was simply not known.

Size: Unknown

Availability: There is no indication that the Monitor property was available for sale in 2005.

Cost: Unknown

Logistics and Technology: Unknown

Summary of Practicability: As described above, the Monitor prospect was still in the exploration phase in 2005 when Augusta purchased the Rosemont Property, and any potential mineral reserves at Monitor were unknown. As such, the practicability of this project in terms of cost, logistics, and technology could not be determined without extensive additional exploration and feasibility analysis. As indicated above, the results of the exploration program subsequent to 2005 appeared to be mixed with regard to the potential for economically extractable ore. The Monitor prospect therefore could not be considered a viable alternative to the Rosemont Project.

2.2.2.9 Markham Wash

The Markham Wash property is a copper exploration project near Safford, Graham County, Arizona. In December 2004, GMC announced the acquisition of certain additional rights to the Markham Wash copper prospect. In that announcement, GMC indicated that it had "detected three high-priority anomalies" within an area of approximately 4 square kilometers that it "interpreted as representing sulphide mineralization related to a porphyry copper system," which prior drilling did not appear to have tested. GMC also stated that its "observations and conclusions further support the target being...a[n undiscovered] buried porphyry copper system."

In March 2006, GMC announced that it had entered into an exploration earn-in with Teck whereby Teck agreed to make certain exploration expenditures to earn up to a 65 percent joint venture interest in the property. About one year later, GMC announced that it intended to spin off its North American assets to a new gold-copper-focused publicly traded company (HDG). The preliminary prospectus for HDG characterized the Markham Wash property as an early stage exploration prospect, classifying it as non-material "[o]ther [p]roperties" owned by HDG in the United States. Subsequent to the spinoff and entering into the earn-in joint venture, Teck initiated a drilling program at Markham Wash, consisting of two holes at approximately 600 meters depth each. Not long thereafter, Teck withdrew from the joint venture. In June 2008, HDG dropped its interest in the property.

Consistently over time, GMC and HDG characterized the Markham Wash property as an exploration prospect. None of the press releases or the preliminary prospectus suggested that the mineralized area at Markham Wash was a proven or mineable reserve, or that the property was ready for development into a mine. Indeed, over a nearly three-and-one-half-year period, GMC and HDG never once reported a quantified resource for Markham Wash (such as the tons and grade of ore).

Size: Unknown

Availability: There is no indication that the Markham Wash property was available for sale in 2005.

Cost: Unknown

Logistics and Technology: Unknown

Summary of Practicability: As described above, the Markham Wash prospect was in the early phase of exploration in 2005, and any potential mineral reserves were unknown. As such, the practicability of developing this deposit in terms of cost, logistics, and technology could not be determined without extensive additional exploration and feasibility analysis. Subsequent exploration efforts have consistently failed to identify a viable mineral reserve. The Markham Wash prospect therefore could not be considered a viable alternative to the Rosemont Project.

2.2.2.10 **Oracle Ridge**

The Oracle Ridge Copper Mine is a historic underground copper mine near Tucson, in Pima County, Arizona. The mine, which began operating in 1991, eventually closed in 1996 after operating difficulties and poor copper prices. Although some feasibility studies were completed in 1994, estimates of 18 million tons of proven copper reserves at the mine still have not been validated.

Pima County records show that in May 2004 the owners of the Oracle Ridge Copper Mine—Oracle Ridge Mining Partners—conveyed a group of patented mining claims consisting of approximately 927 acres to Marble Mountain Ventures LLC (MMV), an entity presumed to be engaged in a non-mining-related real estate investment and development business.

On the same day that MMV acquired the group of patented mining claims, it recorded a Declaration of Covenants, Conditions & Restrictions (CCRs) significantly restricting the use of the patented mining claims by all subsequent owners. Among other things, the CCRs indicated that although the CCRs did not apply to MMV, MMV "shall not engage in any mass industrial mining." Further, the CCRs indicated that none of the owners of the patented mining claim group subject to the CCRs may engage in mass industrial mining, which was defined as a mining operation of the scope and magnitude that was performed on the property over the last 50 years.

Immediately after recording the CCRs, MMV conveyed an approximately 334-acre portion of the mining claim group to LW Holdings, L.L.C. (LWH), and an approximately 167-acre portion of the mining claim group to Old Pueblo Associates, LLC (OPA). The mineral interest was reserved to MMV in both these conveyances. In August 2004, the 167-acre portion of the mining claim group was conveyed by OPA to Stratton Springs Canyon, LLC, which subsequently conveyed the same to Regal Manor Condominiums, L.L.C. (RMC), in February 2007.

In March 2005, MMV conveyed an approximately 160-acre portion of the mining claim group to Summerland Ventures LLC (Summerland). The mineral interest was reserved to MMV in this conveyance.

On February 19, 2010, MMV, LWH, RMC, and Summerland, the collective owners of the 927-acre group of the Oracle Ridge Copper Mine patented mining claims, recorded a termination of the declaration of the CCRs, which extinguished, terminated, and forever released the restrictions associated with the CCRs. On the same day, MMV recorded a memorandum of agreement indicating that it had entered into an agreement to convey certain mineral rights associated with the patented mining claim group to Oracle Ridge Mining, LLC (ORM). Immediately thereafter, ORM recorded a memorandum of lease indicating that it had entered into an industrial lease agreement with MMV regarding certain surface rights associated with a portion of the patented mining claim group owned by MMV.

In a series of press releases issued between the months of August and September 2010, Gold Hawk Resources, Inc. (GHR), announced the acquisition of ORM, along with all the subsurface mining rights and the surface mining rights needed to explore, rebuild, and operate the Oracle Ridge Copper Mine.

GHR has proposed an exploratory and mapping program to verify resource estimates should the sale be approved.

The chronology above indicates that a real estate investor purchased the Oracle Ridge Mining property, apparently for non-mining real estate investment or development purposes in May 2004, and by the declaration of the CCRs, immediately placed restrictions on future owners of the property from conducting any mining-related activities on the property. With the CCRs in place, the original investor presumably was able to sell off portions of the group of patented mining claims to other real estate investors. In February 2010, the original investor, along with all the subsequent owners/investors of the group of patented mining claims, terminated the CCRs, thereby providing the potential opportunity for mining to once again resume on the property. Given the fact that the property was severely restricted by the CCRs between May 2004 and February 2010, the Oracle Ridge Copper Mine property was not available for sale as a viable mining property during that period of time.

Size:	Current estimates of 8.14 million tons proven and probable ore (2.33 percent grade); 16.57 million tons additional possible or inferred. The estimated size of this ore body is much smaller than that of the Rosemont deposit.
Availability:	As indicated above, the Oracle Ridge deposit was not available for purchase as a mine property in 2005.
Cost:	Unknown
Logistics and Technology:	Unknown
Summary of Practicability:	As indicated above, the current purchaser of this project is proposing an exploratory evaluation to confirm the reserve estimates that were calculated back in the 1990s. As such, it is difficult to ascertain what the practicability of the project would be. However, as stated above, the project was not available for purchase as a mine project in 2005.

2.2.2.11 Bear Canyon

Bear Canyon is a recently recognized porphyry target within the historic Bisbee copper-producing region, approximately 28.8 miles west of Bisbee's Copper Queen Mine in Cochise County. Although mineralization within the Bear Canyon area has been known since the 1880s, with minor wartime production during World Wars I and II (primarily tungsten and antimony with limited gold and silver), the porphyry deposit was not identified until 2007. Arizona Copper Corporation, the owner of the Bear Canyon project, is in the process of acquiring permits to initiate an exploratory drilling program at the project.

Size: Unknown

Availability: At the time Augusta purchased the Rosemont Property in 2005, the Bear Canyon project was an unknown and unquantified resource and, in fact, had not yet been discovered as a potential copper resource. The Bear Canyon project was therefore not available to Augusta as an alternative to the Rosemont Project.

Cost: Unknown

Logistics and Technology: Unknown

Summary of Practicability: As described above, because the Bear Canyon project was not identified until 2007, it was not available to Rosemont in 2005 and it is therefore not a practicable alternative to the Rosemont Project.

2.2.3 ROSEMONT-OWNED OFFSITE ALTERNATIVES

Recent and historical exploration has identified three mineral deposits in the vicinity of the Rosemont ore body, within the contiguous Rosemont patented claims. These areas are referred to, from east to west, as Broad Top Butte, Copper World, and Peach-Elgin (Figure 5). Details related to the history of these deposits and their exploration are provided in Appendix A.

During the earlier exploration period of the Rosemont area from the 1950s to the 1970s, extensive exploration of the Rosemont Property started on a regional basis and then progressed to a number of more specific deposits, including the Rosemont, Broad Top Butte, Copper World, and Peach-Elgin deposits. By about the middle 1970s, the cumulative results of the mineral evaluations from across the Rosemont Property had already identified the Rosemont deposit as the site with the best potential for being developed into an economic mine, and hence Rosemont became the focus of subsequent work. The primary attributes of the Rosemont deposit that made it attractive were its significant size (estimated now at over 600 million tons of ore), favorable metal grades, and low stripping ratio, all of which contribute to the economic viability of deposit development.

Because of the focus on the Rosemont deposit, considerably more exploration drilling had been completed at the Rosemont deposit than at the other three nearby deposits at the time Augusta purchased the Rosemont Property in 2005 (over 200,000 feet of core for Rosemont and just over 30,000 feet for the other three resources combined). In 1977, then owner Anamax commissioned an estimate of the Rosemont deposit that identified a geological resource of about 445 million tons of ore. Building on this information, ASARCO, in 1997, commissioned a preliminary feasibility analysis that identified a "mineable resource" at the Rosemont deposit of nearly 341 million tons at an average grade of 0.64 percent copper. Although neither of these estimates met the modern definition of "Mineral Resource" or "Mineral Reserve," the extensive core data and analysis that had been completed on the

Rosemont deposit allowed Augusta to readily develop a modern mineral resource estimate for the deposit with some additional drilling and analysis. A mineral reserve for the Rosemont deposit was estimated following the completion of a preliminary feasibility study in 2007, and the Reserve was revised to its current estimate after additional feasibility analysis was completed in 2009.

By comparison, evaluation to date of the Broad Top Butte, Copper World, and Peach-Elgin deposits has provided, at best, only a preliminary estimate of the inferred mineral resource at these areas. Details related to these deposits are provided in the following sections, with additional detail provided in Appendix A.

2.2.3.1 Broad Top Butte

At the Broad Top Butte resource, Anamax carried out an estimate in 1979 that found a mineral resource of 8.8 million tons at an average grade of 0.77 percent copper and 0.037 percent molybdenum. This estimate must be considered to be historical in nature and is not necessarily consistent with current industry practices and securities reporting requirements. The Applicant estimates it will take at least five years and 12 million dollars to conduct the necessary drilling and engineering to advance the property to a possible economic feasibility stage, although, as is the nature with any early stage exploration mineral project, there are no guarantees that such a project will eventually be shown to be economic by a feasibility study.

The Broad Top Butte resource estimate is only a minor fraction (1.6 percent) of the mineable reserves identified at the Rosemont deposit. In addition, given the lack of information for this resource, it could not yet be considered a viable mineral resource under current definitions. The Broad Top Butte resource has potential as a smaller satellite area of production, but is not a viable substitute for the planned Rosemont deposit production.

Size: Current estimates show 8.8 million tons of mineral resource.

Availability: Available in the sense that Rosemont owns the deposit.

Cost: Unknown. However, as indicated above, the cost just to complete exploration and feasibility analysis for this deposit is estimated at approximately 12 million dollars.

Logistics and Technology: Largely unknown, although considerations of logistics and technology would presumably be similar to those for the Rosemont deposit.

Summary of Practicability: Given the lack of information about this deposit, the feasibility of its extraction cannot be determined until a full exploration campaign and feasibility analysis are completed. Because of the considerable additional time and expense required to complete such an exercise, Broad Top Butte could not be considered a practicable alternative from a cost perspective and is therefore not a viable alternative to the Rosemont Project.

2.2.3.2 Copper World

The Copper World deposit contains mineralization that was mined by a historical small-scale, high-grade mine. Little is known of the remaining mineralization, other than variable results from a few widely scattered drill holes. There is not enough information for the Applicant or predecessor companies to have estimated a mineral resource. It is most likely that a small deposit of low-grade mineralization may remain at Copper World that is only a fraction of what the mineable mineral reserve is for the Rosemont deposit. The Applicant estimates that it would take three and one half years and 7 million dollars to determine the economic feasibility of this resource.

Like the Broad Top Butte resource, the considerable lack of information related to the Copper World deposit makes it impossible to categorize this deposit as a viable mineral resource under the current definition. Based on the very limited information that is available, it seems likely that whatever mineral resource remains at the Copper World deposit would be far smaller than the Rosemont deposit. As with the Broad Top Butte resource, the Copper World deposit has potential as a small satellite area of production, but not as a reasonable alternative to the Rosemont Project.

Size: Unknown, although likely much smaller than the Rosemont deposit.

Availability: Available in the sense that the Applicant owns the deposit.

Cost: Unknown. However, as indicated above, the cost just to complete exploration and feasibility analysis for this deposit is estimated at approximately 7 million dollars.

Logistics and Technology: Largely unknown, although the location of the deposit on the west side of the Santa Rita Mountain ridgeline would significantly affect logistical considerations when compared to the Rosemont Project.

Summary of Practicability: Given the lack of information about this deposit, the feasibility of its extraction cannot be determined until a full exploration campaign and feasibility analysis are completed. Because of the considerable additional time and expense required to complete such an exercise, Copper World could not be considered a practicable alternative from a cost perspective and is therefore not a viable alternative to the Rosemont Project.

2.2.3.3 Peach-Elgin

At the Peach-Elgin deposit, Anaconda carried out an estimate in 1964 that found a mineral resource of 13.7 million tons of sulfide mineralization at an average grade of 0.78 percent copper and 0.037 percent molybdenum, along with 9.7 million tons of oxide mineralization averaging 0.72 percent copper. In producing this estimate, Anaconda drilled a number of additional holes in the 1960s, the records for which were permanently lost before the Applicant obtained the property and property information. As with the 1979 Broad Top Butte estimate, this mineral resource estimate should be considered historical in nature and not necessarily consistent with current industry practices and securities reporting requirements.

This resource is likewise very small, comprising only 4.3 percent of the mineable reserves identified at the Rosemont deposit. In addition, as with the other two nearby mineral resources, the Peach-Elgin deposit has potential as a satellite area of production, but not as a reasonable alternative to the Rosemont deposit.

Size: Current preliminary estimates show 23.4 million tons of mineral resource, which is much smaller than the Rosemont deposit.

Availability: Available in the sense that the Applicant owns the deposit.

Cost: Unknown

Logistics and Technology: Largely unknown, although the location of the deposit on the west side of the Santa Rita Mountain ridgeline would significantly affect logistical considerations when compared to the Rosemont Project.

Summary of Practicability: Given the lack of information about this deposit, practicability in terms of cost, logistics, and technology cannot be determined until a full exploration campaign and feasibility analysis are completed. Such an effort to determine the practicability, or feasibility, of the Peach-Elgin deposit would not meet the Project purpose to "mine copper." As such, the development of the Peach-Elgin deposit could not be considered a viable alternative to the Rosemont Project.

2.2.4 OFFSITE ALTERNATIVES SUMMARY

The Applicant has completed an evaluation of a significant number of offsite alternatives over an expansive geographic area (more than 33,000 square miles). None of these alternatives represents a practicable alternative to the Rosemont Project due to lack of availability, lack of known resources to support a feasibility analysis, and/or inability to meet the overall Project purpose due to size. As such, there are no viable offsite alternatives to the Rosemont Project.

2.3 ONSITE ALTERNATIVES

The formulation of onsite alternatives has been based on information provided by the CNF and the Applicant, and is consistent with typical mine planning approaches. In proposing a leach and SX/EW operation for oxide ore and mill and concentrate operation for sulfide ore with an open pit copper mine, the Applicant has already determined that an underground mine or *in situ* leach operation is not practicable and that the mineralogical characteristics of the leachable ore deposits make other extraction and processing techniques inappropriate. Alternative mining techniques that were considered, but dismissed from further evaluation, are addressed in the EIS being completed for the Project.

The formulation of alternative mine development scenarios for an open pit copper mine is tied to the pit location, as the location of the deposit and considerations related to the appropriate pit location, depth,

and configuration are dependent on the location and arrangement of the ore deposit. For the proposed Project, a floating cone evaluation of the Rosemont deposit resulted in the pit configuration proposed by the Applicant in the 2007 MPO (WestLand, 2007). The floating cone evaluation of potentially economic pit limits is based on a variety of criteria, including the nature and extent of the ore body that can be economically developed, as influenced by projected future copper prices, projected capital and operating expenses, and financial risk factors, and pit stability considerations which set the appropriate setbacks, pit wall slopes, and benching necessary to achieve stable slopes and appropriate safety standards.

Onsite alternatives reflect a variety of configurations, which come primarily from the development and location of heap leach pads, dry stack tailings, waste rock storage, plant site facilities, and onsite and offsite ancillary facilities. Once the pit size and volumes of waste rock, dry stack tailings, and leachable or concentratable ore were defined, the configuration of suitable storage locations for waste rock and dry stack tailings and the acceptable locations for leach stockpiles and processing facilities could be identified. The placement of waste rock, dry stack tailings, heap leach pads, and processing facilities relative to the pit and to each other is not completely independent. There are various technical constraints relative to the interrelated aspects of these components that affect the location and configuration of each with respect to the others in each alternative. In addition to the configuration alternatives, there is one alternative relative to the sequencing of the dry stack tailings.

The development of leachable and concentratable reserves within the Rosemont deposit will result in a relatively fixed volume of material that must be accommodated in the various locations proposed for alternatives, in a manner that is practicable while achieving the Project's overall purpose and need.

The area considered suitable for the evaluation of onsite alternatives is bounded by specific topographic and geographic features. In general, the analysis area is bounded on the west by the ridgeline of the Santa Rita Mountains and on the east by SR 83. The southern boundary of the analysis area was established by the watershed boundary of Cienega Creek, a sensitive riparian resource east of the Project site. Where no topographic or geographic feature constrains the mine plan area, cost considerations for haulage distance also limit the consideration of appropriate alternatives. The relationship between haulage distance and cost creates economic and sometimes logistical constraints that affect the practicability of alternatives.

2.3.1 ONSITE ALTERNATIVES DEVELOPMENT

2.3.1.1 Onsite Alternatives Considered but Dismissed

An expansive suite of alternatives was considered and dismissed as part of the draft EIS development process. Some examples include the mechanical conveyance of ore to a rail head, *in situ* mining in lieu of an open pit, and use of desalinated sea water for mining and ore processing. These alternatives and the rationale for their dismissal are discussed in detail in the EIS or in the EIS supporting documentation.

In addition to the EIS alternative development process, the Applicant evaluated a number of other onsite alternatives that were quickly dismissed due to obvious and significant adverse environmental effects.

- ***Expand Pit West Through Ridge:*** The Rosemont ore body includes economically recoverable reserves that would require expansion of the pit west through the Santa Rita Mountain ridgeline, including Weigles Butte. However, this larger pit would significantly impact the view of the Santa Rita Mountains from the heavily populated Sahuarita and Green Valley areas. This alternative would have also resulted in a significant increase in waste rock and tailings to be disposed of. Given these factors, the Applicant elected to limit the size of the pit to the MPO configuration.

- ***Conventional Tailings Design:*** The Applicant completed a tailings siting study in 2006 (Vector 2006) to identify potential locations for the development of a tailings facility. The study focused on conventional (slurry) tailings, but also evaluated the potential benefits of the use of dry stack tailings. The study concluded that conventional tailings facilities would result in a larger footprint than a comparably located dry stack tailings facility, predominantly because development of a conventional tailings facility requires the construction of a significant downgradient dam to contain the slurried tailings material. The sizes of the conventional tailings facilities evaluated in the siting study ranged from approximately 1,300 to 2,700 acres. Under the current design for the phased tailings, the total area of dry stack tailings material and surrounding buttress is approximately 1,100 acres. Although an analysis of the impacts to potential waters of the U.S. resulting from these larger tailings facilities has not been completed, it is assumed that the increase in impacts would have been commensurate with the increase in size of the facilities.

  The size of the conventional tailings facilities was such that the total volume of an appropriately sized tailings facility and the waste rock material from the operations could not be restricted to a single drainage basin (i.e., Barrel Canyon). Use of a conventional tailings facility therefore would have required development in another drainage basin, such as Sycamore Canyon or east of SR 83 in upper Davidson Canyon, with waste rock being deposited in Barrel Canyon, significantly increasing the geographic scope of the Rosemont Project. The conventional tailings dam had other significant environmental drawbacks as well:

  - Requires considerably more water usage than dry stack tailings
  - Increased risk of seepage to groundwater
  - Increased risk of windblown tailings
  - No opportunity for concurrent reclamation

  Given the larger footprint and significant environmental disadvantages of a conventional tailings design, the Applicant did not pursue this alternative further.

2.3.1.2 Selected Onsite Alternatives

Various configurations of the largest Project structural elements (i.e., heap leach pads, dry stack tailings, and waste rock storage) have been considered. In addition, one alternative is considered that changes the configuration of the pit. Six alternatives affecting the configuration of the mine plan elements and other items are contemplated in this document. The onsite alternatives will be detailed and analyzed in Chapter 3, and are identified as follows:

- Alternative 1: Mine Plan of Operations
- Alternative 2: Alternative Tailings Sequence
- Alternative 3: Barrel Canyon Only
- Alternative 4: Barrel Canyon Only, Landforming
- Alternative 5: Scholefield Tailings
- Alternative 6: Modified Pit Configuration

2.3.2 ELEMENTS COMMON TO ALL ONSITE ALTERNATIVES

Certain elements of the Project planning have not been individually evaluated in the discussion of the alternatives provided below. These items are common to all the alternatives and are listed here to provide an overall understanding of the Project and the context of the alternatives considered, and to reduce the need to describe the common elements within the description of each alternative. These items are described below.

Production Rates, Processing Facility Output, and Types of Equipment: Production rates, processing facility output, and types of equipment used will be the same for all the onsite alternatives. Exploration activities have identified the availability of approximately 600 million tons of ore, and the Project is expected to produce approximately 230 million pounds of copper per year for approximately 20 years for each alternative. The average annual production of molybdenum and silver is projected to be 5 million pounds and 3.5 million ounces, respectively. There is one exception to the expected production: an alternative that considers a smaller pit (Alternative 6), which will reduce the total availability of ore for production. The major mining equipment on site will include drills, loading units, trucks, and support units. The types of equipment will be similar within each alternative, although there may be different quantities of equipment required for the various alternatives and throughout the life of each alternative.

Mineral Processing Operations and Techniques: Mineral processing operations and techniques will be the same for each of the alternatives. Mining of the ore will be through conventional open-pit mining techniques. Mining operations will be carried out in the open pit with benches that are 50 feet in height. The pit will be constructed to meet the standards required for stability as identified by the Applicant's geotechnical engineering analysis and will conform to Mine Safety and Health Administration standards.

Waste rock will be blasted and transported by haul truck to the waste rock storage areas. Ore will be blasted and either transported by haul truck to the leach pad or crushed and loaded onto a conveyor for transport to the mill, depending on the type of ore. Ore will be processed either by conventional sulfide milling or by oxide leaching. The copper concentrates from the milling operations (sulfide material) will be shipped offsite to a smelter. Leach ore (oxide material) will be placed on the leach pad. The heap leach facility will be large enough to contain all the oxide material processed on a lined leach pad. Drainage around the facility will be provided by the stormwater management facilities. Sufficient pond sizing will be available for emergency overflow containment of the 100-year, 24-hour storm event, with pumping

capacity to manage additional flows. Solutions from the pad will be collected in a solution pond and then processed through the SX/EW plant. Copper cathodes generated from the SX/EW plant will be transported offsite for further processing.

Waste rock buttresses will be constructed for the dry stack tailings facilities. The tailings will be filtered prior to disposal and delivered by conveyor from the filter plant to the tailings disposal location to be placed with a radial stacker against the starter buttresses. The tailings location in Scholefield Canyon may alternately use a tailings slurry pipeline for transportation from the main plant site to a filter plant located nearer to the tailings disposal location, although the ultimate disposal will be via dry stack tailings.

General Plant Site Location: The location of the plant site with respect to the pit is similar for all the onsite alternatives. The arrangement of facilities within the plant site may change to better accommodate the configuration of the heap leach and tailings facilities, but the overall footprint of the plant will remain the same. Certain alternatives may also include supplemental facilities at remote locations for operation under that configuration, such as the remote filter plant described above.

Surface Water Management Approach: Surface water management facilities include diversions around the mine facility to convey storm event flows upgradient of the pit, operating facilities, waste rock, and tailings storage areas back into drains or other control structures to discharge downgradient of mine operations. Permanent diversion structures will carry at least the 100-year, 24-hour storm event dependent on location and utility. Temporary diversions, in place for less than five years, will be sized for the 25-year, 24-hour event. Underdrains will be located along the major drainages underlying the facilities.

Reclamation and Closure: The overall slopes will be left at 3:1, which will provide appropriate slopes for reclamation. Topsoil will be removed, stored, and then replaced on the waste rock storage and dry stack tailings facilities as well as the perimeter buttresses. Plants utilized in the reclamation effort will include native grasses, shrubs, forbs, and trees, as well as transplanted and propagated agave plants. Under Alternatives 1, 2, and 3, reclamation of the outer waste rock buttress will be completed concurrently with operations.

Primary and Secondary Access and Utility Alignments: Primary access to the Project site will be from SR 83 for all the onsite alternatives. The actual location for the turnout and the alignment of the roadway vary slightly between the alternatives due to changes in the configuration of the waste rock and tailings, but the primary access is from the east in all alternatives. Secondary access and utility alignments will be from the west for all the onsite alternatives. The water supply system alignment will generally follow the secondary access road alignment. There are several offsite alternatives that address the location of the electrical utility alignment, although none of these alternatives is anticipated to have a significant effect on waters of the U.S.

3. ALTERNATIVES DESCRIPTION, PRACTICABILITY DETERMINATION, AND ENVIRONMENTAL ANALYSIS

Each of the onsite alternatives considered is briefly described below. Following each description is a discussion of each alternative's practicability. Table 3 summarizes a number of key differences between each of the alternatives.

3.1 ONSITE CONFIGURATION ALTERNATIVES

3.1.1 ALTERNATIVE 1 – MINE PLAN OF OPERATIONS

Alternative 1 is the configuration presented in the July 2007 MPO (WestLand, 2007) and therefore represents the original, preferred alternative of the Applicant. The facilities for this alternative incorporate McCleary, Barrel, and Wasp Canyons (Figure 6). For this alternative, waste rock will be placed in the Barrel Canyon drainage. The dry stack tailings will be stored in two separate phases, the North (McCleary Canyon) and the South (Barrel Canyon) Dry Stacks. Tailings will be dewatered at the plant site facilities and then conveyed overland to the tailings facilities. Dry stack tailings will be placed in the North Dry Stack area (McCleary Canyon) first, for a period of approximately 14 years. During year 12, preparation work will begin in the South Dry Stack area to prepare the facility for tailings placement. Tailings will be placed in the South Dry Stack facility (Barrel Canyon) by year 14. The heap leach facility will be located in the Barrel Canyon drainage.

The perimeter berms will be located in the Barrel Canyon drainage, while the buttresses will be located in both Barrel and McCleary Canyons. A large underdrain feature, called the "central drain," will be located along the major McCleary Canyon drainage between the two tailings phases. The primary offsite roadway alignment presented in the original MPO is shown in Figure 6. The primary access will follow a roadway alignment that crosses both Scholefield and McCleary Canyons and the confluence of Barrel Canyon near the intersection with SR 83 at approximately milepost 46.9. A variety of elements related to the construction and impacts of this configuration are presented in Table 3, below.

Environmental Effects: Implementation of Alternative 1 will result in direct impacts to approximately 42.0 acres of potential waters of the U.S. from the construction of the waste rock dumps, tailings piles, plant site, and pit. Approximately 213.8 acres of riparian habitat will be directly impacted as well (WestLand, 2010). An evaluation completed by Tetra Tech (2010a) shows that the average annual stormwater flows within Barrel Canyon at the SR 83 bridge immediately upgradient of the confluence with Davidson Canyon will be reduced by approximately 45.8 percent as a result of this alternative and that peak 100-year flows will be reduced by 53.1 percent.

Practicability Determination: This alternative is likely practicable. That is, Alternative 1 is available, logistically and technologically feasible, economically practicable, and consistent with the Applicant's Project purpose. However, additional engineering and hydrologic evaluation of the central drain design indicated that long-term maintenance of the drain could be a concern. The development of Alternative 2 (below) was accomplished, in part, to address this concern.

Table 3. Summary of Key Elements of Onsite Alternatives

	Alternative 1 Mine Plan of Operations	**Alternative 2** Alternative Tailings Sequence	**Alternative 3** Barrel Canyon Only	**Alternative 4** Barrel Canyon Only, Landforming	**Alternative 5** Scholefield Tailings	**Alternative 6** Modified Pit Configuration
Total area direct impacts (acres)	4,415	4,390	4,162	4,630	3,423	4,390
Total exclusion (fenced) area (acres)	4,635	4,740	4,501	4,969	5,618	4,740
Pit size (acres)	950	950	950	950	950	600
Waste rock area (acres)	2,000	1,370	1,460	2,800*	1,510	1,370
Waste rock ultimate elevation (ft amsl)	5,450	5,470	5,200 / 5,700	Varies	5,600	< 5,470
Tailings area (acres)	870	1,135	987	--*	1,727	1,135
Tailings storage ultimate elevation (ft amsl)	5,250	5,250	5,300	Varies	5,400	< 5,250
Leach pad area (acres)	230	126	126	126	126	126
Leach pad ultimate elevation – before cover (ft amsl)	5,340	5,380	5,380	5,380	5,380	5,380
Estimated average haulage distance – waste rock (ft)	14,475	14,475	17,515	17,515	27,645	14,475
Estimated average conveyor distance – tailings (ft)	12,000	11,105	14,385	14,385	19,450	11,105

*Waste rock and tailings area included together.

3.1.2 ALTERNATIVE 2 – ALTERNATIVE TAILINGS SEQUENCE

Alternative 2 consists of a modification to the 2007 MPO (Alternative 1) as a response to issues raised during public scoping. This alternative is similar to Alternative 1 in that the waste rock and tailings facilities will be confined to McCleary and Barrel Canyons (Figure 7). However, in addition to a number of minor design element changes and mitigation concepts, this alternative includes an alternative tailings sequence in which the McCleary Canyon drainage will be impacted later in the development of the Project. As with Alternative 1, the facilities for this alternative incorporate Wasp, Barrel, and McCleary Canyons.

The phasing for this alternative starts in Barrel Canyon and leaves McCleary Canyon open for a period of approximately 10 years prior to any tailings deposition activity in this area. This keeps the footprint for the first 10 years isolated to an area of Barrel Canyon. As with Alternative 1, the tailings will be stored in two separate phases, the North (McCleary Canyon) and the South (Barrel Canyon) Dry Stacks. Tailings will be dewatered at the plant site facilities and then conveyed overland to either of the tailings facilities. In Alternative 2, dry stack tailings will be placed in the South Dry Stack first for a period of approximately 12 years, leaving McCleary Canyon open. During year 10, preparation work will begin in the North Dry Stack area (McCleary Canyon) to prepare the facility for tailings placement. Tailings will be placed in the facility by year 12.

As under Alternative 1, the waste rock and heap leach facilities will be placed in the Barrel Canyon drainage under this alternative. The perimeter berms will be located in the Barrel Canyon drainage, while the buttresses will be located in both Barrel and McCleary Canyons. A revised underdrain system will be located along the major drainages underlying the facilities. This alternative includes a revised alignment for the offsite roadway, as shown in Figure 7. The same elements presented in Alternative 1 relative to construction and impacts have been analyzed for Alternative 2 and are presented in Table 3.

Environmental Effects: Environmental impacts under Alternative 2 will be similar to those under Alternative 1, with direct impacts to 40.1 acres of potential waters of the U.S. and 220.8 acres of riparian habitat. However, impacts to the higher quality (Class V) riparian habitat in McCleary Canyon (WestLand, 2010) will occur 10 years later in the Project life. Average annual stormwater flows in Barrel Canyon at the SR 83 bridge will be reduced by 44.3 percent and 100-year flood peaks by 49.9 percent (Tetra Tech, 2010b).

Practicability Determination: This alternative is practicable.

3.1.3 ALTERNATIVE 3 – BARREL CANYON ONLY

Under this alternative, both dry stack tailings and waste rock will be confined to Barrel Canyon and an unnamed tributary of Barrel Canyon between Barrel Canyon proper and SR 83 (Figure 8), referred to colloquially as "Trail Canyon," presumably for its proximity to the Arizona Trail. The facilities for this alternative incorporate Wasp and Barrel Canyons. Waste rock storage is provided in both Barrel Canyon and Trail Canyon. Tailings will be dewatered at the plant site facilities and then conveyed overland to the tailings facility. Dry stack tailings will be located entirely within Barrel Canyon. The perimeter berms and

buttresses will be located in the Barrel Canyon drainage as well. Underdrains will be located along the major drainages underlying the facilities. The heap leach facility will be located in the Barrel Canyon drainage within the tailings facility footprint. The roadway alignment for this alternative is the same as for Alternative 2. The same elements presented in Alternative 1 relative to construction and impacts have been analyzed for Alternative 3 and are presented in Table 3.

Environmental Effects: This alternative will result in direct impacts to 37.7 acres of potential waters of the U.S. and approximately 207.5 acres of riparian habitat (WestLand, 2010), although it avoids impacts to some of the highest quality (Class V) habitat in McCleary Canyon. Under Alternative 3, annual average stormwater flows in Barrel Canyon at the SR 83 bridge will be reduced by 33.8 percent and 100-year flood peaks will be reduced by 34.9 percent (Tetra Tech, 2010c). Due to the deposition of waste rock in Trail Canyon, this alternative has potentially higher impacts to visual resources along SR 83 than either Alternative 1 or 2.

Practicability Determination: This alternative is practicable.

3.1.4 ALTERNATIVE 4 – BARREL CANYON ONLY, LANDFORMING

Similar to Alternative 3, this alternative has been developed to address potential concerns related to visual aesthetics and stormwater runoff. Under this alternative, the surface of the waste rock dumps and the covered tailings facility and heap leach pad would be modified to effect a more "natural" contour, resulting in a considerable expansion of the facility footprint (Figure 9). Alternative 4 is otherwise similar to Alternative 3.

Environmental Effects: Development of this alternative will result in direct impacts to approximately 50.5 acres of potential waters of the U.S. Alternative 4 impacts approximately 238.4 acres of riparian habitat (WestLand, 2010), although, like Alternative 3, this alternative avoids impacts to some of the highest quality (Class V) riparian habitat in McCleary Canyon. Under this alternative, annual average stormwater flows in Barrel Canyon at the SR 83 bridge will be reduced by 42.0 percent and 100-year flood peaks will be reduced by 40 percent (Tetra Tech, 2010d).

In addition, when compared to Alternative 3, this alternative impacts a greater number of cultural resource sites that have been recommended as eligible for listing on the National Register of Historic Places.

Practicability Determination: This alternative is practicable.

3.1.5 ALTERNATIVE 5 – SCHOLEFIELD TAILINGS

Alternative 5 (Scholefield Tailings) was developed in an effort to avoid cultural resources, riparian habitat, and recreational opportunities within Barrel Canyon. Under this alternative, the dry stack tailings will be located entirely within Scholefield Canyon (Figure 10). Waste rock will be located in two locations, both outside the canyon bottoms: 1) adjacent to and immediately south of the dry stack tailings within the McCleary Canyon drainage basin, but outside the drainage bottom and 2) between Wasp and

Barrel Canyons, overlying the heap leach pad once leaching operations have ceased and the heap leach pad has been reclaimed.

Two mechanisms for transporting the tailings to Scholefield Canyon are being considered for this alternative: conveyor and slurry pipeline. For the conveyor option, tailings will be dewatered at the plant site facilities and then conveyed overland to the tailings facility. For the slurry pipeline option, the tailings will be transported to a separate tailings filter plant and dewatered prior to their placement in Scholefield Canyon via an additional conveyor. The perimeter berms and buttresses will be located in the Scholefield Canyon drainage. The heap leach facility will be located in the Barrel Canyon drainage. This alternative includes a primary access roadway alignment that originates farther south on SR 83, as shown in Figure 10. The same elements presented in Alternative 1 relative to construction and impacts have been analyzed for Alternative 5 and are presented in Table 3.

Environmental Effects: Alternative 5 results in fewer direct impacts to both potential waters of the U.S. and riparian habitat (26.5 and 83.4 acres, respectively) than do Alternatives 1 through 4. Impacts to Class IV and V riparian habitat total 39.9 acres under this alternative. Average annual flood flows in Barrel Canyon at the SR 83 bridge will be reduced by 18.4 percent as a result of this alternative and 100-year flood peaks will be reduced by 29.0 percent (Tetra Tech, 2010e).

However, this alternative would result in the loss of Scholefield Spring, one of the only special aquatic sites (wetlands) identified within the Project site and a feature that supports the giant sedge, designated by the U.S. Forest Service as "sensitive." In addition, construction of the tailings facility within Scholefield Canyon would bring the operation to within approximately 0.5 mile of a potentially significant lesser long-nosed bat roost site. Although it has been shown that mine operations are compatible with lesser long-nosed bat maternity roost sites (notably with the operation of the Cyprus Tohono Corporation mine facility near the Old Mammon Mine), an alternative that was developed further away from the roost feature would be expected to have less potential to adversely affect the roost site or the individuals within it.

Although the major drainages within the Project area would remain largely open under this alternative, their functions and values would be expected to be adversely impacted due to the significant effects to the adjacent uplands, particularly within McCleary Canyon. Reclamation of these upland areas would not occur concurrently with operations as it would under Alternatives 1 and 2 (and potentially 3), and reclamation options in general would be severely limited due to the steepness of the slopes and access challenges associated with this alternative.

This alternative would have a substantial adverse impact to lands designated by the Pima County Sonoran Desert Conservation Plan as being a Biological Core area. The total area of Biological Core affected by Alternative 4 (over 1,240 acres) is more than five times greater than the next highest impact (Alternative 1).

Finally, given the significantly longer haulage and conveyor distances associated with this alternative (see Table 3), this alternative would have comparatively larger increases in energy and fuel use and

greenhouse gas emissions compared to the other action alternatives. A thorough examination of the differences in energy use and greenhouse gas emissions is beyond the scope of this evaluation, but is being accomplished as part of the draft EIS being completed by the CNF.

Practicability Determination: This alternative suggests a waste rock disposal method (stacked on slopes outside of drainages) not commonly used in copper mines in Arizona due to cost and stability considerations. In addition, it presents logistical challenges due to significant increases in haulage distance for waste rock and conveyor distance for dry stack tailings material, as well as an increased haulage distance for deposition of tailings buttress material in Scholefield Canyon. The incremental cost estimate associated with the increased haulage distance for this alternative, over Alternative 1, is $35 million in initial capital, with a cumulative life-of-mine incremental cost increase of $237 million. A substantial portion of the increased costs represent increased energy requirements, which are difficult to predict long term but are expected to increase over the life of the mine. The total increased cost would be expected to be even higher given the technological and logistical challenges of stacking the waste rock on the side of a hill. Despite the logistical and cost challenges presented by this alternative, it is still considered practicable for the purposes of this analysis. However, the significant adverse environmental effects of this alternative, described above, prevent this alternative from being identified as the least environmentally damaging practicable alternative (LEDPA).

3.1.6 ALTERNATIVE 6 – MODIFIED PIT CONFIGURATION WITH WASP CANYON OPEN

Alternative 6 consists of a modification to Alternative 2 (Alternative Tailings Sequence) in which a portion of the proposed pit would remain undeveloped to avoid mining through Wasp Canyon (Figure 11). Under this alternative, a portion of the Rosemont ore body would not be recovered, eliminating the seventh (and final) mining phase and shortening the life of the mine by four years. The result of this revised pit design is a loss of over 87 million tons of sulfide ore, which represents a 16 percent reduction in recoverable sulfide ore. The facilities for this alternative incorporate Barrel, Sycamore, McCleary, and portions of Wasp Canyons, although the upper extent of Wasp Canyon would remain largely open. Stormwater flows within Wasp Canyon would impound or flow through the waste rock facility. The leach stockpiles and waste rock facilities would be constructed similarly to Alternative 2 in terms of slopes and methods, but waste rock facilities would contain an estimated 25 percent less waste rock. This reduction in waste would be presumed to come from the facility height and that the facility footprint would remain essentially the same. In order to avoid loss of waters in Wasp Canyon, this alternative would not include an upgradient stormwater diversion channel around the pit, as is contemplated for all the alternatives with a full-size pit. All other items relative to the configuration of the facilities and tailings sequence would be identical to those described in Alternative 2.

Environmental Effects: Impacts to potential waters of the U.S. and riparian habitat under this alternative are similar to those under Alternatives 1 and 2, with the exception of a portion of Wasp Canyon. Avoidance of impacts to Wasp Canyon would result in approximately 1.5 fewer acres of direct impacts to potential waters of the U.S. than Alternative 2, for a total direct impact to potential waters of the U.S. of 38.6 acres (not including haul road crossings). This alternative would result in direct impacts to approximately 219.1 acres of riparian habitat (compared to 220.8 acres under Alternative 2). The

1.5 acres of riparian habitat that will be avoided under this alternative are Class II and III habitat and generally of lower vegetation quality (or density) than other riparian habitats (Classes IV and V) in McCleary, Barrel, and Scholefield Canyons. Impacts to stormwater flows under this alternative would be similar to those under Alternatives 1 and 2, with reductions in average annual flows into Davidson Canyon of 44.3 percent and reduction of 100-year peak flows of 49.9 percent.

This reach of Wasp Canyon would be isolated from downstream receiving waters by the construction of the waste rock facility and would be bounded on either side by a waste rock dump and the pit. In addition, the haul road from the pit to the waste rock dump would be required to cross the wash in three places during successive phases of mine life. As such, the functions and values of the avoided reach of Wasp Canyon would be significantly compromised.

Practicability Determination: This alternative is not practicable for several reasons. First, the alternative is logistically impracticable. Continued stormwater flows within Wasp Canyon would compromise the stability of the pit wall on the south and east portions of the pit (Appendix B), where the relatively low-strength Willow Canyon arkose and alluvium occur. This impact to stability represents a threat to the safety of mine employees. As such, a stormwater diversion channel and groundwater dewatering system would be required to keep this reach of Wasp Canyon dewatered. The construction of the stormwater diversion channel would result in the "loss" of this reach of Wasp Canyon due to the dewatering effects of the channel.

The loss of 87 million tons of sulfide ore results in a 16.4 percent increase in cost per ton of ore and a loss of over a billion dollars in revenue. The initial capital investment for a mining project is substantial, and Rosemont is no exception, with an initial capital cost of an estimated $897.2 million. The only way for such a large project to become economically viable is to be able to amortize these significant capital costs, which are largely fixed (e.g., roadways, utilities, equipment, SX/EW, mill, etc.), over a commensurately substantial ore tonnage. With a fully sized pit, the capital costs will be spread over the recovery of approximately 546 million tons of sulfide ore (proven and probable), for an estimated cost of approximately $1.64 per ton of sulfide ore. By reducing the volume of recovered sulfide ore by 87 million tons, the per-ton cost increases to approximately $1.95 per ton of sulfide ore, a 19 percent increase in the cost of production. When compared to the capital cost over the total ore tonnage (including oxide), the cost increases from $1.46 per ton of ore for a full-sized pit to $1.70 per ton of ore for the smaller pit, an increase of 16.4 percent. The revenue losses associated with this alternative are unreasonable. At today's prices, ranging from USD $3.30 to USD $3.50, this would represent potential cash flow losses (undiscounted) of approximately USD $1.2 billion.

The reasonableness of this level of revenue loss must be judged against the environmental benefits associated with pursuing this alternative. As was noted by the Corps Los Angeles District in a recent 404(b)(1) analysis (Newhall Ranch Project; Corps File No. 2003-01264-AOA), "the substantial cost increases associated with some alternatives also must be viewed in light of the amount of additional avoidance of waters of the United States that they provide. A substantial cost increase may be reasonable if impacts also are reduced substantially, while a large increase in cost associated with a minimal reduction in impacts may not be reasonable." As is demonstrated here, due to logistical constraints,

Alternative 6 results in essentially no avoidance of loss of potential waters of the U.S. at a loss of over a billion dollars in revenue. Given this, Alternative 6 would not be considered a practicable alternative.

3.2 UTILITY LINE ALTERNATIVES

As described above, electrical power and water will be brought to the Project site from the west for all onsite alternatives. This section describes alternative alignments and, in the case of the waterline, alternative technologies to the proposed action.

3.2.1 POWER

Electrical power will be provided by Tucson Electric Power (TEP), which is currently evaluating transmission line alignment alternatives as part of the Arizona Corporation Commission's Certificate of Environmental Compatibility (CEC) process. As part of this process, TEP has identified a number of potential alternative alignments to be evaluated, although there is considerable overlap in several of these alternatives (Figure 12).

Power for all alternatives will be provided from a link attached to transmission lines on the South Substation loop. All the transmission line alternatives include above-ground transmission lines and an associated unpaved maintenance road, with only minor temporary impacts to potential waters of the U.S. In general, it is anticipated that no transmission line poles, substations, or other structures will be constructed in potential waters of the U.S. Impacts to potential waters of the U.S. will occur only from the construction of a 12-foot-wide unpaved access road, and most of these impacts are anticipated to be temporary, that is, where feasible, the potential waters of the U.S. will be restored to preconstruction contours following construction of the transmission lines and access road. The only permanent fill will be the culverted crossings of waters.

Impacts to potential waters of the U.S. resulting from the various alternatives are provided in Table 4, below. Again, the majority of these impacts would be temporary.

Table 4. Impacts to Potential Waters of the U.S. from Transmission Line Alternatives

Alignment	Impact to Potential Waters of the U.S. (acres)
Preferred Route	0.10
Alternative 1	0.22
Alternative 2	0.29
Alternative 3	0.40
Alternative 4	0.20

Impacts to potential waters of the U.S. resulting from the construction of any of the transmission line alignment alternatives described above would result from the construction of the access road, and those

impacts would, in general, be temporary. Following construction of the transmission line, the potential waters of the U.S. along each of the alignments would be restored to preconstruction contours to the greatest extent practicable. As such, impacts to potential waters of the U.S. would generally be comparable for each of the alignment alternatives, and each alignment is assumed to be practicable from a cost, logistics, and technology standpoint.

Selection of the appropriate alignment alternative will be based therefore on other environmental factors (e.g., visual impacts), which are currently being evaluated as part of the CEC process. It is reasonable to conclude therefore that the alignment that is ultimately selected during the CEC process will constitute the LEDPA for the Project.

3.2.2 WATER

Two waterline alignments have been proposed: the one that was provided in the 2007 MPO (WestLand, 2007) and a second that largely parallels Santa Rita Road through the Santa Rita Experimental Range. In discussions with the Arizona State Land Department and the University of Arizona (which are responsible for the Santa Rita Experimental Range), the Applicant determined that the preferred alignment for all parties is that which parallels Santa Rita Road (Figure 13).

With either alignment, the pipeline will be constructed with a minimum soil cover of 36 inches within State Land or BLM easements, and 24 inches on the mine property. The pipe bedding requirements will follow the manufacturer's recommendations. Isolation valves will be installed in the pipeline at intervals of approximately 3,000 feet and at elevation changes of 250 feet. The pipeline at the wash crossings will be constructed below the calculated scour depth of the wash, and grade control structures will be provided at the largest washes to provide additional protection. Construction of the pipeline will include an unpaved permanent maintenance road and up to five forebay reservoirs and pump stations. The reservoirs and pump stations will be built outside potential waters of the U.S.

Because the impacts to potential waters of the U.S. from either alignment will be minimal and almost exclusively temporary (and therefore comparable), this analysis considers only the preferred alignment along Santa Rita Road (Figure 13). The two alternatives to be considered for the construction of the waterline relate to the technology to be used: 1) standard trenching and 2) jack-and-bore beneath the potential waters of the U.S.

Under the standard trenching alternative, impacts to potential waters of the U.S. would total approximately 0.51 acre of temporary impacts and 0.07 acre of permanent impacts resulting from the construction of road crossings and grade control structures. This construction method will cost between $210 and $360 per linear foot, depending on the size of pipe that is used.

Under the second waterline alternative, the waterline will be installed beneath potential waters of the U.S. using jack-and-bore technology, such that there would be no discharge of fill material to potential waters of the U.S. The estimated cost for the jack-and-bore alternative is between $1,100 and $1,800 per linear foot, or even more, depending on how large the wash crossing is. For the largest washes within the

analysis area, additional costs will be incurred by the contractor for the excavation and shoring of the jack-and-bore pits. Utilizing jack-and-bore technology for the largest wash crossings within the analysis area will cost an estimated $1.5 million compared to $180,000 to $250,000 for the standard trenching technology. Jack-and-bore methods also generally result in substantially more disturbance to native vegetated ground than standard trenching techniques. This is due to the fact that the wash crossing itself is generally unvegetated (i.e., is located within the ordinary high water mark of the wash) while the staging areas located in the adjacent upland areas are generally vegetated. Staging areas are needed on either side of a wash being crossed, both for equipment and deposition of excavated material. Thus, avoiding temporary impacts within the wash itself results in increased adverse effects to upland areas. On balance then, jack-and-bore methods are not less environmentally damaging.

As demonstrated here, the use of jack-and-bore technology costs between five and eight times that of standard trenching technology, results in an impracticable cost increase over the standard trenching methodology, and is not less environmentally damaging. As such, standard trenching represents the LEDPA for the Project waterline.

4. SUMMARY AND CONCLUSIONS

This alternatives analysis has been completed in order to identify the LEDPA for the development of the Rosemont Project.

An analysis of potential offsite alternatives that were identified as being in existence in 2005 when Augusta Resource Corporation purchased the Rosemont Property was done at the request of the Corps. No viable offsite alternatives were identified.

The onsite alternatives that were evaluated as part of this analysis focused on various configurations of the dry stack tailings, waste rock dumps, and heap leach pad. The locations of the pit and plant site were assumed to remain the same for all alternatives. Other ancillary facilities (minor access roads, etc.) would be expected to have relatively minimal impacts to waters of the U.S. Table 5 provides a summary of the practicability criteria for the various onsite alternatives, the selected environmental effects of each alternative, and a determination of practicability. As shown in Table 5, Alternatives 1 through 5 have been determined to be practicable alternatives to the Rosemont Project. Although Alternative 1 is practicable when evaluating availability, costs, logistics, and technology, it presents challenges with regard to long-term management of stormwater flows and would therefore not represent an appropriate alternative. Alternative 5 (Scholefield Canyon) has the lowest impacts to potential waters of the U.S., but has other significant environmental effects that would prevent it from being considered the LEDPA. Of the three remaining alternatives, Alternative 4 (Barrel Canyon Only, Landforming) has the greatest direct impacts to waters of the U.S. (50.5 acres). Of the two remaining alternatives, Alternative 3 has the lowest comparable direct and indirect effects to potential waters of the U.S. (37.7 acres). Table 6 provides a quick ranking summary of the practicability criteria and environmental effects of each of the onsite alternatives.

Five alignments are being considered as part of the Arizona Corporation Commission's Certificate of Environmental Compatibility for the Rosemont Project powerline. Impacts to potential waters of the U.S. resulting from any of these alignments will be almost solely temporary, resulting from the construction of an access and maintenance road. No poles or other appurtenances are anticipated to be constructed in potential waters of the U.S. As such, impacts to potential waters of the U.S. resulting from any of the alignments will be comparable and relatively minor. It is reasonable to conclude, therefore, that whatever alignment is ultimately selected as part of the CEC process will constitute the LEDPA for this portion of the Rosemont Project.

The two alternatives evaluated for the offsite waterline include a standard trench construction methodology that would result in 0.51 acre of temporary and 0.07 acre of permanent impacts to potential waters of the U.S. and cost an estimated $210 to $360 per linear foot. The other alternative entails using a jack-and-bore technique for installing the waterline below the washes that would result in no impacts to potential waters of the U.S. but would increase adverse impacts to upland vegetation and cost an estimated $1,100 to $1,800 per linear foot, or more, depending on the size of the pipe that is used and the width of the wash crossing. Because the jack-and-bore technology results in other environmental consequences at a cost five to eight times higher than that for the standard trenching technology, it is not a practicable or least environmentally damaging alternative.

Table 5. Summary of Impacts and Practicability of Onsite Alternatives

	Alternative 1 Mine Plan of Operations	**Alternative 2** Alternative Tailings Sequence	**Alternative 3** Barrel Canyon Only	**Alternative 4** Barrel Canyon Only, Landforming	**Alternative 5** Scholefield Tailings	**Alternative 6** Modified Pit Configuration
Practicability Criteria						
Availability	Yes	Yes	Yes	Yes	Yes	Yes
Cost	Yes	Yes	Yes	Yes	No	No
Project Purpose	Yes	Yes	Yes	Yes	Yes	Yes
Logistics and Technology	Yes	Yes	Yes	Yes	No	No
Impacts to potential waters of the U.S. (acres)						
Direct	42.0	40.1	37.7	50.5	26.5	38.6
Indirect	5.8	4.8	2.2	2.8	5.0	5.4
Total	47.8	44.9	39.9	53.3	31.5	44.0
Special aquatic sites	No	No	No	No	Yes	No
Direct impacts to total riparian habitat (per WestLand [2010]) (acres)	213.8	220.8	207.5	238.2	83.4	219.1
Direct impacts to Class IV and Class V riparian habitat (per WestLand [2010]) (acres)	119.8	125.3	121.3	123.7	39.9	125.3
Area in Sonoran Desert Conservation Plan Biological Core (acres)	250.7	155.4	63.4	82.1	1,242.6	155.4
Reduction in average annual stormwater flows reporting to Davidson Canyon (%)	45.8	44.3	33.8	42.0	18.4	44.3
Other sensitive resources			Visual resources along SR 83	Visual resources along SR 83	Scholefield Spring; giant sedge; lesser long-nosed bat roost	
Initial capital cost[1] per ton of ore	$1.46	$1.46	$1.46	$1.46	$1.51+	$1.70
Practicability	YES – However, may be technological concern regarding long-term maintenance of stormwater underdrains.	YES – Improved stormwater management design	YES – longer haulage profile, but economically viable	YES – longer haulage profile and significant reclamation costs, but economically viable	YES – increased cost over proposed action. Impacts to sensitive resources not affected in other alternatives. Minimal options for reclamation.	NO – logistically impracticable due to need to dewater Wasp Canyon area. In addition, considerably increased cost over proposed action, as well as significant loss of revenue.

[1] *Initial capital cost* refers to a cost incurred at the beginning of a project for the purchase of equipment and the construction of facilities to be used to bring the project to an operable status.

Table 6. Ranking of Onsite Alternatives Based on Practicability Criteria and Environmental Impacts

	Alternative 1 Mine Plan of Operations	**Alternative 2** Alternative Tailings Sequence	**Alternative 3** Barrel Canyon Only	**Alternative 4** Barrel Canyon Only, Landforming	**Alternative 5** Scholefield Tailings	**Alternative 6** Modified Pit Configuration
Availability	1	1	1	1	1	1
Practicability	1	1	1	1	0	0
Waters of the U.S.	1	1	1	0	2	1
Special aquatic sites	2	2	2	2	0	2
Riparian habitat	0	0	1	1	2	0
Upland habitat	1	1	2	2	0	1
Downstream stormwater flows	0	0	1	1	2	0
Visual resources (proximity to receptors)	1	1	1	1	0	1
Sensitive species	1	1	1	1	0	1
Unique cultural resources	1	1	1	0	1	1
Total	**9**	**9**	**12**	**10**	**8**	**8**

Rankings: 2 = least environmentally damaging of the six evaluated alternatives
1 = mid-range environmental damage among the six evaluated alternatives
0 = most environmentally damaging of the six evaluated alternatives

5. REFERENCES

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_____. 2010c. Barrel Only Alternative Stormwater Assessment. Technical Memorandum prepared for Rosemont Copper Company, dated March 5, 2010.

_____. 2010d. Expanded Barrel Only Alternative Stormwater Assessment. Technical Memorandum prepared for Rosemont Copper Company, dated September 10, 2010.

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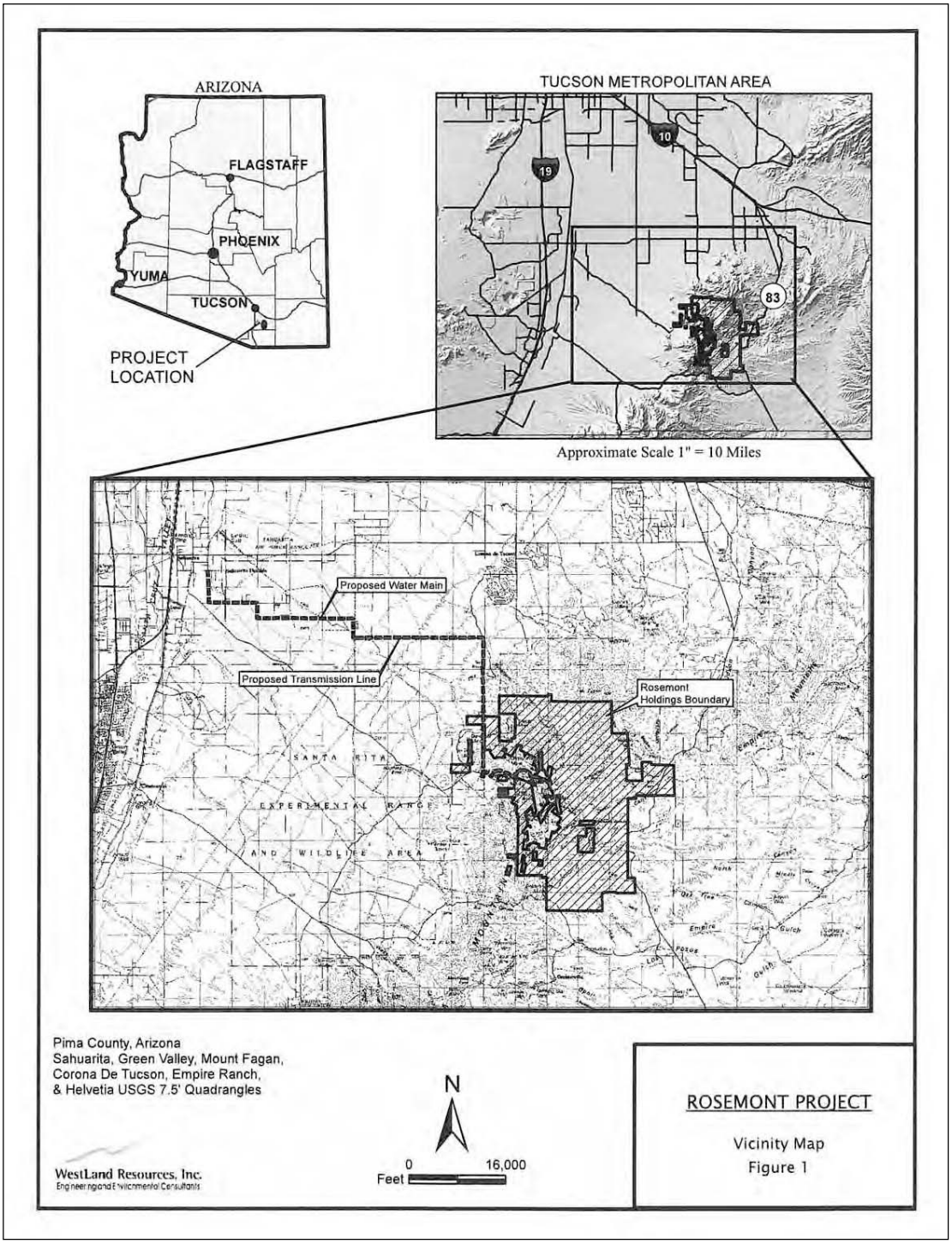
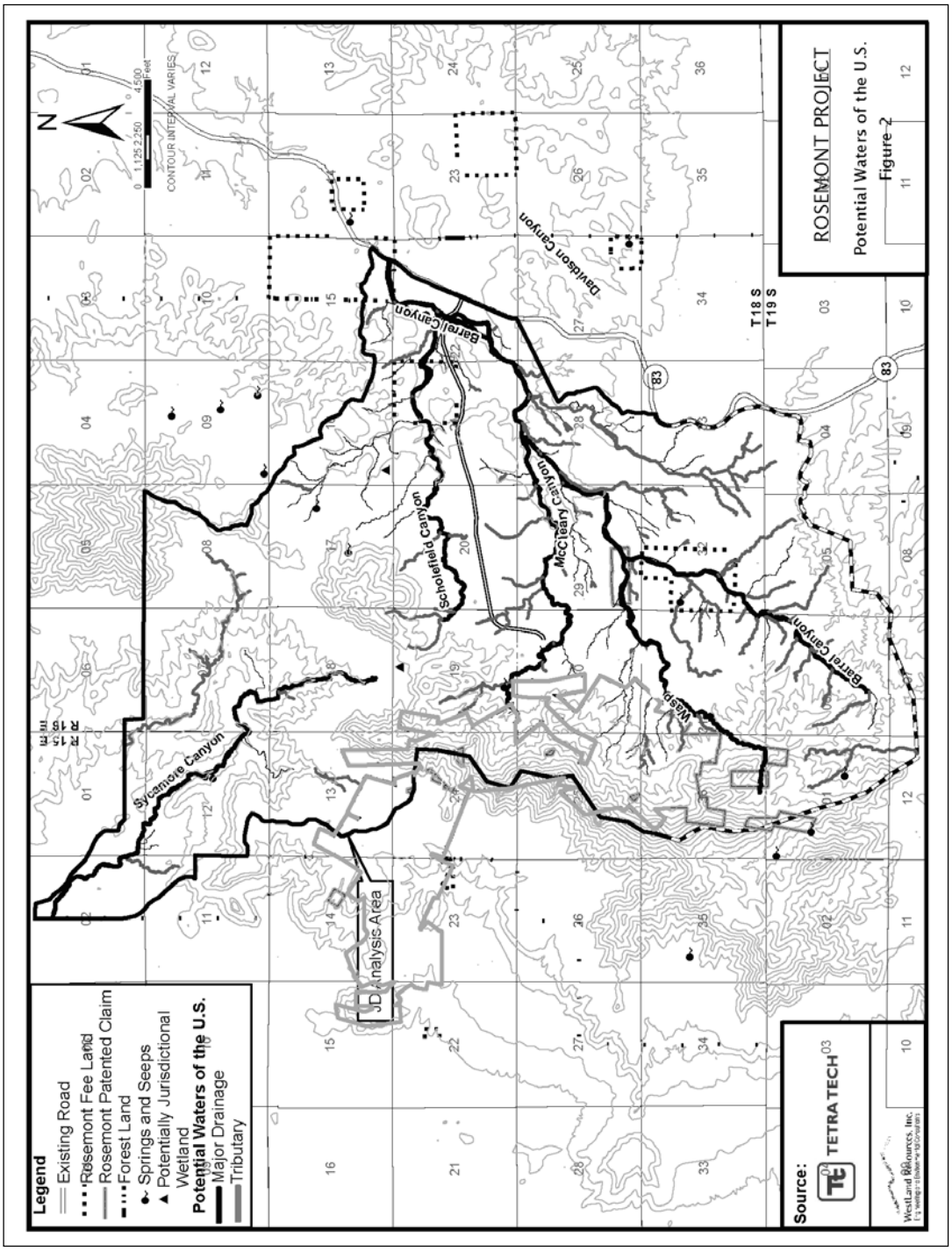
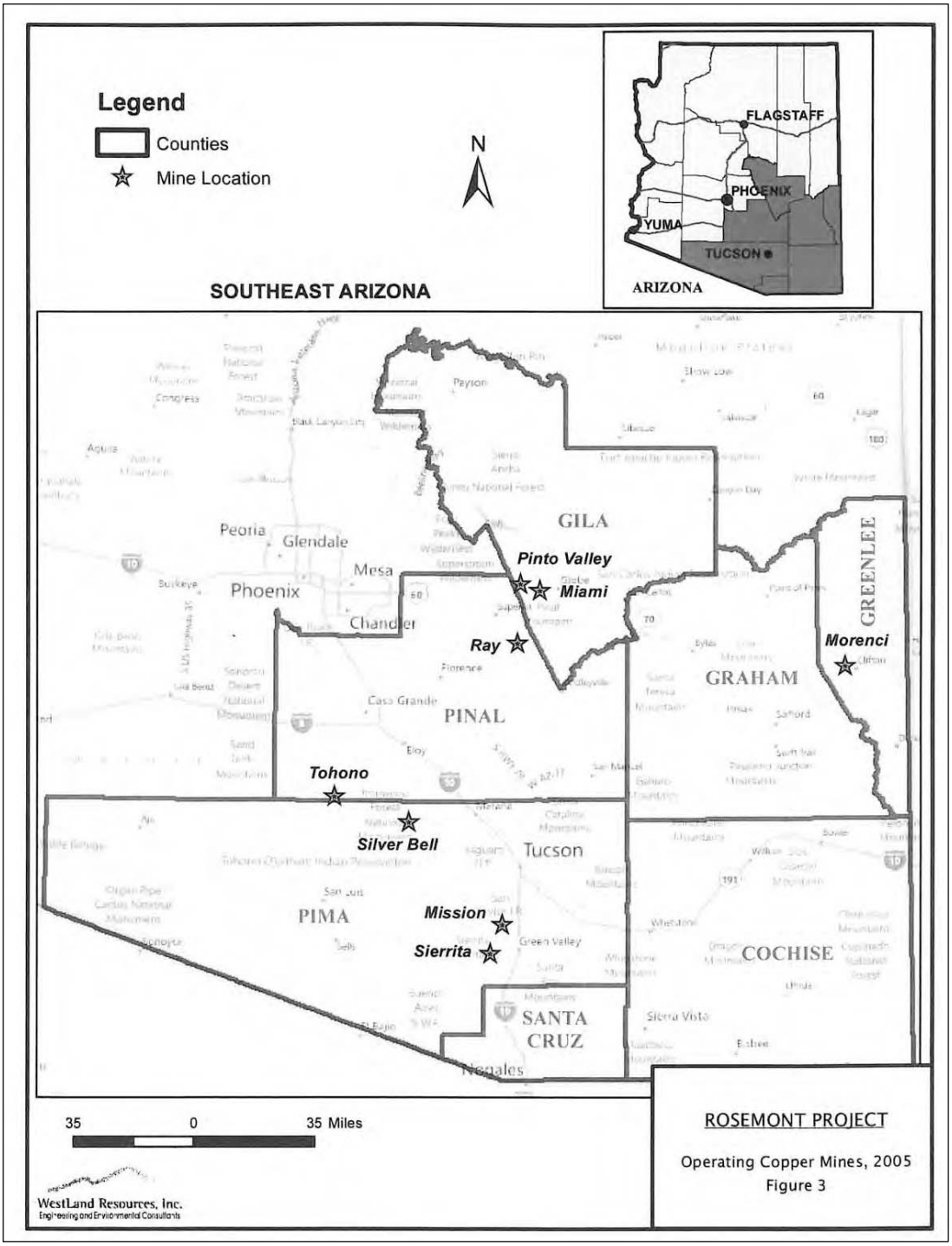
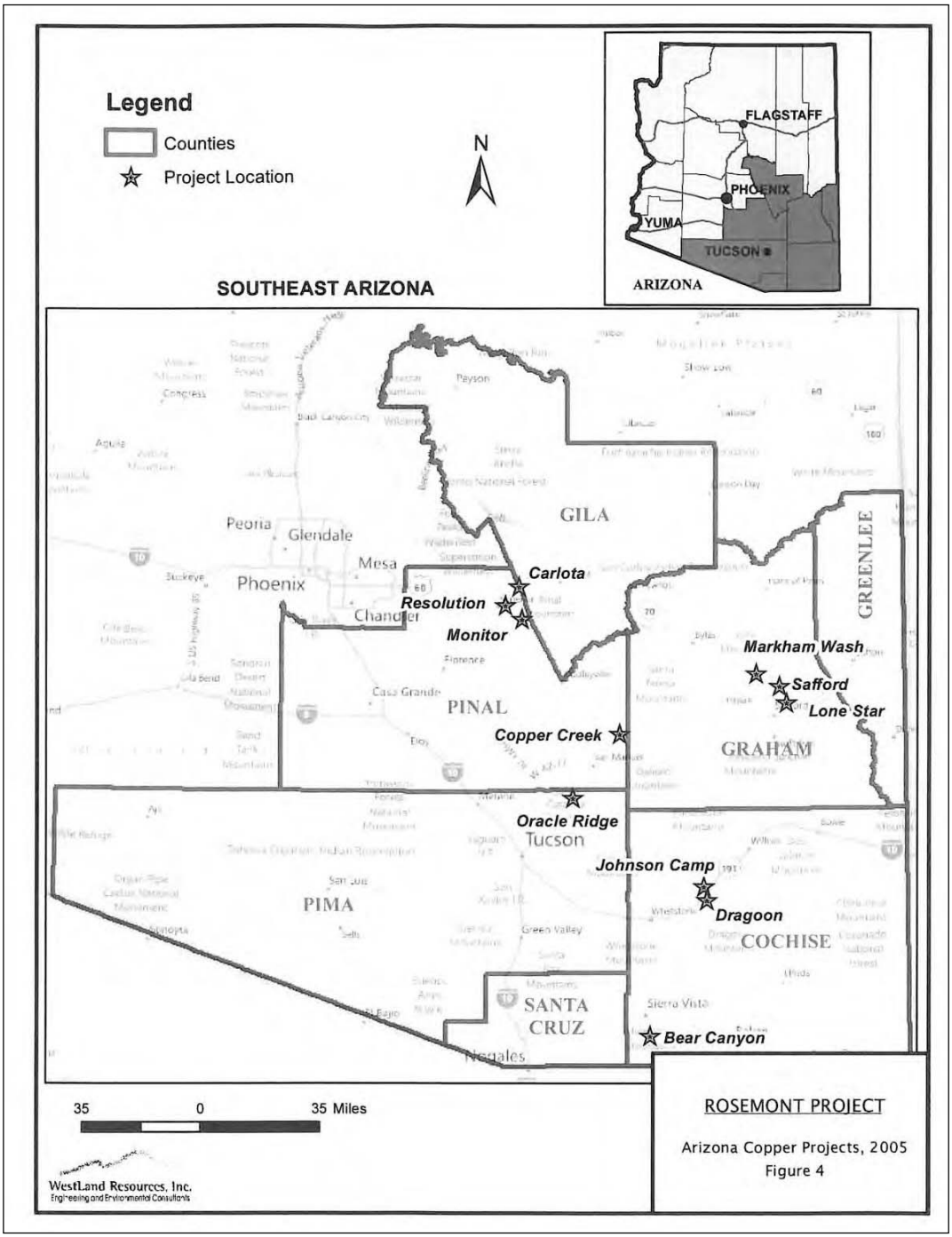
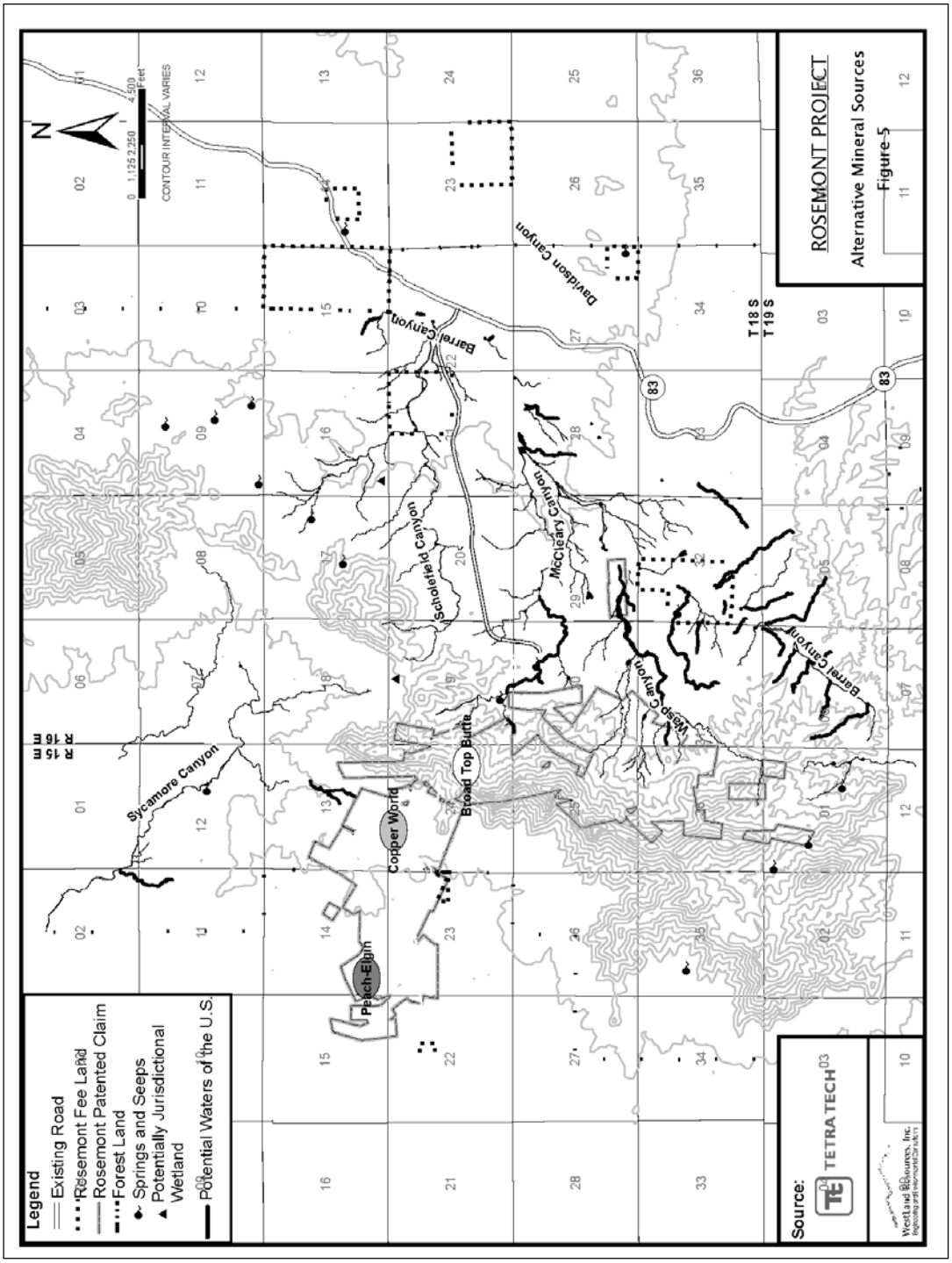
FIGURES

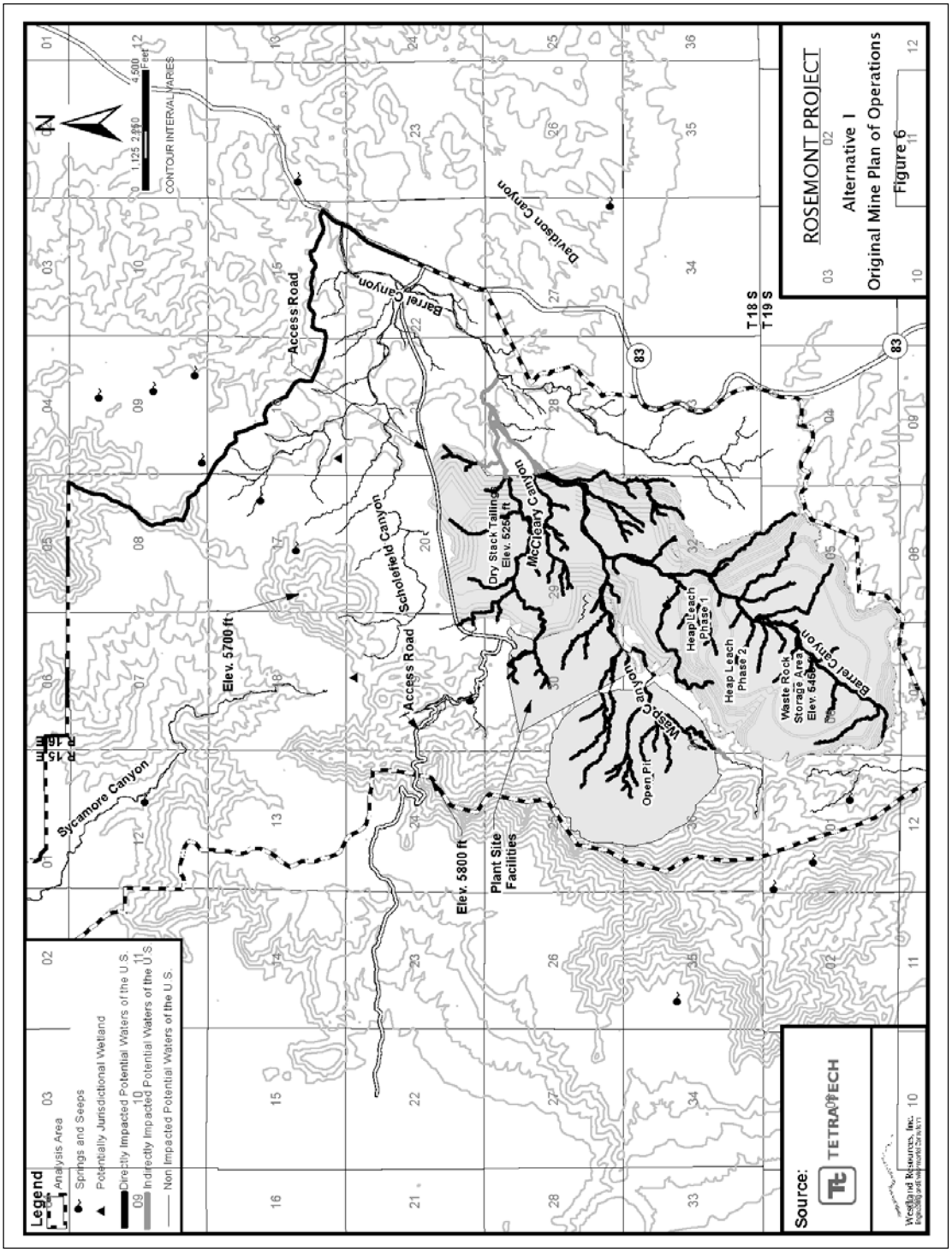

ARIZONA
FLAGSTAFF
PHOENIX
YUMA
TUCSON
PROJECT LOCATION
TUCSON METROPOLITAN AREA
10
19
83
Approximate Scale 1" = 10 Miles
Proposed Water Main
Proposed Transmission Line
Rosemont Holdings Boundary
SANTA RITA
EXPERIMENTAL RANGE
AND WILDLIFE AREA
Pima County, Arizona
Sahuarita, Green Valley, Mount Fagan,
Corona De Tucson, Empire Ranch,
& Helvetia USGS 7.5' Quadrangles
N
0
16,000
Feet
WestLand Resources, Inc.
Engineering and Environmental Consultants
ROSEMONT PROJECT
Vicinity Map
Figure 1

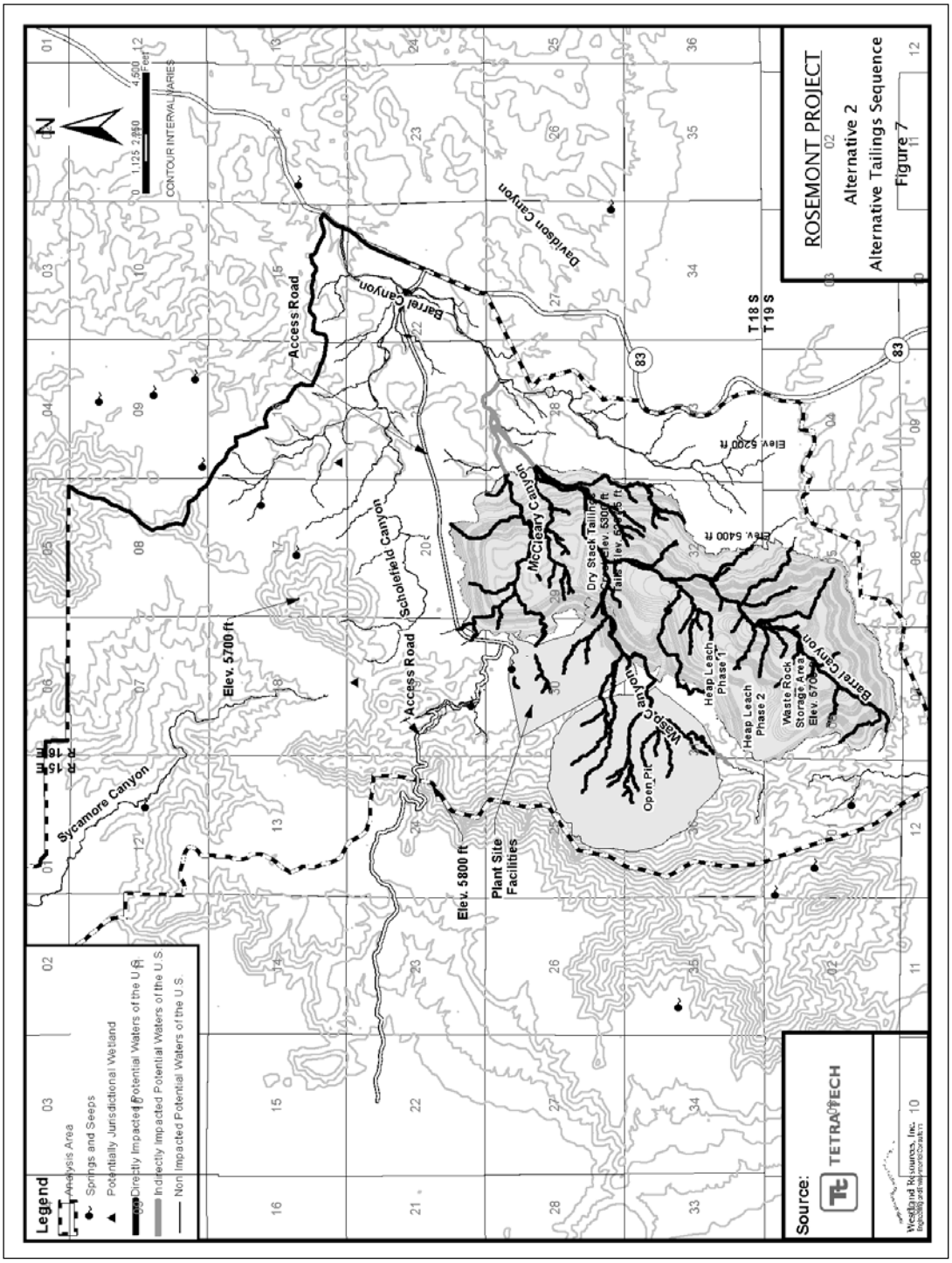

Legend
Existing Road
Rosemont Fee Land
Rosemont Patented Claim
Forest Land
Springs and Seeps
Potentially Jurisdictional Wetland
Potential Waters of the U.S.
Major Drainage
Tributary
JD Analysis Area
Sycamore Canyon
Scholefield Canyon
McCleary Canyon
Barrel Canyon
Davidson Canyon
Wash
R 15 E
T 18 S
T 19 S
83
N
CONTOUR INTERVAL VARIES
0 1,125 2,250 4,500 Feet
Source:
TETRA TECH
WestLand Resources, Inc.
ROSEMONT PROJECT
Potential Waters of the U.S.
Figure 2

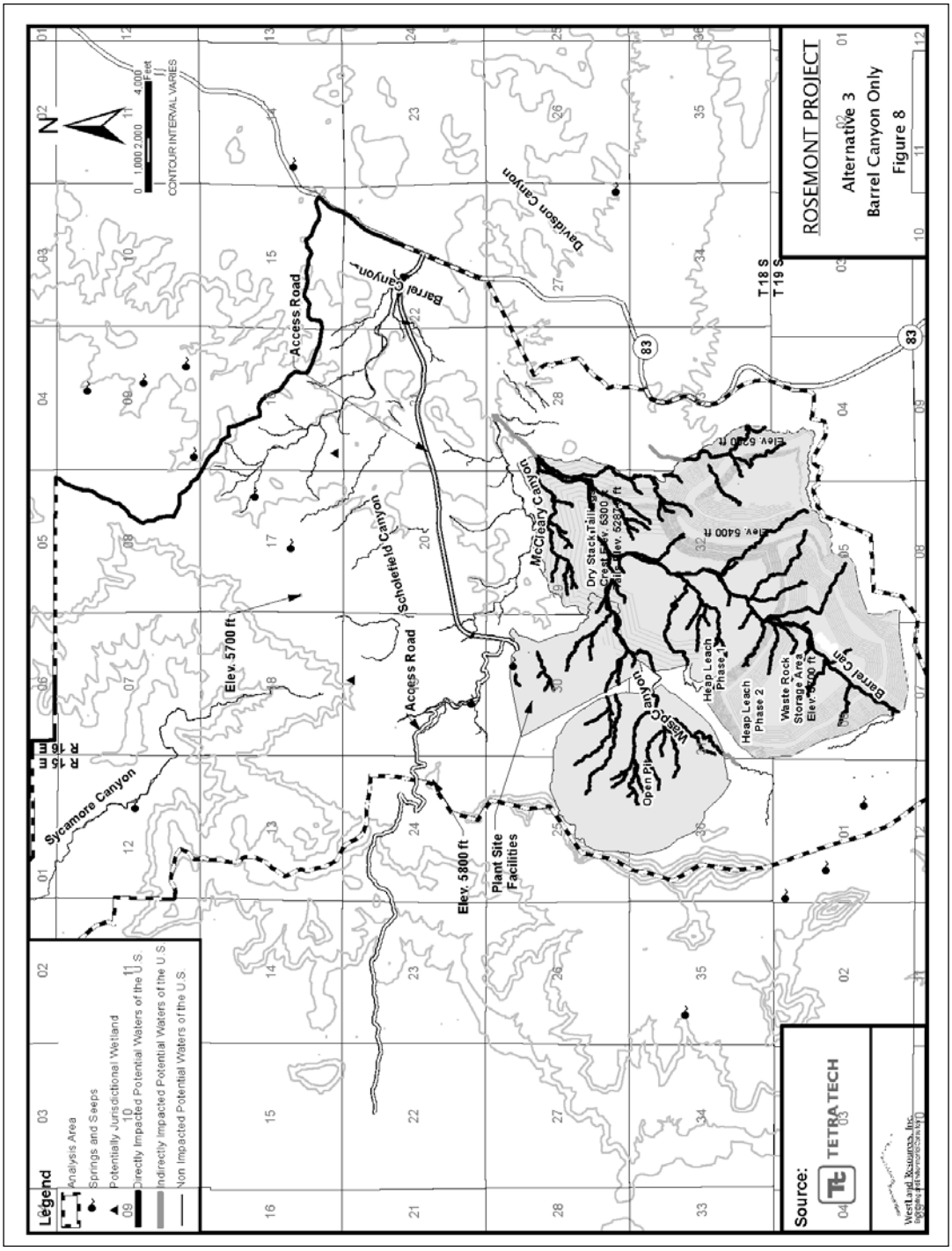

Legend
Counties
Mine Location
N
SOUTHEAST ARIZONA
FLAGSTAFF
PHOENIX
YUMA
TUCSON
ARIZONA
GILA
GREENLEE
GRAHAM
PINAL
PIMA
COCHISE
SANTA CRUZ
Peoria
Glendale
Mesa
Phoenix
Chandler
Payson
Casa Grande
Tucson
Nogales
Pinto Valley
Miami
Ray
Morenci
Tohono
Silver Bell
Mission
Sierrita
35 0 35 Miles
WestLand Resources, Inc.
Engineering and Environmental Consultants
ROSEMONT PROJECT
Operating Copper Mines, 2005
Figure 3

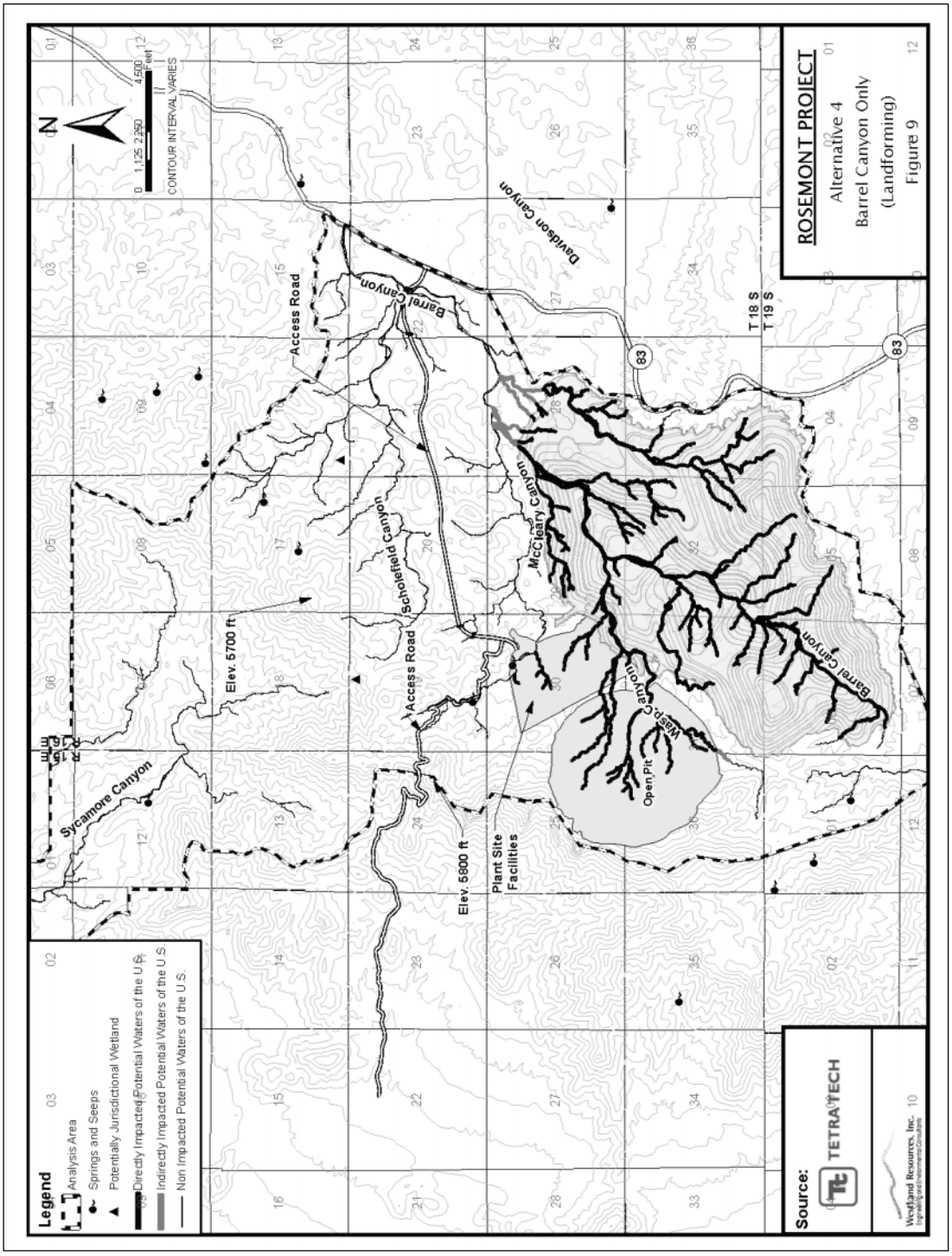

Legend
Counties
Project Location
N
SOUTHEAST ARIZONA
FLAGSTAFF
PHOENIX
YUMA
TUCSON
ARIZONA
GILA
GREENLEE
PINAL
GRAHAM
PIMA
COCHISE
SANTA CRUZ
Payson
Peoria
Glendale
Mesa
Phoenix
Chandler
Tucson
Carlota
Resolution
Monitor
Markham Wash
Safford
Lone Star
Copper Creek
Oracle Ridge
Johnson Camp
Dragoon
Bear Canyon
35 0 35 Miles
WestLand Resources, Inc.
Engineering and Environmental Consultants
ROSEMONT PROJECT
Arizona Copper Projects, 2005
Figure 4

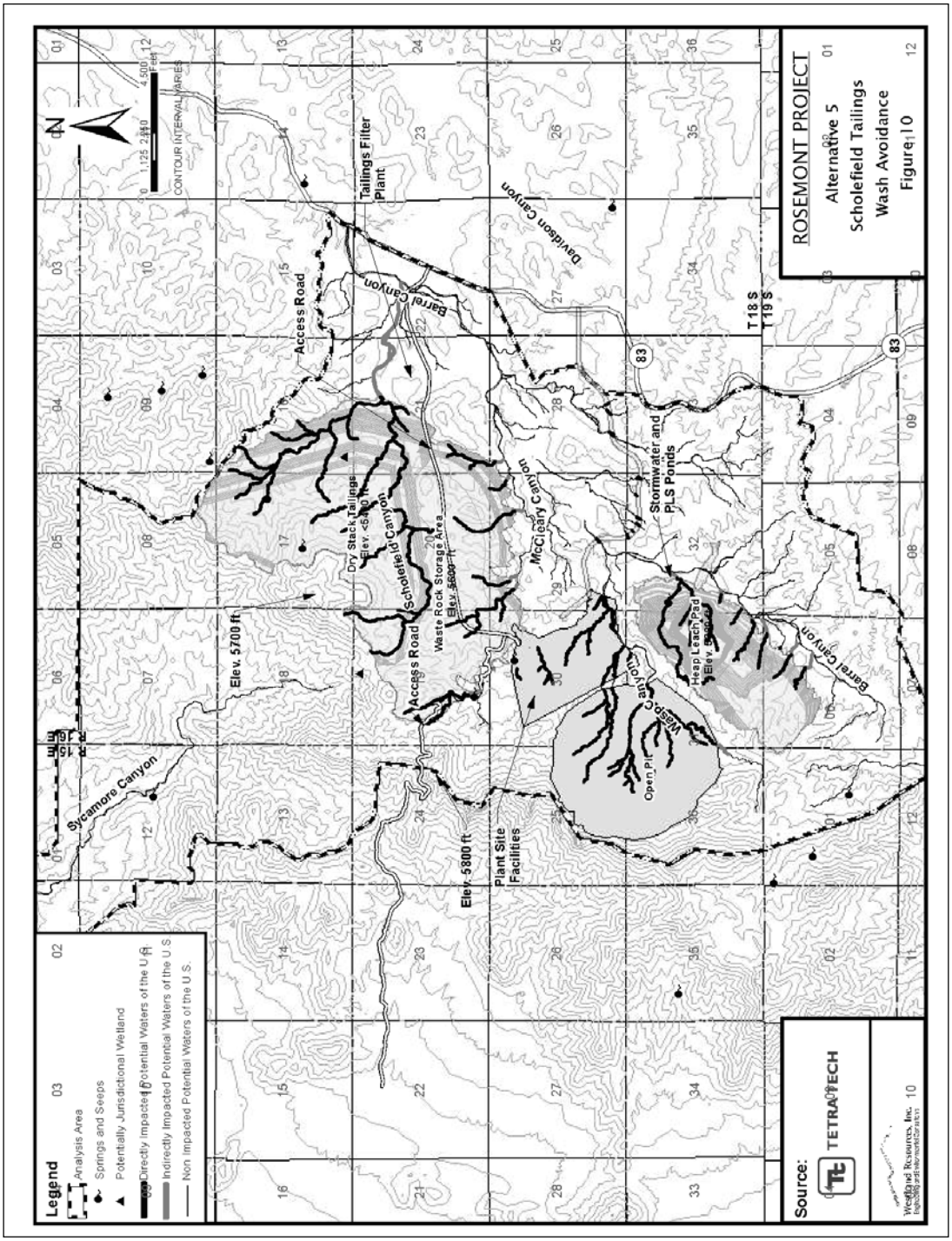

Legend
Existing Road
Rosemont Fee Land
Rosemont Patented Claim
Forest Land
Springs and Seeps
Potentially Jurisdictional Wetland
Potential Waters of the U.S.
N
0 1,125 2,250 4,500 Feet
CONTOUR INTERVAL VARIES
R 15 E
R 16 E
T 18 S
T 19 S
Sycamore Canyon
Peach-Elgin
Copper World
Broad Top Butte
Scholefield Canyon
Barrel Canyon
Davidson Canyon
McCleary Canyon
Wasp Canyon
83
Source:
TETRA TECH
WestLand Resources, Inc.
ROSEMONT PROJECT
Alternative Mineral Sources
Figure 5

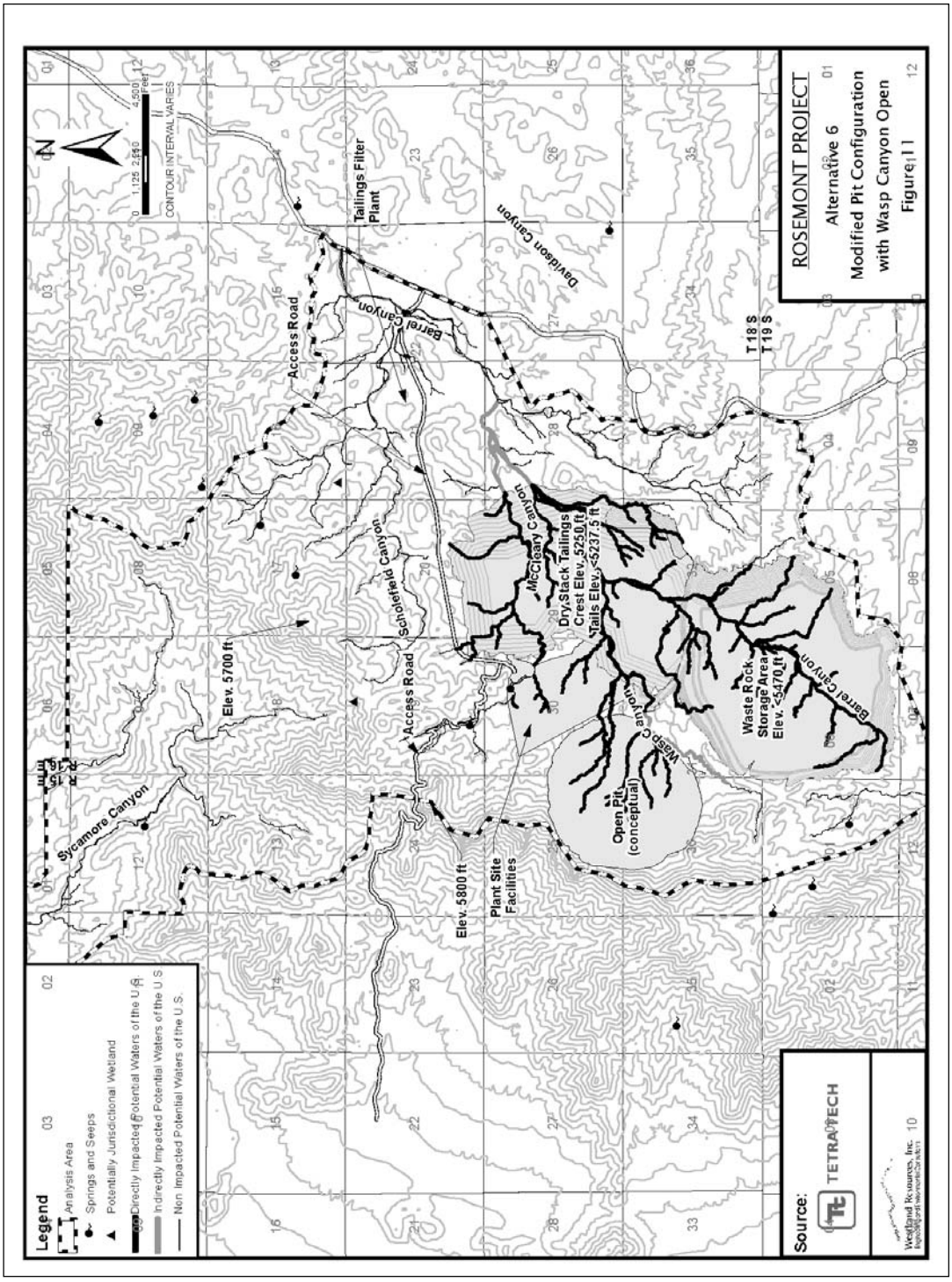

Legend
Analysis Area
Springs and Seeps
Potentially Jurisdictional Wetland
Directly Impacted Potential Waters of the U.S.
Indirectly Impacted Potential Waters of the U.S.
Non Impacted Potential Waters of the U.S.
N
CONTOUR INTERVAL VARIES
Feet
ROSEMONT PROJECT
Alternative I
Original Mine Plan of Operations
Figure 6
Source:
TETRA TECH
Sycamore Canyon
Elev. 5700 ft
Elev. 5800 ft
Access Road
Scholefield Canyon
Barrel Canyon
Davidson Canyon
McCleary Canyon
Dry Stack Tailings
Plant Site Facilities
Open Pit
Waspe Canyon
Heap Leach Phase 1
Heap Leach Phase 2
Waste Rock Storage Area
T18 S
T19 S
R 15 E
R 16 E
83

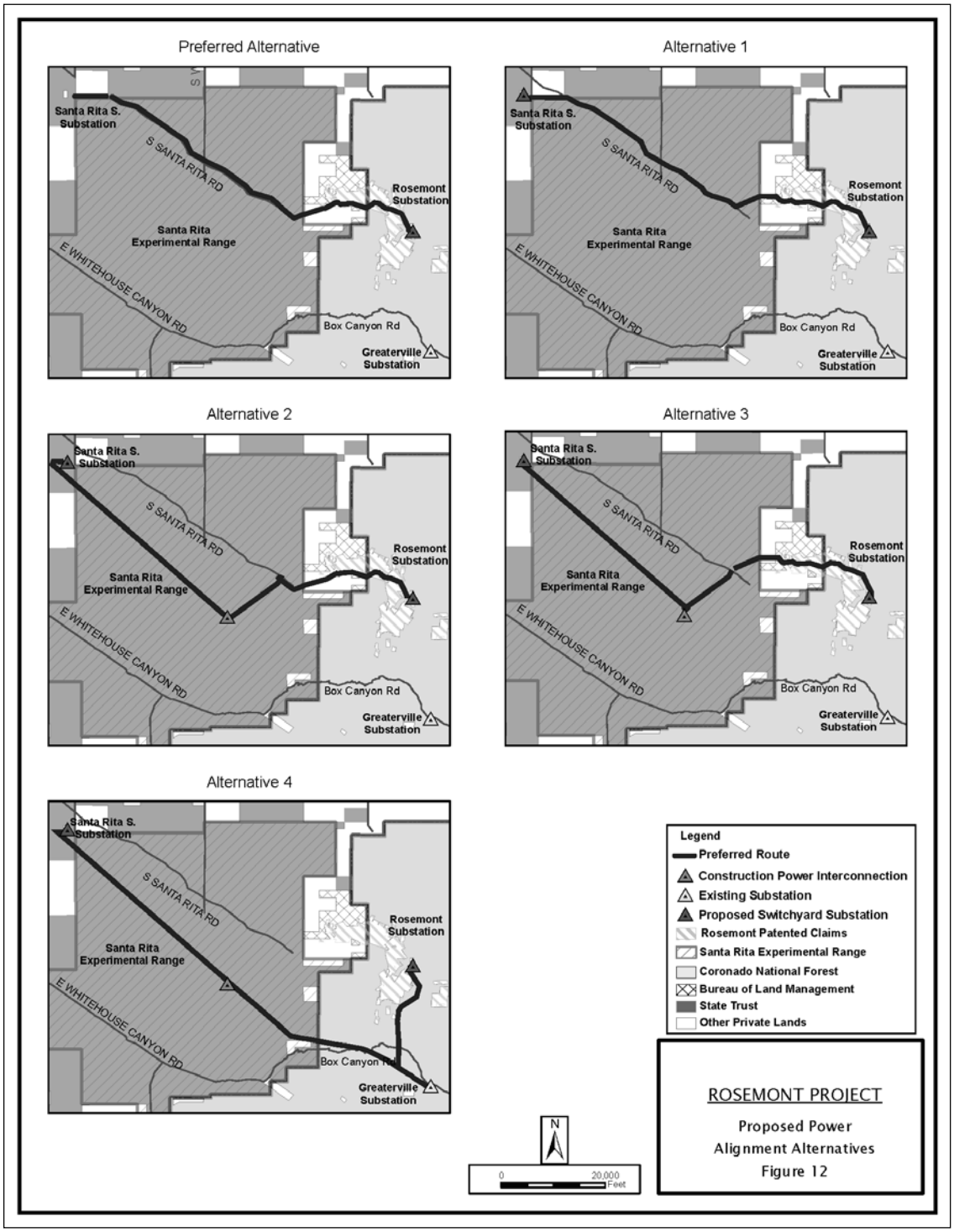

ROSEMONT PROJECT
Alternative 2
Alternative Tailings Sequence
Figure 7
Legend
Analysis Area
Springs and Seeps
Potentially Jurisdictional Wetland
Directly Impacted Potential Waters of the U.S.
Indirectly Impacted Potential Waters of the U.S.
Non Impacted Potential Waters of the U.S.
Source:
TETRA TECH
Sycamore Canyon
Elev. 5700 ft
Access Road
Scholefield Canyon
Elev. 5800 ft
Plant Site Facilities
Barrel Canyon
Davidson Canyon
McCleary Canyon
Dry Stack Tailings
Wasp Canyon
Open Pit
Heap Leach Phase 1
Heap Leach Phase 2
Waste Rock Storage Area
Elev. 5400 ft
Elev. 5200 ft
T18 S
T19 S
R 16 E
83
CONTOUR INTERVAL/MARIES
Feet

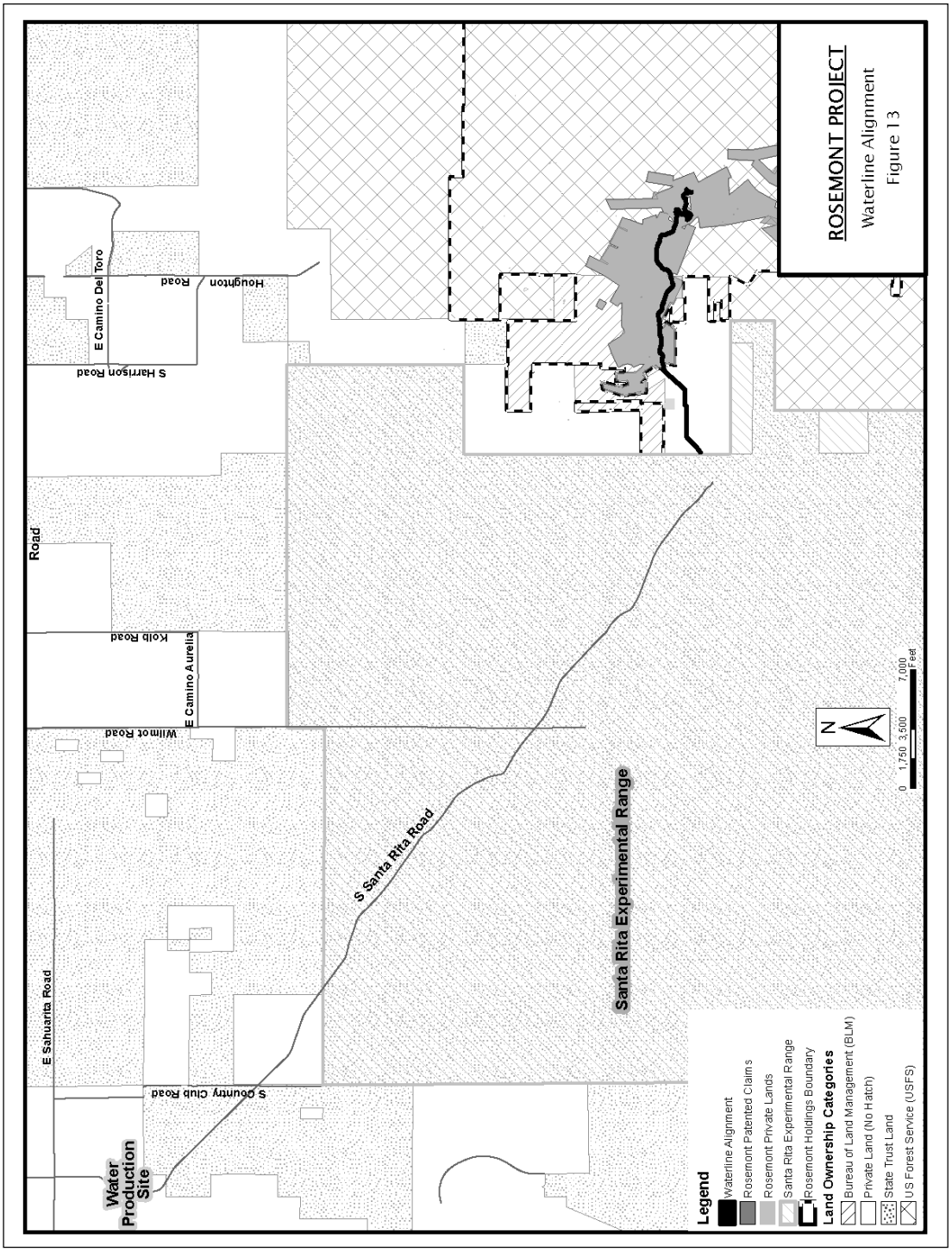

ROSEMONT PROJECT
Alternative 3
Barrel Canyon Only
Figure 8
Legend
Analysis Area
Springs and Seeps
Potentially Jurisdictional Wetland
Directly Impacted Potential Waters of the U.S.
Indirectly Impacted Potential Waters of the U.S.
Non Impacted Potential Waters of the U.S.
Source:
TETRA TECH
N
0 1,000 2,000 4,000 Feet
CONTOUR INTERVAL VARIES
Sycamore Canyon
Elev. 5700 ft
Access Road
Scholefield Canyon
Barrel Canyon
Davidson Canyon
McCleary Canyon
Elev. 5800 ft
Plant Site Facilities
Dry Stack Tailings Crest Elev. 6300 ft
Tailings Elev. 5280 ft
Open Pit
Waste Rock Storage Area Elev. 6400 ft
Heap Leach Phase 1
Heap Leach Phase 2
Elev. 6400 ft
Elev. 6200 ft
T 18 S
T 19 S
R 16 E
R 15 E
83


Legend
Analysis Area
Springs and Seeps
Potentially Jurisdictional Wetland
Directly Impacted Potential Waters of the U.S.
Indirectly Impacted Potential Waters of the U.S.
Non Impacted Potential Waters of the U.S.
N
0 1125 2250 4500 Feet
CONTOUR INTERVAL VARIES
ROSEMONT PROJECT
Alternative 4
Barrel Canyon Only
(Landforming)
Figure 9
Source:
TETRA TECH
Wetland Resources, Inc.
Sycamore Canyon
Elev. 5700 ft
Access Road
Barrel Canyon
Davidson Canyon
Scholefield Canyon
Access Road
Elev. 5800 ft
Plant Site Facilities
McCleary Canyon
Open Pit
Barrel Canyon
T 18 S
T 19 S
83
83


ROSEMONT PROJECT
Alternative 5
Scholefield Tailings
Wash Avoidance
Figure 10
Legend
Analysis Area
Springs and Seeps
Potentially Jurisdictional Wetland
Directly Impacted Potential Waters of the U.S.
Indirectly Impacted Potential Waters of the U.S.
Non Impacted Potential Waters of the U.S.
Source:
TETRA TECH
Westland Resources, Inc.
CONTOUR INTERVAL VARIES
Sycamore Canyon
Elev. 5700 ft
Access Road
Tailings Filter Plant
Barrel Canyon
Davidson Canyon
Dry Stack Tailings
Scholefield Canyon
Waste Rock Storage Area
McCleary Canyon
Stormwater and PLS Ponds
Heap Leach Pad
Open Pit
Wasp Canyon
Elev. 5800 ft
Plant Site Facilities
T18 S
T19 S
R 16 E
83


Legend
Analysis Area
Springs and Seeps
Potentially Jurisdictional Wetland
Directly Impacted Potential Waters of the U.S.
Indirectly Impacted Potential Waters of the U.S.
Non Impacted Potential Waters of the U.S.
N
0 1,125 2,250 4,500 Feet
CONTOUR INTERVAL VARIES
ROSEMONT PROJECT
Alternative 6
Modified Pit Configuration
with Wasp Canyon Open
Figure 11
Source:
TETRA TECH
Wetland Resources, Inc.
Tailings Filter Plant
Access Road
Barrel Canyon
Davidson Canyon
Scholefield Canyon
McCleary Canyon
Dry Stack Tailings
Crest Elev. 5250 ft
Tails Elev. <5237.5 ft
Waste Rock Storage Area
Elev. <5470 ft
Open Pit (conceptual)
Wasp Canyon
Plant Site Facilities
Elev. 5800 ft
Elev. 5700 ft
Sycamore Canyon
T 18 S
T 19 S


Preferred Alternative
Alternative 1
Alternative 2
Alternative 3
Alternative 4
Santa Rita S. Substation
S SANTA RITA RD
Rosemont Substation
Santa Rita Experimental Range
E WHITEHOUSE CANYON RD
Box Canyon Rd
Greaterville Substation
Legend
Preferred Route
Construction Power Interconnection
Existing Substation
Proposed Switchyard Substation
Rosemont Patented Claims
Santa Rita Experimental Range
Coronado National Forest
Bureau of Land Management
State Trust
Other Private Lands
N
0
20,000 Feet
ROSEMONT PROJECT
Proposed Power Alignment Alternatives
Figure 12


ROSEMONT PROJECT
Waterline Alignment
Figure 13
Water Production Site
E Sahuarita Road
S Country Club Road
S Santa Rita Road
Santa Rita Experimental Range
Wilmot Road
E Camino Aurelia
Kolb Road
Road
S Harrison Road
E Camino Del Toro
Houghton Road
N
0 1,750 3,500 7,000
Feet
Legend
Waterline Alignment
Rosemont Patented Claims
Rosemont Private Lands
Santa Rita Experimental Range
Rosemont Holdings Boundary
Land Ownership Categories
Bureau of Land Management (BLM)
Private Land (No Hatch)
State Trust Land
US Forest Service (USFS)

APPENDIX A
ROSEMONT LETTERS REGARDING NEARBY DEPOSITS

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4500 Cherry Creek South Drive, Suite 1040
Denver, CO 80246
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FAX: (303) 300 0135
WEB: www.augustaresource.com

Mr. Brian Lindenlaub
Westland Resources, Inc.
4001 East Paradise Falls Drive
Tucson, AZ 85712

August 30, 2010

RE: U.S. Army Corp of Engineers – Rosemont Project Alternative 6 – General Deposit Evaluation – Report 1/5

Mr. Lindenlaub

I am sending you the following discussion regarding the U.S. Army Corp Of Engineers Alternative 6 for the Rosemont Project, Pima County, Arizona. This is a follow up on information provided previously starting in September 2009. The discussion addresses the vastly higher economic potential and more advanced state of evaluation of the Rosemont Deposit, compared with other known deposits on the Rosemont Property, along with technical and financial reporting requirements that must be adhered to in presenting any public information on these deposits.

General Mining Project Evaluation & Financial Reporting

Introduction

A mining project begins with the exploration of a geologically favorable region. As the results of more and more exploration and evaluation become available for the region certain areas are targeted as being more favorable. Increasingly detailed work will show what the relative potential of each targeted area is, and typically identify the highest potential target area. Exploration is then focused on the best potential area. When sufficient geologic data has been collected, mine engineering is conducted, culminating in a comprehensive economic feasibility study. A positive conclusion from the feasibility study will justify the investment of significant capital used to construct the mine facilities and bring the operation into production. Even before the construction capital is committed, however, significant expenditures have been incurred on the exploration and engineering efforts.

During this exploration and engineering process, exploration information is advanced to define geologic Mineral Resources, which in turn are categorized as economic Mineral Reserves with the implementation of the mine engineering and cost considerations, all of which are conducted as part of the process of the economic feasibility evaluation. Within a feasibility study, the identification and reporting of Mineral Resources and Mineral Reserves is rigorously regulated by various security exchange commissions. All work is prepared under the supervision of a "Qualified Person" or "Competent Person." A Qualified Person is officially defined as: *" An individual who is an engineer or geoscientist with at least five years of experience in mineral exploration, mine development or operation or mineral project assessment, or any combination of these; has experience*

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relevant to the subject matter of the mineral project and technical report; and is a member or licensee in good standing of a professional organization." The Qualified Person takes the professional and legal responsibility for any publically released project information prepared under their supervision.

Financial & Technical Reporting

Any publically traded company has a fiduciary duty to make the best investment decisions for the benefit of the stockholders of the company, including any decisions regarding project development, while concurrently considering other possible uses of capital funding. Corporate financial reporting, including economic feasibility studies, must meet the regulatory and reporting requirements of the security commissions in the jurisdiction(s) in which the company reports. United States based companies must meet the requirements of the United States Securities And Exchange Commission (SEC). If is not unusual for mining companies to have a financial presence in more than one country (i.e. Canada, United Kingdom, etc.) which then requires reporting in compliance with each of these jurisdictions. A summary of the application of the requirements for Mineral Resource and Mineral Reserve reporting is summarized in an independent Pincock Perspective bulletin (International Mining Consultants) dated November 2003 (Attachment A).

REPORTING REQUIREMENTS IN THE UNITED STATES

The United States Stock Exchange Commission (SEC) regulates the reporting of Resources and Reserves for mineral companies with United States stock exchange listings. The SEC has issued Industry Guide 7: *Description of Property by Issuers Engaged or to be Engaged in Significant Mining Operations* (Attachment B) for guidance. In practice, mining companies often also make use of the Mineral Resource and Mineral Reserve reporting guideline developed by the United States professional group Society of Mining, Metallurgy and Exploration (SME). The SME has developed *A Guide For Reporting Exploration Information, Mineral Resources, And Mineral Reserves* ("SME Reporting Guide") dated 2007 (Attachment C). Industry Guide 7 is generally consistent with the SME Reporting Guide, with some differences, including no requirement for a qualified person and requiring the term "mineralized material," rather than mineral resources. SEC practice is that mineralized material may only include measured and indicated categories and may not include inferred category material, as they consider it too speculative. Also, SEC practice is to have reserves defined by a feasibility study for undeveloped properties, with necessary permits reasonably pending or having been issued. A mine plan or prefeasiblity study is acceptable for additions to operating mines. The SME Reporting Code requires that Mineral Reserves be based on *appropriate assessments, which may include feasibility studies,* carried out to demonstrate that the reserves are economically viable. Reserves are to be based on prices at the time of the determination, but can consist of a three year historic average to minimize price volatility.

REPORTING REQUIREMENTS IN CANADA

Canada is a common location for mining companies to have either primary or secondary registration. In Canada, the Canadian Securities Administrators (CSA) regulates the reporting of resources/reserves for mineral companies with Canadian stock exchange listings. The CSA has issued National Instrument 43-101 (NI 43-101), a rule that governs how stock issuers disclose technical information about mineral projects, which originally became effective on February 1,

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2001, with the latest update effective on December 30, 2005 (Attachment D). The rule incorporates the Mineral Resource and Mineral Reserve reporting guidelines developed by the Canadian Institute Of Mining, Metallurgy and Petroleum (CIM) entitled *CIM Standards On Mineral Resources And Reserves* ("CIM Standards"), the latest version dated December 11, 2005. The CIM Standards are very similar to those of the SME Reporting Code, as they were developed in collaboration with common professional groups. The rule requires that all disclosure be based on work by a "Qualified Person" (QP) and requires stock issuers to file Technical Reports for which there is a prescribed format. Mineral exploration conducted to delineate a deposit is to follow the *Mineral Exploration Best Practices* guidelines published in June 2000 (Attachment E). Mineral Resource estimation is to follow the *Estimation of Mineral Resources and Mineral Reserves Best Practices* guidelines, dated November 23, 2003 (Attachment F).

The CIM Standards do not allow for inferred Mineral Resources to be added with either measured and/or indicated resources for presenting a total mineral resource estimate. An issuer should not disclose the results of an economic evaluation that used inferred Mineral Resources; however, a preliminary assessment or scoping study at an early stage of a project can use inferred Mineral Resources in an economic evaluation as long as it is clearly stated as such. The CIM Standards requires that reserves be based on at least a Preliminary Feasibility Study or Prefeasibility Study, demonstrating that, at the time of reporting, economic extraction can be justified.

Project Advancement

Exploration and evaluation conducted by a company is the process used to identify projects that have the best economic potential for development. A project identified as having economic potential for advancement is then advanced consistent with industry standard practices. This project advancement can be grouped into general stages including deposit exploration drilling, project economic feasibility, and project development. During each stage, financial and technical work must be conducted and can only be reported consistent with regulatory requirements.

Stage 1: Deposit Exploration Drilling

The first stage of a mineral exploration project is to conduct evaluations of the geologic character and mineral distribution sufficient to allow for the identification of a mineral deposit for which an initial mineral resource estimate can be conducted. Mineral resources have been officially been defined as: *"A concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge."* Mineral Resources are sub-divided, in order of increasing geological confidence, into inferred, indicated, and measured categories.

Stage 2: Project Economic Feasibility

The next major stage of a mineral exploration project is to incorporate mine, metallurgical, and environmental engineering to determine what part of the mineral resource is economically extractable, which then allows for an estimate of the Mineral Reserve (mineable part of the Mineral Resource). Mineral Reserves have been officially defined as: *"The economically mineable part of a*

Measured or Indicated Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified. A Mineral Reserve includes diluting materials and allowances for losses that may occur when the material is mined." Mineral Reserves are sub-divided, in order of increasing economic confidence, into proven and probable categories. Material that cannot be considered as part of the economic Mineral Reserves must remain as Mineral Resource for reporting purposes.

Stage 3: Project Development

Once the economic feasibility study has demonstrated the mineral project to be economically viable, the next step includes detailed engineering, environmental impact analysis, and procurement of project financing. The geological Mineral Resource and economic Mineral Reserve are largely fixed at this point but may be updated if additional project information becomes available. In such circumstances, the additional information is usually incorporated into an economic feasibility study update.

With Regards,

Mark G. Stevens

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V.P. Exploration

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August 30, 2010

RE: U.S. Army Corp of Engineers – Rosemont Project Alternative 6 – Rosemont Deposit Evaluation – Report 2/5

Mr. Lindenlaub

I am sending you the following discussion regarding the U.S. Army Corp Of Engineers Alternative 6 for the Rosemont Project, Pima County, Arizona. This is a follow up on information provided previously starting in September 2009. The discussion addresses the vastly higher economic potential and more advanced state of evaluation of the Rosemont Deposit, compared with other known deposits on the Rosemont Property, along with technical and financial reporting requirements that must be adhered to in presenting any public information on these deposits.

Rosemont Copper Project Evaluation

Introduction

The Rosemont Copper Project is the cumulative result of more than 50 years of exploration drilling and mine engineering evaluations by several successive mining companies, at a total cost estimated to be on the order of $150 million dollars (Rosemont Copper Company does not have the accounting records of previous mining companies and these costs can only be estimated). Rosemont Copper Company envisions that the Rosemont Project will consist of the mining of the Rosemont Deposit in order to extract copper, as well as molybdenum and silver. The Rosemont Deposit was identified through extensive mineral exploration carried out on the Rosemont Property. Exploration conducted on the property during the period from the 1950s to the 1970s initially consisted of work conducted on a more regional property basis, but then progressed to a number of more specific deposit areas, as favorable results were obtained in these areas. Deposit areas that became more of a focus included Rosemont, Broadtop Butte, Copper World, and Peach-Elgin; each of which had various degrees of previous mining activity dating back as far as the late 1800s.

By about the middle 1970s, the cumulative results of the mineral evaluations from across the Rosemont property had identified the Rosemont mineral deposit as the site with the best economic potential for being developed into an economic mine, and hence Rosemont became the focus of subsequent work. The recognition of the potentially larger deposit size and better economic return from the Rosemont deposit was not only the conclusion of the mining company owners at that

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time, Anamax, but also was the consistent conclusion of subsequent mining company owners ASARCO, and then Rosemont Copper Company. The economic potential of the Rosemont site was so clearly demonstrated from exploration drilling, that upon entering into a purchase agreement for the property in 2005, Rosemont Copper immediately continued the process of advancing the Rosemont Deposit, with very little attention given to the other mineralized areas on the property.

Rosemont Copper Company's work on the Rosemont Deposit requires corporate financial reporting of Rosemont Project information, including economic feasibility study results, consistent with the regulatory and reporting requirements of the United States Securities And Exchange Commission (for United States securities reporting) and the Canadian Securities Administrators (for Canadian securities reporting). The Canadian Securities Administrators requirements are generally accepted as being more detailed, but adherence must be made to both systems. As a publically traded company, Rosemont Copper Company has a fiduciary duty to make the best investment decisions for the benefit of the stockholders of the company, including any decisions regarding project development, while concurrently considering other possible uses of capital funding. The Rosemont Project has advanced over the last several years by Rosemont Copper Company as being the best alternative for corporate investment. Implementing this process, Rosemont Copper Company has successively invested approximately $115 million in the Rosemont Copper Project, over the last five years. This does not include the investment made by previous mining company owners, estimated to be on the order of $35 million (in current dollars) for the previous Rosemont Deposit work.

Rosemont Project Advancement by Rosemont Copper Company

Since its purchase, Rosemont Copper Company has advanced the Rosemont Project in a manner consistent with industry practices. From the work conducted previously, Rosemont Copper Company recognized that the Rosemont deposit had the best potential for development, as had the previous mining company owners. Rosemont Copper Company has since proceeded to advance the Rosemont Deposit from exploration through economic feasibility to the current project development stage.

Stage 1: Deposit Exploration Drilling (2005 – 2008)

Previous mining company owners of the Rosemont property drilled 179 holes, for a total of 209,999 feet, in the Rosemont deposit. Subsequently, Rosemont Copper Company has conducted three progressive drilling campaigns to further explore the Rosemont deposit, totaling 75 drill holes for 113,876 feet of drilling. This additional drilling was necessary to better delineate geologic lithology and structure in the deposit, as well as to more accurately quantify the grade distribution of the mineralization to be consistent with industry standard practices. At the time of this initial work in 2005 and 2006, it was only appropriate to report on Mineral Resources of the Rosemont Deposit. The estimation of the Mineral Resources and assessment of the reasonable prospects for economic extraction required the judgment of a consulting engineer to serve as the official Qualified Person. In early 2007, the positive results from preliminary assessments of the Rosemont Deposit, allowed for the corporate decision to proceed to the next stage.

Stage 2: Project Economic Feasibility (2007 – 2009)

Rosemont Copper Company completed an economic feasibility study in August 2007. The study demonstrated the positive economic viability of the Rosemont Deposit. With the receipt of

subsequent information with regards to the Mineral Resources, Mineral Reserves, metallurgy, and capital and operating costs; an Updated Feasibility Study was finalized in January 2009. Again, the feasibility update demonstrated the positive economic viability of the Rosemont Deposit. For each of these studies, a Mineral Reserve was reported. The current Rosemont Mineral Reserve is estimated to include 1) 546 million tons of sulfide ore averaging 0.45% copper, 0.015% molybdenum, and 0.12 ounces per ton silver and 2) 70 million tons of oxide ore averaging 0.17% copper. Mineral Reserves of this magnitude demonstrate that the Rosemont Deposit is a large deposit. . This Mineral Reserve is capable of supporting a 20 plus year mine life, at a production rate of 75,000 tons of ore per day. The estimation of the Mineral Reserves and determination of economic feasibility for the project required the expertise of a team of company and consulting engineers. The lead engineer for each of the technical disciplines involved in the study served as a Qualified Person. The positive economic finding of the feasibility studies allowed for the corporate decision to advance the project to the next stage.

Stage 3: Rosemont Project Development (2009 – Current)

Rosemont Copper Company is currently in this stage of activity, which includes detailed engineering, environmental impact analysis, and procurement of project financing. The geological Mineral Resource and economic Mineral Reserve are largely fixed as of the 2009 feasibility study update.

Rosemont's focus all along has been entirely on the advancement of the Rosemont Deposit and has spent little or no time, effort, or cost on other Rosemont property prospect areas; as it was recognized from the initial property purchase, that the best economic potential identified to date on the property, was in the Rosemont Deposit. As such, Rosemont Copper Company has spent more than $115 million dollars in this effort, including $30 million on land purchases, $22 million on exploration drilling, $23 million on project engineering, and $22 million on environmental studies. This does not acknowledge the cost of exploration drilling by previous mining company owners, who likely spent on the order of $35 million on exploration drilling (in current dollars) and geologic evaluation, on the Rosemont Deposit area.

With Regards,

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August 30, 2010

RE: U.S. Army Corp of Engineers – Rosemont Project Alternative 6–Broadtop Butte Deposit Evaluation – Report 3/5

Mr. Lindenlaub

I am sending you the following discussion regarding the U.S. Army Corp Of Engineers Alternative 6 for the Rosemont Project, Pima County, Arizona. This is a follow up on information provided previously starting in September 2009. The discussion addresses the vastly higher economic potential and more advanced state of evaluation of the Rosemont Deposit, compared with other known deposits on the Rosemont Property, along with technical and financial reporting requirements that must be adhered to in presenting any public information on these deposits.

Broadtop Butte Copper Project Evaluation

Introduction

The Broadtop Butte Deposit is one of several mineralized areas that occur on the Rosemont Property. During the earlier exploration period from the 1950s to the 1970s, extensive exploration of the Rosemont Property, started on a regional basis and then progressed to a number of more specific deposits, one of which was Broadtop Butte. By about the middle 1970s, the cumulative results of the mineral evaluations from across the Rosemont property had already identified the Rosemont Deposit as the site with the best potential for being developed into an economic mine, and hence Rosemont became the focus of subsequent work.

Historical Evaluation

The Broadtop Butte Deposit occurs approximately 6,000 feet to the north of the Rosemont Deposit. A total of 18 holes have been drilled at Broadtop Butte, for a total of 10,170 feet. Drilling was conducted during the 1960s and 1970s on the deposit. Little work has been conducted since that time, because of the focus on the better economic potential at the Rosemont Deposit. It is estimated that approximately $2 million (in current dollars) had previously been spent on exploration of the Broadtop Butte Deposit.

Detailed exploration information on the Broadtop Butte Deposit does not exist. Drilling results deposit obtained during the 1960s and 1970s are widely spaced and are only sufficient for the preliminary estimation of a Mineral Resource, but not Mineral Reserves, based on current standard

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industry practices and security exchange reporting requirements. Previously in 1979, Anamax carried out an estimate that found a Mineral Resource of 8.8 million tons at an average grade of 0.77% copper and 0.037% molybdenum. It is noted that this estimate must be considered to be historical in nature and is not necessarily consistent with current industry practices and securities reporting requirements.

Potential Plan

Rosemont Copper Company has spent very little time and effort evaluating the Broadtop Butte Deposit, as earlier exploration results indicated this location had less economic potential than the Rosemont Deposit. At some point in the future, Rosemont Copper Company intends to conduct further work at Broadtop, to better evaluate the mineral potential. This work can only be conducted pending the priority for availability funds to cover the costs of the further work. Rosemont Copper Company estimates it will take at least $12 million to conduct the necessary drilling and engineering to advance the property to a possible economic feasibility stage. This work is likely to take 5 years to carry out. As is the nature with any early stage exploration mineral project, there can be no guarantees that such a project will eventually be shown to be economic by a feasibility study. Rosemont Copper Company believes from the existing information that the Broadtop Butte Deposit has potential as a smaller satellite area of production, but not as a possible substitute for the planned Rosemont Deposit production.

It is noted that United States Securities And Exchange Commission and Canadian Security Administrator requirements prohibit the public presentation of any Mineral Reserve without the requisite geologic study and corresponding engineering studies. Such a representation can be very misleading with the results being very speculative. As such, Rosemont Copper Company would be at risk to consider generating such an evaluation.

Conclusion

The geologic Mineral Resource currently known in the Broadtop Butte Deposit is only a fraction (1.6%) of what the mineable Mineral Reserve is in for the Rosemont Deposit. As such, the Broadtop Butte Deposit is not "available" as a substitute for the Rosemont Deposit. In addition, there is insufficient engineering to currently qualify the Broadtop Butte mineralization as a Mineral Reserve. Until such time as a comprehensive program of exploration drilling, metallurgical testing, mine planning, and economic evaluation have been completed in a definitive feasibility study, the Broadtop Butte mineralization cannot be considered "capable of being done". For Rosemont to attempt to do so currently would be speculative and prohibited by financial regulation. The Broadtop Butte Deposit is neither "available" nor "capable of being done" and cannot be considered as "practicable".

With Regards,

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August 30, 2010

RE: U.S. Army Corp Of Engineers – Rosemont Project Alternative 6 – Copper World Deposit Evaluation – Report 4/5

Mr. Lindenlaub

I am sending you the following discussion regarding the U.S. Army Corp Of Engineers Alternative 6 for the Rosemont Project, Pima County, Arizona. This is a follow up on information provided previously starting in September 2009. The discussion addresses the vastly higher economic potential and more advanced state of evaluation of the Rosemont Deposit, compared with other known deposits on the Rosemont Property, along with technical and financial reporting requirements that must be adhered to in presenting any public information on these deposits.

Copper World Project Evaluation

Introduction

The Copper World Deposit is one of several mineralized areas that occur on the Rosemont property. During the earlier exploration period from the 1950s to the 1970s, extensive exploration of the Rosemont Property, started on a regional basis and then progressed to a number of more specific deposits, one of which was Copper World. By about the middle 1970s, the cumulative results of the mineral evaluations from across the Rosemont property had already identified the Rosemont Deposit as the site with the best potential for being developed into an economic mine, and hence Rosemont became the focus of subsequent work.

Historical Evaluation

The Copper World Deposit occurs approximately 10,000 feet to the northwest of the Rosemont Deposit. Copper World was a significant part of the Helvetia area production during the late 1800s, from selective underground high-grade areas. During the 1960s and 1970s, 28 holes were drilled at Copper World, for a total of 11,449 feet. Little exploration work has been conducted since that time, because of the focus on the better economic potential at the Rosemont Deposit. A reclamation action by ASARCO in the 1990s resulted in part of the surface area being graded and contoured where historical turn of the century mining took place. It is estimated that approximately $3 million (in current dollars) had previously been spent on exploration and another 0.5 million on the previous reclamation of the Copper World Deposit.

Detailed exploration information on the Copper World Deposit does not exist. Drill holes in the deposit obtained during the 1960s and 1970s are widely spaced and are not sufficient for the preliminary estimation of a Mineral Resource and certainly not for a Mineral Reserves, based on current standard industry practices and security exchange reporting requirements. Drilling results are mixed, some encouraging, some not so encouraging, that together would indicate a smaller, geologically complex deposit is more likely present in the area.

Potential Plan

Rosemont Copper Company has spent very little time and effort evaluating the Copper World Deposit, as earlier exploration results indicated this location had less economic potential than the Rosemont Deposit. At some point in the future, Rosemont Copper Company intends to conduct further work at Copper World, to better evaluate the mineral potential. This work can only be conducted pending the priority for available funds to cover the costs of the further work. Rosemont Copper Company estimates it will take at least $7 million to conduct the necessary drilling and engineering to advance the property to an a possible economic feasibility stage. This work is likely to take 3 to 5 years to carry out. As is the nature with any early stage exploration mineral project, there can be no guarantees that such a project will eventually be shown to be economic by a feasibility study. Rosemont Copper Company believes from the existing information that the Copper World Deposit has potential as a smaller satellite area of production, but not as a possible substitute for the planned Rosemont Deposit production.

It is noted that United States Securities And Exchange Commission and Canadian Security Administrator requirements prohibit the public presentation of any mineral reserve without the requisite geologic study and corresponding engineering studies. Such a representation can be very misleading with the results being very speculative. As such, Rosemont Copper Company would be at risk to consider generating such an evaluation.

Conclusion

The Copper World Deposit contains mineralization that was mined by a historical small-scale, high-grade mine. Little is known of the remaining mineralization, other than variable results from a few widely scattered drill holes. There is not enough information for Rosemont Copper Company or predecessor companies to have estimated a Mineral Resource. It is most likely that a small deposit of low-grade mineralization may remain at Copper World that is only a fraction of what the mineable Mineral Reserve is in for the Rosemont Deposit. As such, the Copper World Deposit is not "available" as a substitute for the Rosemont Deposit . Since there is no current geologic Mineral Resource, there is no mineable Mineral Reserve, as no engineering has been conducted. Until such time as a comprehensive program of exploration drilling, metallurgical testing, mine planning, and economic evaluation have been completed in a definitive feasibility study, the Copper World mineralization cannot be considered "capable of being done". For Rosemont to attempt to do so currently would be speculative and prohibited by financial regulation. The Copper World Deposit is neither "available" nor "capable of being done" and cannot be considered as "practicable".

With Regards,

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August 30, 2010

RE: U.S. Army Corp of Engineers – Rosemont Project Alternative 6 – Peach-Elgin Deposit Evaluation – Report 5/5

Mr. Lindenlaub

I am sending you the following discussion regarding the U.S. Army Corp Of Engineers Alternative 6 for the Rosemont Project, Pima County, Arizona. This is a follow up on information provided previously starting in September 2009. The discussion addresses the vastly higher economic potential and more advanced state of evaluation of the Rosemont Deposit, compared with other known deposits on the Rosemont Property, along with technical and financial reporting requirements that must be adhered to in presenting any public information on these deposits.

Peach-Elgin Project Evaluation

Introduction

The Peach-Elgin Deposit is one of several mineralized areas that occur on the Rosemont property. During the earlier exploration period from the 1950s to the 1970s, extensive exploration of the Rosemont Property, started on a regional basis and then progressed to a number of more specific deposits, one of which was Peach-Elgin. By about the middle 1970s, the cumulative results of the mineral evaluations from across the Rosemont property had already identified the Rosemont Deposit as the site with the best potential for being developed into an economic mine, and hence Rosemont became the focus of subsequent work.

Historical Evaluation

The Peach-Elgin Deposit occurs approximately 15,000 feet to the northwest of the Rosemont Deposit. Peach-Elgin was a significant part of the Helvetia area production during the late 1800s, from selective underground high-grade areas; with some surface production in the middle 1900s. During the 1960s and 1970s, 21 holes were drilled at Peach-Elgin, for a total of 8,600 feet. Little exploration work has been conducted since that time, because of the focus on the better economic potential at the Rosemont Deposit. It is estimated that approximately $2.0 million (in current dollars) had previously been spent on the drilling and evaluation of these 21 holes at the Peach-Elgin Deposit.

Detailed exploration information on the Copper World Deposit does not exist. Drilling results from the deposit obtained during the 1960s and 1970s are widely spaced are only sufficient for the

preliminary estimation of Mineral Resource, but not Mineral Reserves, based on current standard industry reporting requirements. Previously in 1964, Anaconda carried out an estimate that found a Mineral Resource of 13.7 million tons of sulfide mineralization at an average grade of 0.78% copper and 0.037% molybdenum, along with 9.7 million tons of oxide mineralization averaging 0.72% copper. It is noted that this estimate must be considered to be historical in nature and is not necessarily consistent with current industry practices and securities reporting requirements. In producing this estimate, Anaconda drilled a number of additional holes in the 1960s, the records for which were permanently lost before Rosemont Copper Company obtained the property and property information.

Rosemont Copper Company has spent very little time and effort evaluating the Peach-Elgin Deposit, as earlier exploration results indicated this location had less economic potential than the Rosemont Deposit. At some point in the future, Rosemont Copper Company intends to conduct further work at Peach-Elgin, to better evaluate the mineral potential. This work can only be conducted pending the priority for available funds to cover the costs of the further work. Rosemont Copper Company estimates it will take at least $10 million to conduct the necessary drilling and engineering to advance the property to an a possible economic feasibility stage. This work is likely to take 5 years to carry out. As is the nature with any early stage exploration mineral project, there can be no guarantees that such a project will eventually be shown to be economic by a feasibility study. Rosemont Copper Company has no evidence that the Peach-Elgin Deposit would be a possible substitute for the planned Rosemont Deposit production.

It is noted that United States Securities And Exchange Commission and Canadian Security Administrator requirements prohibit the public presentation of any mineral reserve without the requisite geologic study and corresponding engineering studies. Such a representation can be very misleading with the results being very speculative. As such, Rosemont Copper Company would be at risk to consider generating such an evaluation.

Conclusion

The geologic Mineral Resource currently known in the Peach-Elgin Deposit is only a fraction (4.3%) of what the mineable Mineral Reserve is in for the Rosemont Deposit. As such, the Broadtop Butte Deposit is not "available" as a substitute for the Rosemont Deposit. In addition, there is insufficient engineering to currently qualify the Broadtop Butte mineralization as a Mineral Reserve. Until such time as a comprehensive program of exploration drilling, metallurgical testing, mine planning, and economic evaluation have been completed in a definitive feasibility study, the Broadtop Butte mineralization cannot be considered "capable of being done". For Rosemont to attempt to do so currently would be speculative and prohibited by financial regulation. The Broadtop Butte Deposit is neither "available" or "capable of being done" and cannot be considered as "practicable".

With Regards,

Mark G. Stevens

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APPENDIX B
ROSEMONT TECHNICAL MEMORANDUM – *AVOIDANCE OF WASP CANYON WASH*

ROSEMONT COPPER

Memo

Rosemont Copper Company

To: Jamie Sturgess, Kathy Arnold
From: Fermin A. Samorano – Mine Manager
CC:
Date: September 1, 2010
Re: Avoidance of Wasp Canyon Wash

General Comments:

During the review of the smaller pit alternative that entailed avoidance of Wasp Canyon, there were several mining related issues that had to be addressed. These issues were operational, safety, reserves, and logistics. For this evaluation we had Moose Mountain Technical Services develop a Wasp Canyon Avoidance Pit and calculate lost mineral resources based on the current $1.75 pit shell. In addition, Tetra Tech researched the flows into and around the affected area, and Call and Nicholas evaluated the new pit geometry and associated stability issues.

Mining Resources:

In their evaluation, Moose Mountain Technical Services identified a loss of 87,295,000 tons of ore at a grade of 0.39% copper and 0.018% molybdenum when compared to the Rosemont Copper Updated Feasibility study pit. The potential value of the sterilized metal as approximated by Moose Mountain is USD $326,652,000 million (undiscounted), using $1.75/lb copper.

At today's prices, ranging from USD $3.30 to USD $3.50, this would represent potential cash flow losses (undiscounted) of approximately USD $1.2 billion.

The potential losses only takes into account the proven and probable reserves and does not include inferred resources at the USD $1.75 pit shell or the additional resources available at higher copper prices. A detailed study of these resources is beyond the scope of this evaluation, but a Lerchs Grossman run at different copper prices show the potential gain (Moose Mountain September 1, 2010 Memorandum).

The loss of over 87 million tons of sulfide ore would result in an increase in the cost of the project. The initial capital investment for a mining project is substantial, and Rosemont is no exception with an initial capital cost of an estimated $897.2 million. The initial capital investment would be the same even with the smaller pit because the first six phases of mine development would be the same under both pit scenarios. The estimate of initial capital covers the first three years of mine development, which occurs within the first phase of development. For example, the size of the mill is dependent on daily throughput not total volume of ore, and the number of trucks would be the same because the first six phases and destinations of the smaller pit are identical to the proposed pit.

The way that a large project becomes economically viable is to be able to amortize these significant capital costs over a commensurately substantial ore tonnage. With a fully-sized pit, the capital costs will be spread over the recovery of approximately 546 million tons of sulfide ore (proven and probable), for an

ROSEMONT COPPER

Memo

estimated cost of approximately $1.64 per ton of sulfide ore. By reducing the volume of recovered sulfide ore by 87 million tons, the per ton cost increases to approximately $1.95 per ton of sulfide ore, a 19% increase in the cost of production.

Operations:

Water management will still be a significant part of the mine operations in order to avoid operational delays and address any potential safety issues. Specifically, the following projects will need to be implemented regardless of the size of the pit:

1. Stormwater diversion above the open pit. For this project we have designed two diversions that route the surface flows around the upgradient portion of the open pit to avoid flooding the operations during significant rain storms throughout the operations.

2. The development of drainages under the waste rock and dry stack landforms that keep water from ponding on the eastern and southern edges of the pit which may cause a saturation of the low-strength Willow Canyon arkose and alluvium geologic formations.

3. Dewatering of the low-strength Willow Canyon arkose and alluvium from the 5,100 foot elevation to the 4,400 ft elevation along the eastern and southern edges of the pit. We have to start dewatering these critical areas before we start to mine in these units for stability and safety.

All three of these water management projects are critical for pit slope stability and safety, particularly on the southern and eastern portions of the pit where the Willow Canyon arkose and alluvium occur. As shown in the attached memorandum by Call and Nicholas, this area of the pit has the lowest strength and therefore requires the shallowest slope angles. Of particular importance to the stability of this area of the pit is that it be dewatered down to the 4,400 ft elevation (Call and Nicholas, 2010).

Because the dewatering of the Willow Canyon arkose and alluvium is so critical to the stability of that portion of the pit, development of the stormwater diversion channel around the pit is also necessary. As shown in the attached technical memorandum from Tetra tech, construction of the designed stormwater diversion channel will reduce flows in this area by approximately half (from 588 cfs to 321 cfs in the 100-year/24-hour storm), resulting in a commensurate reduction in surface water volume (from 82.20 to 40.17 acre-feet in the 100-year/24-hour storm event).

In addition to the projects described above, additional infrastructure will need to be established within the Wasp Canyon area. During the development of the individual mine phases we will have three separate haul road crossings, averaging approximately 150 ft in width, across Wasp Canyon to the waste rock dumps in Barrel Canyon. In addition, there are pipelines to and from the heap leach, as well as a main power line and mine power line that will be constructed along the Wasp Canyon haul road corridor (see Attached Figure).

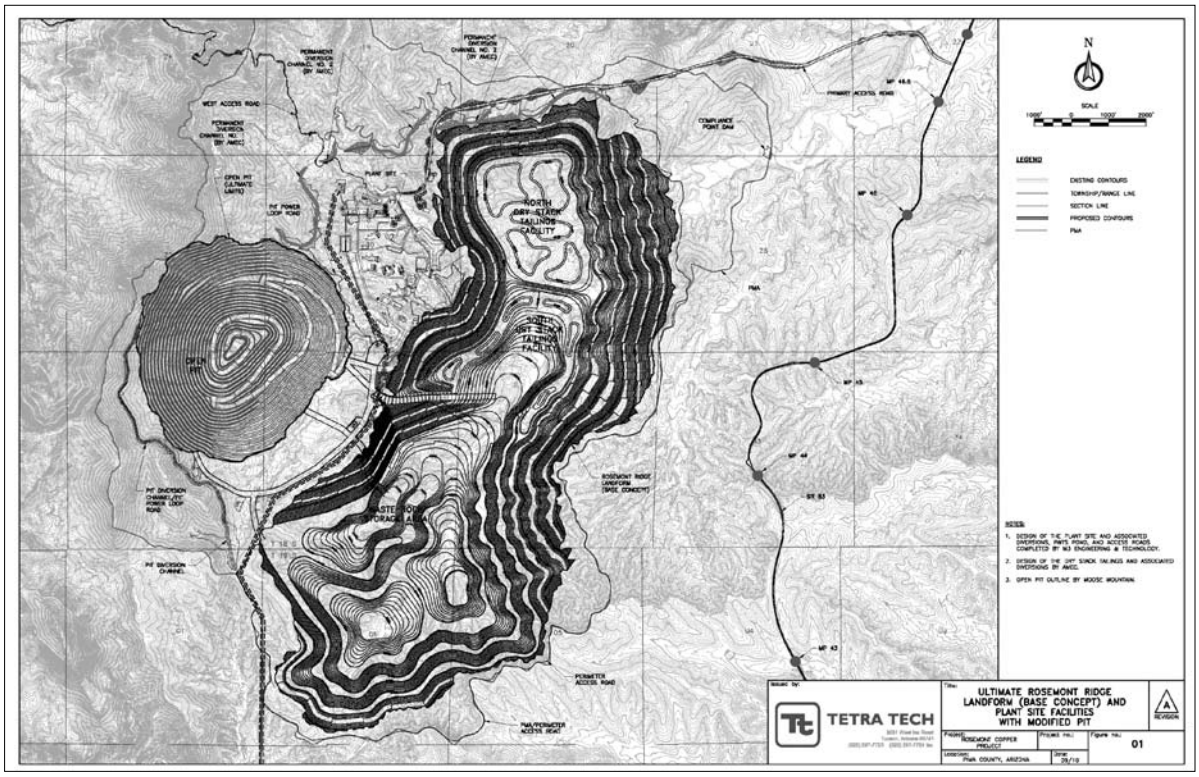
Summary:

Avoiding Wasp Canyon significantly reduces the economics of the Rosemont Copper Project by limiting the recovery of proven and probable ore reserves. The estimate of the sterilization of the ore in the area does not include potential inferred resources.

ROSEMONT COPPER

Memo

The avoidance of the wash does not change the operational requirements for the project. We will still have to develop diversions channels for routing water away from the operations, we will have to develop drainages for local waters around the pit edge and we will have to keep the Willow Canyon arkose and alluvium dewatered in this area to protect against high wall failure for the safety of the employees.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EXISTING CONTOURS
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PROPOSED CONFIGURE
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NOTES:
1. DESIGN OF THE PLANT SITE AND ASSOCIATED DIVERSIONS, PARTS POND, AND ACCESS ROADS COMPLETED BY W.I. ENGINEERING & TECHNOLOGY.
2. DESIGN OF THE DRY STACK TAILINGS AND ASSOCIATED DIVERSIONS BY AMEC.
3. OPEN PIT OUTLINE BY MOOSE MOUNTAIN.
NORTH DRY STACK TAILINGS FACILITY
NORTH WET STACK TAILINGS FACILITY
OPEN PIT
WEST ACCESS ROAD
PERIMETER ACCESS ROAD
COMPLIANCE POINT SW4
PERMANENT ACCESS ROAD
MP 46.5
MP 45
MP 44
MP 43
PMA
ROSEMONT RIDGE LANDFORM (BASE CONCEPT)
ISSUED BY:
TETRA TECH
TITLE:
ULTIMATE ROSEMONT RIDGE LANDFORM (BASE CONCEPT) AND PLANT SITE FACILITIES WITH MODIFIED PIT
REVISION
PROJECT: ROSEMONT COPPER PROJECT
PROJECT NO.:
FIGURE NO.: 01
LOCATION: PIMA COUNTY, ARIZONA
DATE: 09/10

Moose Mountain
Technical Services

MEMORANDUM

From: Bob Fong (MMTS)

To: Fermin Samorano, Rosemont Copper

Date: August 30, 2010

Re: Rosemont Copper - Address to Questions on Ultimate/Economic Pit, Updated September 1, 2010

This memorandum addresses the questions in your August 9th, 2010 email to me with respect to ultimate pit reserves, reserves that are restricted by the wasp Canyon, and other optimized pit resources.

1. Development of Optimized Pit and Pit Reserves

The floating cone, or Lerchs Grossman (LG, also known as Whittle), are open pit optimization methodologies that are accepted industry wide as a first approach to determining economic pit limits.

The computer algorithm reads in economic parameters – metal price, metal recoveries, mining and process costs, and generates a pit shell on a 3D geology block model. This pit shell contains all incremental ore blocks that are economic based on the input parameters, and considers the overlying waste blocks that have to be stripped. Model blocks immediately outside this pit shell are deemed uneconomic.

The limits of the potential pit can be restricted for non-economic reasons such as encroachment on infrastructure or avoidance areas. For the Rosemount ultimate pit, restrictions are applied to the west so that the potential pit wall does not extend beyond the top of the mountain ridge.

An ultimate pit with ramp accesses, smooth pit walls and phase development is designed using the economic LG pit shell. A net smelter return value (NSR /t) is calculated for each block in the 3D block model that is contained in the ultimate pit. This value represents the combined net metal value on per ton basis. A cut-off NSR value is established as the value of the block that is sufficient to pay for the plant process and G & A costs. For this project it was determined to be $3.56 /t for sulfide ores and $2.19 /t for oxide ores. Ore blocks that are equal or above these values are destined to the mill, and those below are designated as waste blocks destined to the waste disposal sites. The sum of the contained blocks that are above the cut-off NSR determine the ore reserves.

2. Ultimate Pit Reserves and Comparison with Wasp Canyon Restricted Pit

The reserves for the ultimate pit in the feasibility study and the pit restricted by the Wasp Canyon are summarized in Tables 1 and 2. (from Memo_Wasp Canyon Restricted Pit-Rev2.pdf). Fig. 1 shows that the restricted pit is fully contained within the ultimate pit. The incremental difference is 87 M-tons of ore from the restricted pit to the ultimate pit, with an average NSR value of $12.69 /t, well above the cut-off value.

Table 1 Ultimate Pit Quantities

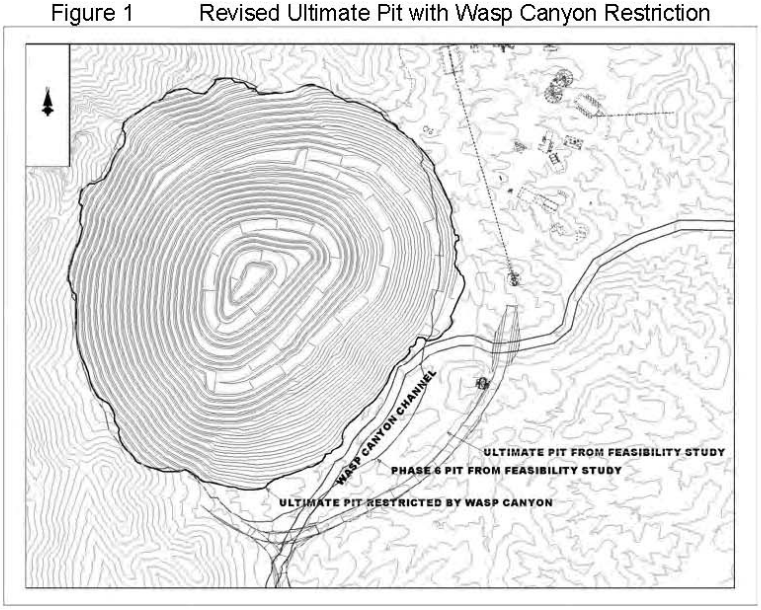
	INSITU ORE (ktons)	RUN OF MINE (ktons)	WASTE TOTAL (ktons)	ROM S/R t/t	DILUTED GRADE NSR ($/ton)	DILUTED GRADE TCU (%)	DILUTED GRADE MO (%)	DILUTED GRADE AG (oz/ton)
Wasp Canyon Restricted Ultimate Pit	511,364	529,020	928,913	1.8	12.26	0.43	0.013	0.11
Feasibility Ultimate Pit	595,302	616,315	1,231,171	2.0	12.32	0.42	0.013	0.11
Differential	**83,938**	**87,295**	**302,258**	**3.5**	**12.69**	**0.39**	**0.018**	**0.11**

Table 2 Ultimate Pit – Sulphide Ores

SULPHIDE ORE					
	RUN OF MINE (ktons)	DILUTED GRADE NSR ($/ton)	DILUTED GRADE TCU (%)	DILUTED GRADE MO (%)	DILUTED GRADE AG (oz/ton)
Wasp Canyon Restricted Ultimate Pit	459,058	13.54	0.46	0.014	0.12
Feasibility Ultimate Pit	546,340	13.42	0.45	0.015	0.12
Differential	**87,282**	**12.75**	**0.39**	**0.018**	**0.11**

Memo_Wasp Canyon Restricted Pit_Addendum Sept 1, 2010_Updated Page 2

Figure 1 Revised Ultimate Pit with Wasp Canyon Restriction



3. Potential Pit Resources at Variable Copper Prices

The feasibility study shows the analyses of the various potential pit limits tested against metal prices and costs scenarios (See Rosemont Pit Optimization MS-EP Summary, Oct 24 08. XLS). Economic reserves will primarily be dependent on metal prices. The bases for the economic pit are $1.75 /lb Cu, $15.00 /lb Mo, and $10.00 /oz Ag. If long term metal prices do not decline significantly below these assumptions, the current pit design and reserves will remain economically viable.

The potential economic pit is shown to be larger than the feasibility study designed pit if the restrictions on the west limits are removed. Therefore, the existing designed pit is constrained by physical limits, not necessarily economic limits.

Additional LG optimized pits are generated with copper prices at $2.00 /lb, $2.50 /lb, and $3.00 /lb, to compare against the base case of $1.75 /lb used in the feasibility study. Other metal prices remain unchanged. Tables 3 and 4 summarize the total ore and sulfides, respectively.

Also shown is the comparison of the designed ultimate pit compared to base case LG pit. The differences are due to pit wall smoothing and adding the in-pit haul road.

Table 3 Optimized Pits for Raised Cu Prices – Total Ore, ox and sulph

	RUN OF MINE (ktons)	WASTE TOTAL (ktons)	ROM S/R t/t	DILUTED GRADE NSR ($/ton)	DILUTED GRADE TCU (%)	DILUTED GRADE MO (%)	DILUTED GRADE AG (oz/ton)
Designed Ultimate Pit	616,315	1,231,171	2.0	12.32	0.42	0.013	0.11
Base Case LG $1.75 /lb Cu	640,405	1,205,277	1.9	12.28	0.42	0.013	0.11
LG $2.00 /lb Cu	669,048	1,229,188	1.8	13.54	0.41	0.013	0.10
LG $2.50 /lb Cu	711,486	1,258,515	1.8	16.00	0.40	0.013	0.10
LG $3.00 /lb Cu	756,231	1,391,481	1.8	18.41	0.38	0.012	0.10
Variance from Base Case LG $1.75 /lb Cu							
LG $2.00 /lb Cu	28,643	23,911	0.8	41.58	0.18	0.006	0.05
LG $2.50 /lb Cu	71,081	53,238	0.7	49.53	0.16	0.006	0.05
LG $3.00 /lb Cu	115,826	186,204	1.6	52.31	0.17	0.006	0.05

Table 4 Optimized Pits for Raised Cu Prices – Sulfide Ore Only

Sulfide Ores					
	RUN OF MINE (ktons)	DILUTED GRADE NSR ($/ton)	DILUTED GRADE TCU (%)	DILUTED GRADE MO (%)	DILUTED GRADE AG (oz/ton)
Designed Ultimate Pit	546,340	13.42	0.45	0.015	0.12
Base Case LG $1.75 /lb Cu	568,466	13.35	0.45	0.015	0.12
LG $2.00 /lb Cu	591,418	14.76	0.44	0.014	0.11
LG $2.50 /lb Cu	622,281	17.60	0.43	0.014	0.11
LG $3.00 /lb Cu	659,370	20.29	0.42	0.014	0.11
Variance from Base Case LG $1.75 /lb Cu					
LG $2.00 /lb Cu	22,952	49.60	0.20	0.007	0.06
LG $2.50 /lb Cu	53,815	62.42	0.19	0.007	0.06
LG $3.00 /lb Cu	90,904	63.70	0.19	0.007	0.05

4. Economic Pit and Pit Phases

As previously discussed in Part 1 of this document, the ultimate pit is designed around the selected economic pit shell from the pit optimization study. The financial analysis provided in the feasibility study document demonstrates that all reserves contained within the current ultimate pit design are economic.

The ultimate pit is divided into pit phases for the purpose of providing an effective mining sequence and a balanced material schedule. In general terms, the mining sequence follows the order of the mining phases – Phase 1 is mined first, Phase 7 is mined at the end of the life of mine (LOM) production schedule. If the cashflow for the latter years of the LOM production schedule indicate negative cashflow, then Phase 7 would not be

economic. On the contrary, the cashflows are positive, and therefore Phase 7 contribute to the economics of the project.

To further demonstrate the viability of the feasibility study ultimate pit, following is a brief economic analysis on the increment ore between it and the Wasp Canyon restricted pit. The reserves that would be sterilized by the Wasp Canyon restriction are analyzed in isolation, assuming that it is similar to Phase 7 of the ultimate pit as far as the timing of when it will be mined.

A simplified net present value (NPV) calculation indicates a positive value for the 87 M-tons of incremental ore between the Wasp Canyon restricted pit and the ultimate pit. A production schedule for the incremental ore and waste is shown in Table 5. It is estimated that recovering the ore from this last increment would not commence until Year 17, with waste stripping five years in advance. Average costs are estimated from the LG inputs, and the revenues are estimated from the average NSR /t values of the calculated increment. These are design parameters and may not necessarily represent the actual economics that are used for the financial analysis.

The positive discounted cashflow, both undiscounted ($326,652 k) and discounted ($29,166 k), demonstrate the economic viability of the incremental ore.

Table 5 NPV of Ore Sterilized under Wasp Canyon

			Yr 12	Yr 13	Yr 14	Yr 15	Yr 16	Yr 17	Yr 18	Yr 19	Yr 20	Yr 21	Totals
Ore, ktons								2,296	27,376	27,376	27,376	2,870	87,294
Waste, ktons			564	63,361	61,866	51,486	40,014	34,924	31,434	11714	4,369	2,525	302,258
Revenue, k$	12.69	$/t						29,141	347,400	347,402	347,401	36,417	1,107,761
Costs, k$													
Ore Mining	1.51	$/t						3,467	41,338	41,338	41,338	4,333	131,814
Waste Mining	1.12	$/t	632	70,964	69,290	57,664	44,816	39,115	35,206	13,120	4,893	2,828	338,528
Ore Process and G&A	3.56	$/t						8,175	97,458	97,459	97,459	10,216	310,767
Cashflow, k$			-632	-70,964	-69,290	-57,664	-44,816	-21,617	173,398	195,486	203,712	19,039	
Discount Rate	10%												
NPV – Undiscounted, k$	**$326,652**												
NPV- Discounted, k$	**$29,166**												

Memo_Wasp Canyon Restricted Pit_Addendum Sept 1, 2010_Updated Page 5

Reference documents:

- Memo_Wasp Canyon Restricted Pit-Rev2.pdf
- Rosemont Pit Optimization MS-EP Summary, Oct 24 08. XLS
- Filenote_Potential Ultimate Pit Expansion.PDF
- LGs Results Aug 16-2010.xlsx

TETRA TECH

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Technical Memorandum

To:	Fermin Samorano; Kathy Arnold	**From:**	Monica Salguero
Company:	Rosemont Copper Company	**Date:**	August 19, 2010
Re:	Rosemont Wasp Canyon Analysis	**Doc #:**	219/10-320878-5.3
CC:	David Krizek, P.E. (Tetra Tech); Joel Carrasco		

1.0 Introduction

This Technical Memorandum summarizes the methods and computations employed to perform the hydrological analysis of the Wasp Canyon sub-basin at the proposed Rosemont Copper Project (Project) in Pima County, Arizona. The objective of this analysis was to assess the stormwater run-off response within the basin to a 100-year, 24-hour event associated with four (4) different scenarios as shown on Figures 1 through 4 in Attachment 1:

- Wasp Canyon sub-basin as natural terrain (Figure 1);
- Wasp Canyon sub-basin with a Modified Pit configuration with the Open Pit Diversion Channel (Figure 2);
- Wasp Canyon sub-basin with a Modified Pit configuration without the Open Pit Diversion Channel (Figure 3); and
- Wasp Canyon sub-basin with the existing P673 Pit configuration and Open Pit Diversion Channel (Figure 4).

Except for the scenario containing the existing pit configuration, P673 Pit, all scenarios were evaluated at a "downstream common point". Figure 1 shows the natural basin conditions without any Project development. Figure 2 shows this same elevation point (downstream common point) in the Wasp Canyon sub-basin with a Modified Pit configuration and with the Open Pit Diversion channel. The Open Pit Diversion channel diverts stormwater away from the Open Pit and from the Wasp Canyon sub-basin and into Barrel Canyon. Figure 3 shows the Wasp Canyon drainage sub-basin without the Open Pit Diversion channel. In this case, more stormwater reports to both the Open Pit and to the Wasp Canyon drainage (i.e., the "downstream common point"). The "downstream common point" is the point where Wasp Canyon is blocked by the Rosemont Ridge Landform (Dry Stack Tailings/Waste Rock).

Figure 4 shows the current P673 Open Pit outline and its interaction with Wasp Canyon. As shown, the final P673 pit configuration cuts through the Wasp Canyon drainage. For reference, the "downstream evaluation point" shown on Figures 1 through 3 is also indicated on Figure 4. The scenario shown on Figure 4 assumes construction of the Open Pit Diversion channel. Only

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a small remaining portion of the watershed remains in the upper portion of the Wasp Canyon sub-basin, reporting to the "upper Wasp Canyon point".

2.0 Methodology and Precipitation

The Natural Resource Conservation Service (NRCS) method was selected to perform the hydrologic calculations. The NRCS method described herein is based on two (2) components, the Curve Number procedure (to determine initial losses and excess precipitation) and the unit hydrograph method (to derive the hydrograph resulting from excess rainfall).

HEC-HMS, developed by the U.S. Army Corps of Engineers, incorporates the NRCS method and was selected to determine the discharge resulting from the basins considered in this analysis.

The NRCS has developed a widely used curve number procedure for estimating runoff from storm events. Rainfall initial losses depend primarily on soil characteristics and land use (surface cover). The NRCS method uses a combination of soil conditions and land use to assign runoff factors (curve numbers). Curve numbers represent the runoff potential of a soil type (i.e., the higher the curve number, the higher the runoff potential).

A detailed discussion of the NRCS method can be found in the Technical Memorandum titled *Rosemont Hydrology Method Justification* (Tetra Tech, 2010).

Precipitation data was acquired from the National Oceanic and Atmospheric Association (NOAA) Atlas 14 Point Precipitation website (NOAA, 2009).

3.0 Hydrology

The NRCS method was selected as the most appropriate for this level of analysis based on the information available and on the analysis expectations.

3.1 Rainfall Excess

The NRCS method determines rainfall runoff volume using the following relationship:

$$Q = \frac{(P - 0.2S)^2}{P + 0.8S}$$

Where,

Q is the accumulated runoff volume in inches;

P is the accumulated precipitation in inches, (100-year, 24-hour rainfall depth = 4.75");

S is the maximum soil water retention parameter, $(S = \frac{1000}{CN} - 10)$ in inches; and

CN is the curve number.

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3.2 Curve Number

The Curve Number selected for the contributing basin is 85 based on previous study. The initial abstraction used was 0.2S = 0.35".

3.3 Lag Time

The SCS lag time is defined as:

$$T_{LAG} = L^{0.8} \frac{(S+1)^{0.7}}{1900\sqrt{Y}}$$

Where; T_{LAG}= lag time, in hours;

S= the maximum soil water retention parameter;

L= hydraulic length, in feet; and

Y= watershed slope in %.

Table 1 summarizes the hydrologic basin parameters for the four (4) Wasp Canyon analysis scenarios.

Table 1 Hydrologic Basin Parameters

Wasp Canyon Sub-basin	A (mi^2)[1]	CN	S	L (ft)	Y (ft/ft)	Lag Time (min)[2]
Natural Terrain	1.251	85	1.765	10228	9.0	34.61
Modified Pit w/ Open Pit Diversion channel	0.240	85	1.765	5726	6.0	26.65
Modified Pit w/o Open Pit Diversion channel	0.491	85	1.765	9732	10.0	31.56
Current P673 Pit w/Open Pit Diversion channel	0.073	85	1.765	2444	6.5	12.96

[1]mi^2 = square miles, [2]min = minutes

4.0 Results

Peak flow and the flow volume produced by the 100-year, 24-hour event was obtained from the hydrological analysis using the HEC-HMS and was applied to the four (4) scenarios. A summary of the results is shown in Table 2. Except for the current P673 Pit configuration, stormwater volumes and peak flows were taken at the "downstream common point" shown on the figures. Values for the current P673 Pit configuration were taken at the "upper Wasp Canyon point" as shown on Figure 4.

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Table 2 Hydrologic Results

Wasp Canyon Sub-basin Description	Peak (cfs)[3]	Volume (ac-ft)[4]
Natural Terrain	1184	209.40
Modified Pit w/Open Pit Diversion channel	321	40.17
Modified Pit w/o Open Pit Diversion channel	588	82.20
Current P673 Pit w/Open Pit Diversion channel	146	12.17

[3]cfs = cubic feet per second, [4]ac-ft = acre-feet

Detailed results from the HEC-HMS model output are provided in Attachment 2.

4

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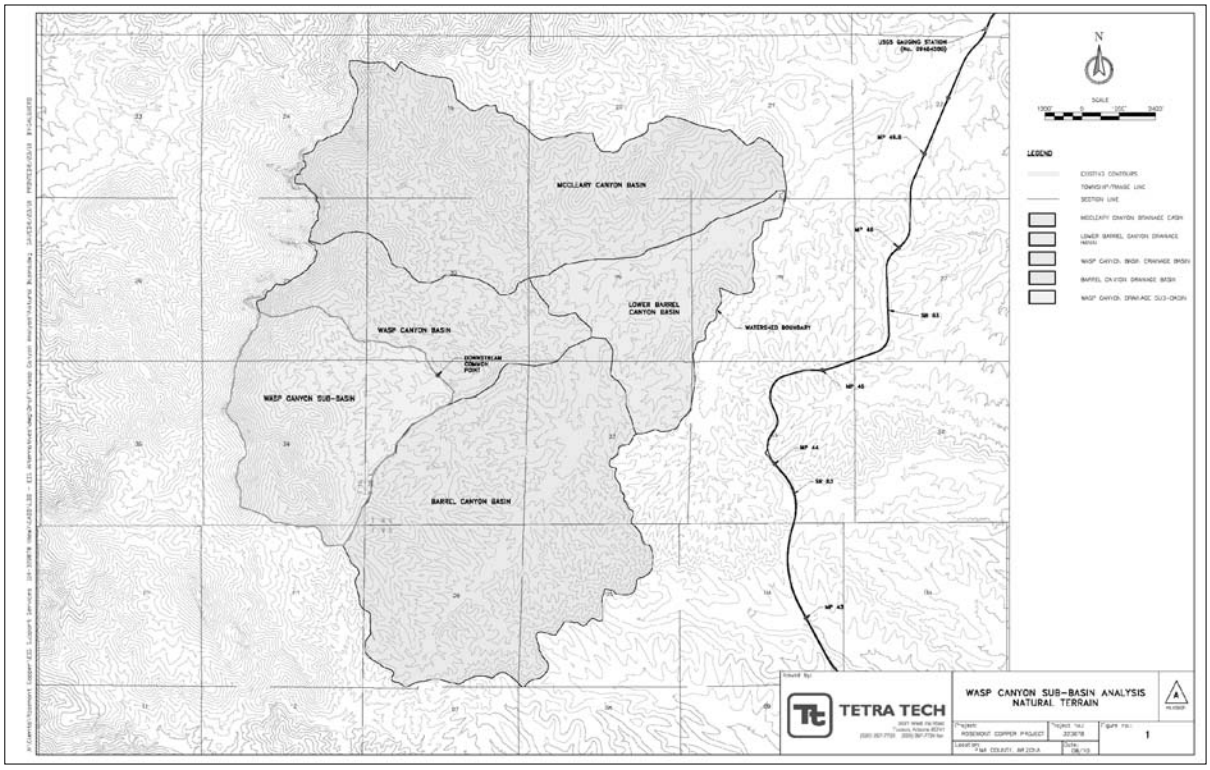
REFERENCES

Ven Te Chow, D.R. Maidment, L.W. Mays *Applied Hydrology*. McGraw Hill, 1988.

National Oceanic and Atmospheric Administration (NOAA), *NOAA Atlas 14 – Precipitation Frequency Atlas of the United States*. Website: http://hdsc.nws.noaa.gov, Visited June 11, 2009

Tetra Tech Chee, R., and Hemmen, G. (2010). *Rosemont Hydrology Method Justification*. Technical Memorandum to Kathy Arnold (Rosemont Copper Company). Technical Memorandum dated January 27, 2010.

ATTACHMENT 1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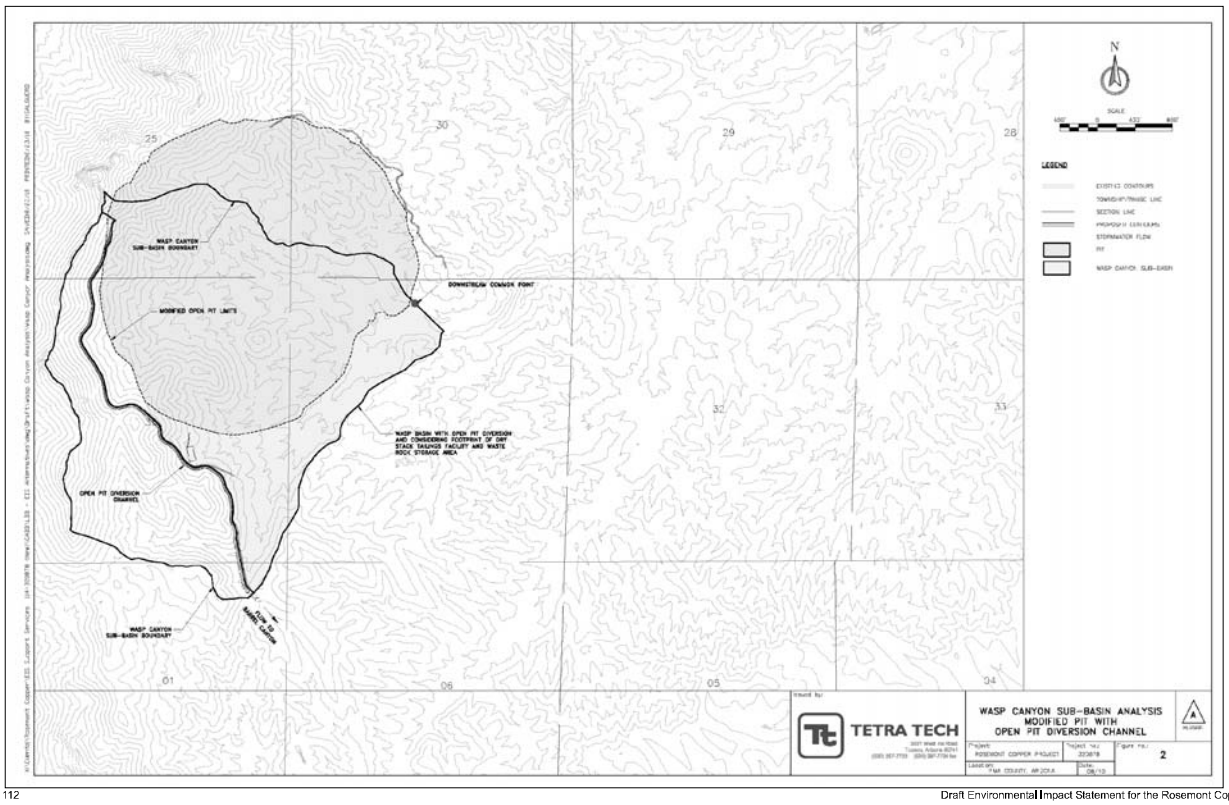
WASP CANYON SUB-BASIN ANALYSIS
NATURAL TERRAIN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WASP CANYON SUB-BASIN ANALYSIS
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OPEN PIT DIVERSION CHANNEL
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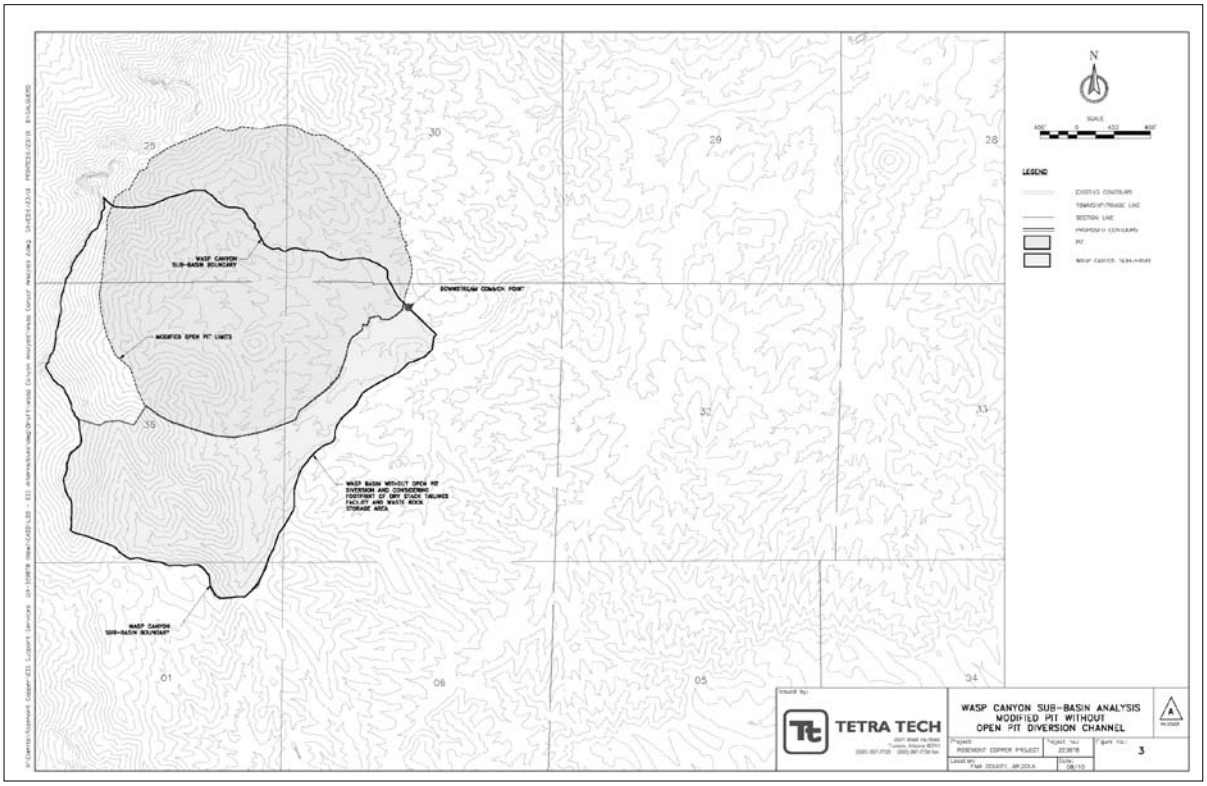
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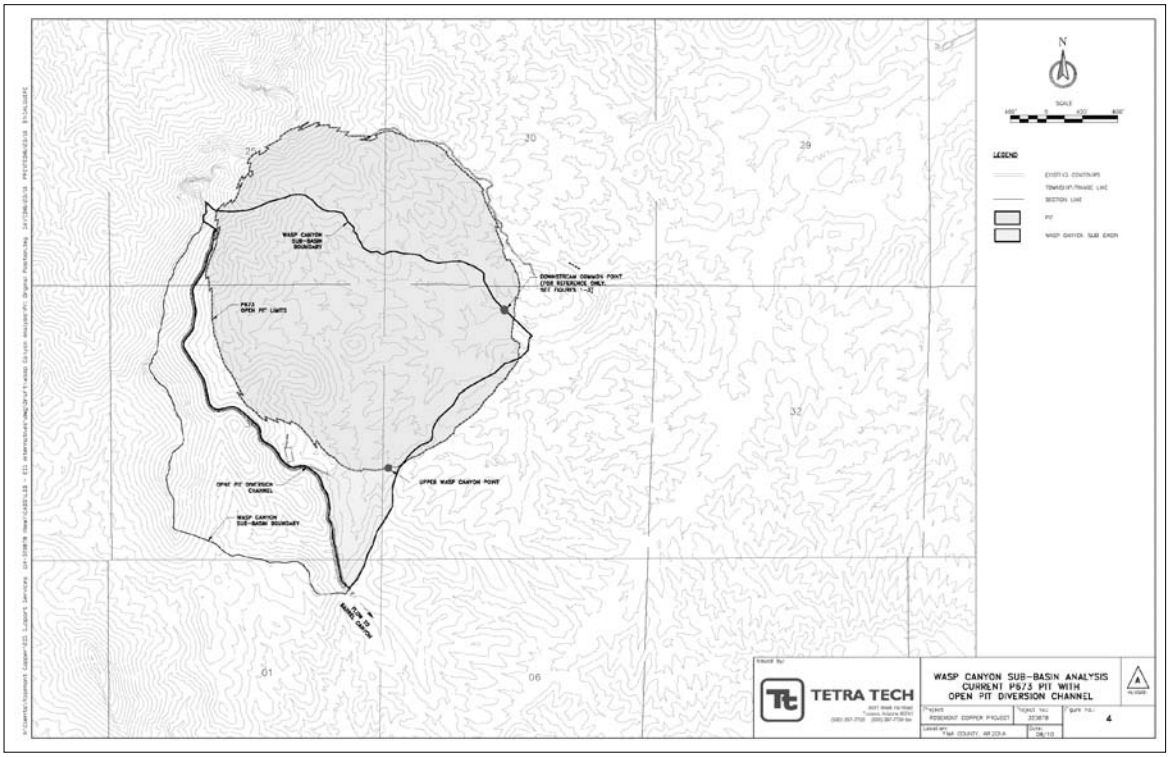
MODIFIED PIT WITHOUT
OPEN PIT DIVERSION CHANNEL
ROSEMONT COPPER PROJECT
3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PIT73 OPEN PIT LIMITS
DOWNSTREAM CANYON POINT (FOR REFERENCE ONLY. SEE FIGURES 1-2)
UPPER WASP CANYON POINT
OPEN PIT DIVERSION CHANNEL
WASP CANYON SUB-BASIN BOUNDARY
TETRA TECH
WASP CANYON SUB-BASIN ANALYSIS
CURRENT PIT73 PIT WITH
OPEN PIT DIVERSION CHANNEL
ROSEMONT COPPER PROJECT
PIMA COUNTY, ARIZONA
4

ATTACHMENT 2

Project: Was Canyon Analysis

Simulation Run: Run Natural Terrain Subbasin: Subbasin Natural Terrain

Start of Run:	13Aug2010, 12:00	Basin Model:	Basin Natural Wasp
End of Run:	15Aug2010, 12:05	Meteorologic Model:	Met 1
Compute Time:	19Aug2010, 10:21:04	Control Specifications:	Control 1

Volume Units: AC-FT

Computed Results

Peak Discharge :	1404.39 (CFS)	Date/Time of Peak Discharge :	14Aug2010, 00:30
Total Precipitation :	316.92 (AC-FT)	Total Direct Runoff :	209.53 (AC-FT)
Total Loss :	107.39 (AC-FT)	Total Baseflow :	0.00 (AC-FT)
Total Excess :	209.53 (AC-FT)	Discharge :	209.53 (AC-FT)

Project: Was Canyon Analysis

Simulation Run: Run With Pit Channel Subbasin: Subbasin w/ Pit Chnnl

Start of Run:	13Aug2010, 12:00	Basin Model:	Basin Modif Pit with Chn
End of Run:	15Aug2010, 12:05	Meteorologic Model:	Met 1
Compute Time:	17Aug2010, 11:08:48	Control Specifications:	Control 1

Volume Units: AC-FT

Computed Results

Peak Discharge :	320.60 (CFS)	Date/Time of Peak Discharge :	14Aug2010, 00:20
Total Precipitation :	60.77 (AC-FT)	Total Direct Runoff :	40.17 (AC-FT)
Total Loss :	20.59 (AC-FT)	Total Baseflow :	0.00 (AC-FT)
Total Excess :	40.17 (AC-FT)	Discharge :	40.17 (AC-FT)

Project: Was Canyon Analysis

Simulation Run: Run Wasp Without Pit Channel Subbasin: Subbasin w/o Pit Chnnl

Start of Run:	13Aug2010, 12:00	Basin Model:	Basin Moidf Pit NO Chann
End of Run:	15Aug2010, 12:05	Meteorologic Model:	Met 1
Compute Time:	19Aug2010, 10:20:59	Control Specifications:	Control 1

Volume Units: AC-FT

Computed Results

Peak Discharge :	587.53 (CFS)	Date/Time of Peak Discharge :	14Aug2010, 00:25
Total Precipitation :	124.33 (AC-FT)	Total Direct Runoff :	82.20 (AC-FT)
Total Loss :	42.13 (AC-FT)	Total Baseflow :	0.00 (AC-FT)
Total Excess :	82.20 (AC-FT)	Discharge :	82.20 (AC-FT)

Project: Was Canyon Analysis
Simulation Run: Run Original Pit Subbasin: Subbasin Original Pit

Start of Run:	13Aug2010, 12:00	Basin Model:	Basin Original Pit Position
End of Run:	15Aug2010, 12:05	Meteorologic Model:	Met 1
Compute Time:	17Aug2010, 11:08:35	Control Specifications:	Control 1

Volume Units: AC-FT

Computed Results

Peak Discharge :	146.11 (CFS)	Date/Time of Peak Discharge :	14Aug2010, 00:05
Total Precipitation :	18.41 (AC-FT)	Total Direct Runoff :	12.17 (AC-FT)
Total Loss :	6.24 (AC-FT)	Total Baseflow :	0.00 (AC-FT)
Total Excess :	12.17 (AC-FT)	Discharge :	12.17 (AC-FT)

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Principals
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E. C. Wellman, P.E.

MEMORANDUM

To: Mr. Fermin Samorano / Rosemont Copper Company

From: Mr. Robert Pratt, P.E.
Mr. David Nicholas, P.E.

Date: 23 August 2010

Subject: Rosemont Wasp Canyon Restricted Pit Slope Stability

This memorandum presents results of Call & Nicholas, Inc.'s (CNI) review of Rosemont Copper Company's Wasp Canyon restricted ultimate pit. This pit was constructed with the limitation of avoiding disruption to Wasp Canyon, which has resulted in an offset of the ultimate pit crest on the southeastern side of the pit, as shown on Figure 1. The remaining portion of the pit is unchanged from the original feasibility pit design. CNI reviewed modifications to the pit for any potential slope stability issues.

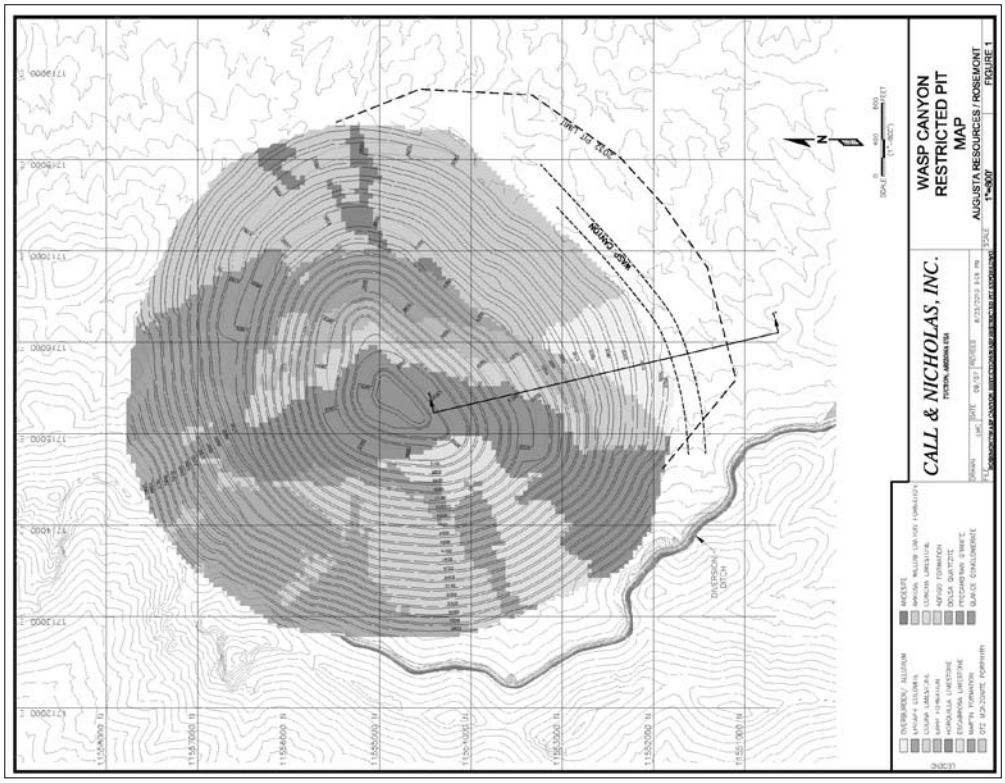
The geology projected onto the Wasp Canyon restricted pit is similar to that of the nonrestricted ultimate pit, and therefore slope stability issues will not change from those identified as part of CNI's feasibility study (*Feasibility-Level Geotechnical Study for the Rosemont Deposit,* February 2008). No change is needed to the interramp slope angles recommended for the southeast wall as part of CNI's 2008 feasibility study (28 degrees for the alluvium, 33 to 35 degrees for Willow Canyon, and 45 to 48 degrees for Paleozoic rocks in the lower portion of the slope). These slope angles were determined based on typical mine design criteria.

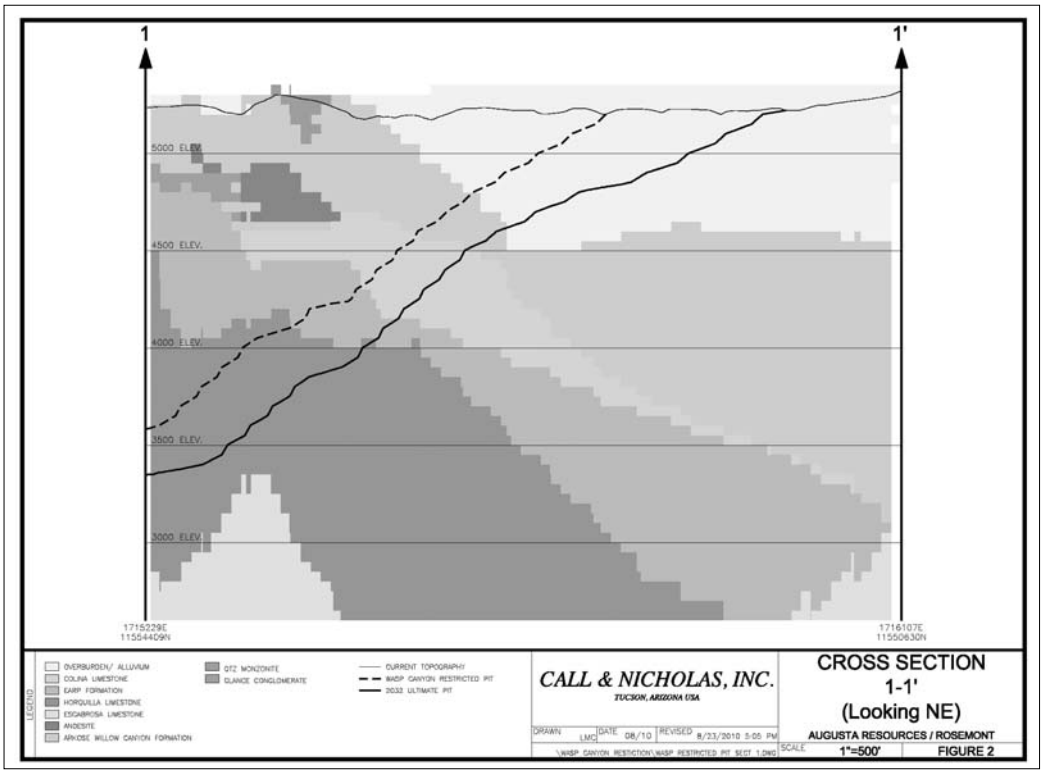
Due to the easterly dip of the Paleozoic rocks and change in pit location, the height of the upper alluvium and Willow Canyon slope decreases, as shown on Figure 2. This reduction in height of the upper portion of the slope in relatively low-strength materials is expected to improve the slope design reliability. It may also be possible to steepen the slope angle while maintaining slightly lower, but acceptable slope-design reliability typical for mine slopes.

Geological Engineering ***Slope Stability*** ***Rock Mechanics***

The primary issue with respect to slope stability in the southeastern portion of the pit will be the success of dewatering efforts. To stabilize the upper portion of the slope, which consists of relatively low-strength Willow Canyon arkose and alluvium (Figure 2), dewatering from the 5,100-foot level to an elevation of approximately 4,400 feet will be required to achieve slope angles recommended as part of CNI's feasibility study.

CNI recommends future reevaluation of final pit slope angles in the alluvium and Willow Canyon slopes after the startup of mining. Slope angles determined for these materials are based on a nominal amount of information obtained from drill cores. With data gathered from mine benches, an improved assessment of slope angles could be performed. CNI also recommends pump testing and an evaluation of dewatering feasibility in the southeastern alluvium.


WASP CANYON
RESTRICTED PIT
MAP
AUGUSTA RESOURCES / ROSEMONT
1"=300'
FIGURE 1
CALL & NICHOLAS, INC.
TUCSON, ARIZONA USA
WASP CANYON
DIVERSION DITCH
N


1
1'
5000 ELEV.
4500 ELEV.
4000 ELEV.
3500 ELEV.
3000 ELEV.
1715229E
1155440N
1716107E
1155063N
LEGEND
OVERBURDEN/ ALLUVIUM
COLINA LIMESTONE
EARP FORMATION
HORQUILLA LIMESTONE
ESCABROSA LIMESTONE
ANDESITE
ARKOSE WILLOW CANYON FORMATION
QTZ MONZONITE
CLANCE CONGLOMERATE
CURRENT TOPOGRAPHY
WASP CANYON RESTRICTED PIT
2032 ULTIMATE PIT
CALL & NICHOLAS, INC.
TUCSON, ARIZONA USA
DRAWN LMC
DATE 08/10
REVISED 8/23/2010 5:05 PM
\WASP CANYON RESTRICTION\WASP RESTRICTED PIT SECT 1.DWG
CROSS SECTION
1-1'
(Looking NE)
AUGUSTA RESOURCES / ROSEMONT
SCALE 1"=500'
FIGURE 2