June 2007

Summary of Tetra Tech Reports
Provided for the Feasibility Study
And the Mine Plan of Operations
Rosemont Project

TETRA TECH
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Provided for the Feasibility Study
And the Mine Plan of Operations
Rosemont Project
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June 2007
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1.0 INTRODUCTION

This report presents the Tetra Tech Mining and Manufacturing (Tetra Tech) feasibility level studies and designs for the following aspects of the Augusta Resource Rosemont Copper Project (Project).

- Geologic Hazards
- Geotechnical Study
- Geochemical Study
- Leaching Facility Design
- Dry Tailings Facility Design
- Site Water Management Plan
- Reclamation and Closure Plan

In August 2006, Augusta authorized Tetra Tech to provide professional engineering services related to site wide geotechnical and geochemical studies and feasibility-level design of the Rosemont Project. This report provides an executive summary of the compendium of reports presenting the feasibility-level design of the above-mentioned Project aspects. The list of reports below present the results of field investigations, laboratory testing, and engineering analyses and design activities carried out in support of the above-mentioned Project aspects. The detailed scope of work for each aspect of the Project is presented in their respective reports.
2.0 PROJECT DESCRIPTION

2.1 Location

The Project site is located approximately 30 miles southeast of Tucson, west of State Highway 83. The primary Project facilities include a primary crusher and process plant, a tailings filter plant, and access roads.

The primary Project facilities include a primary crusher and process plant, a tailings filter plant, and access roads.

2.2 Facilities and Operations

Facilities, stockpiles and administration buildings, supply water tank and pipelines, and many tailings ponds and storage facilities, will provide full containment of operational solutions. Tailings ponds located south of the open pit, leachings of the former tailings area, and waste rock storage facilities, will provide full containment of operational solutions. Tailings ponds located south of the open pit, leachings of the former tailings area, and waste rock storage facilities, will provide full containment of operational solutions.

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A geologic hazards assessment was performed to identify potential hazards within the bounds of the Project site, estimate the risk associated with these hazards, and present possible mitigation techniques.

The primary hazards identified by this study are rockfall hazards and abandoned mine workings. The geologic hazards assessment also estimated the seismic hazard for the Rosemont site in accordance with the Arizona Department of Environmental Quality (ADEQ) published guidelines.

The geologic hazards assessment also included a geotechnical study to assess the stability of the Project site and surrounding areas. The site was evaluated for potential landslides, sinkholes, and other geotechnical hazards. The assessment also included a review of previous mining activities in the area to identify any potential hazards associated with abandoned mine workings.

Mitigation techniques included the design of engineered structures to reduce the risk of rockfall hazards and the development of plans for the safe and effective removal of abandoned mine workings. These plans were developed in collaboration with the project team and local authorities to ensure compliance with all relevant regulations.

The results of the geologic hazards assessment were used to inform the design of the Rosemont open pit mine, ensuring that potential hazards were addressed in a safe and effective manner.
Tetra Tech has performed site-wide geotechnical studies for the various proposed facilities. Initial site investigations were conducted between November 2006 and March 2007 at the Rosemont site. Additional site investigations are planned to support the feasibility designs of the Rosemont facilities. The site investigation included borehole drilling, test pit excavating, field penetration and hydraulic testing, geotechnical logging of condemnation boreholes, geophysical ground surveys, and laboratory testing.

The main objectives of the site investigation work performed included:

- Providing engineering properties for design of structure foundations;
- Determining the groundwater regime;
- Determining material and mass properties of the bedrock for foundations, including rock and soil materials for excavation and structure foundations, and pond and PWT pond and dam, waste rock storage facility, crusher, plant, and other planned mine structures;
- Determining foundation conditions beneath the dry tailings storage facility, leach pad, and pond, PWTS pond and dam, waste rock storage facility, crusher, plant, and other planned mine structures.

Laboratory testing was conducted to analyze the suitability of local materials as foundation materials and in stopes and fills. Soil samples from selected test pits and boreholes were taken to several soil laboratories and a testing program, comprised of grain size distribution, Atterberg limits, modified Proctor, and standard penetration, was carried out.

A total of 71 field locations (47 test holes, 33 test pits, and 18 miles of geophysical profiles) were completed using refraction microtremeter and seismic refraction methods. Six shear wave sounding locations were completed using refraction microtremeter. A total of 10 boreholes totaling 877 feet of drilling, 33 test pits, and 18 miles of geophysical survey lines were completed to provide supplemental data to the data collected and field testing at the various locations. The testing included packer and falling head testing within various lithologic units, field logging, including rock and soil materials, and laboratory testing of samples from selected test pits and boreholes.

The geotechnical program included:

- Geotechnical Program
  - Fieldwork carried out by Tetra Tech included mapping of bedrock outcrops and the extent of superficial materials within the plant and heap leach areas to supplement published mapping previously performed by others.
  - Geotechnical Program
  - Data collected during the initial phase of the work supported the feasibility assessment of the proposed facility locations. Six shear wave sounding locations were completed using refraction microtremeter.
  - Geotechnical Program
  - Laboratory testing was conducted to analyze the suitability of local materials as foundation materials and in stopes and fills. Soil samples from selected test pits and boreholes were taken to several soil laboratories and a testing program, comprised of grain size distribution, Atterberg limits, modified Proctor, and standard penetration, was carried out.

The geotechnical program has been completed in the geo-data database management and reporting program and includes field and laboratory data. The database includes a comprehensive database of geotechnical data for the project site.
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included a total of 70 exploration/condemnation holes drilled by Augusta and previous owners in addition to the data gathered by Tetra Tech.

4.2 Investigation Findings

General

Due to the size of the Rosemont site, the overall Project area was broken up into four facility areas. The surficial geology for each area has been mapped and geological and geotechnical cross sections have been generated through each area, generally along the seismic survey lines, with lithological designations of soil, cemented soil/soft rock, rippable bedrock, and non-rippable bedrock estimated from seismic velocity zones correlated with borehole and test pit data. Seismic sections from seismic surveys have been generated through each area, generally along the seismic survey lines, with lithological designations of soil, cemented soil/soft rock, rippable bedrock, and non-rippable bedrock. Seismic sections have been merged with the integrated geologic units, measured material properties, and other information to create a comprehensive view of the site conditions. This information was used to assess the suitability of the site for the proposed facilities and to develop engineering designs and construction plans.

Facility Area 1

Cemented materials exhibit increased density with depth, and moderately to weakly cemented sand with silty and gravelly silt indicate the presence of load-bearing soils. The surficial geology in this area was found to be a mix of 50 feet of soil and gravel overlying bedrock. The geological and geotechnical information indicates the site is suitable for construction of the proposed facilities. The surficial geology consists of a mix of soil, cemented soil/soft rock, rippable bedrock, and non-rippable bedrock. Seismic sections from seismic surveys have been generated through each area, generally along the seismic survey lines, with lithological designations of soil, cemented soil/soft rock, rippable bedrock, and non-rippable bedrock. Seismic sections have been merged with the integrated geologic units, measured material properties, and other information to create a comprehensive view of the site conditions. This information was used to assess the suitability of the site for the proposed facilities and to develop engineering designs and construction plans.

Facility Area 2

This area encompasses the engineering facilities and associated areas. The surficial geology in this area consists of a mix of soil, cemented soil/soft rock, rippable bedrock, and non-rippable bedrock. Seismic sections from seismic surveys have been generated through each area, generally along the seismic survey lines, with lithological designations of soil, cemented soil/soft rock, rippable bedrock, and non-rippable bedrock. Seismic sections have been merged with the integrated geologic units, measured material properties, and other information to create a comprehensive view of the site conditions. This information was used to assess the suitability of the site for the proposed facilities and to develop engineering designs and construction plans.

Facility Area 3

The surficial geology in this area consists of a mix of soil, cemented soil/soft rock, rippable bedrock, and non-rippable bedrock. Seismic sections from seismic surveys have been generated through each area, generally along the seismic survey lines, with lithological designations of soil, cemented soil/soft rock, rippable bedrock, and non-rippable bedrock. Seismic sections have been merged with the integrated geologic units, measured material properties, and other information to create a comprehensive view of the site conditions. This information was used to assess the suitability of the site for the proposed facilities and to develop engineering designs and construction plans.

Facility Area 4

The surficial geology in this area consists of a mix of soil, cemented soil/soft rock, rippable bedrock, and non-rippable bedrock. Seismic sections from seismic surveys have been generated through each area, generally along the seismic survey lines, with lithological designations of soil, cemented soil/soft rock, rippable bedrock, and non-rippable bedrock. Seismic sections have been merged with the integrated geologic units, measured material properties, and other information to create a comprehensive view of the site conditions. This information was used to assess the suitability of the site for the proposed facilities and to develop engineering designs and construction plans.
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Andesitic porphyry, a mafic lava flow, an extrusive rhyolite, and alluvium deposits within the footprint. Apache Canyon and Willow Canyon rock mass values within the tailings area are believed to be similar to those for the nearby heap leach pad and plant site area. Values are not yet available for the Mount Fagan Rhyolite due to the limited access for drilling. Based on point load and laboratory strength testing, the three above-mentioned rock types are suitable for dam rock fill on the heap pad.

Facility Area 4

This area comprises the waste rock storage facility area. The waste rock facility is mostly underlain by the Gila Conglomerate except for deposits of alluvium located within the drainages and associated floodplains. Although test pits were completed within the tailings area, no test pits were completed for the waste rock facility. The alluvium in this area was found to be as thick as 80 feet. The alluvium material is predominantly a moderately to weakly cemented sand with silt and gravel. Field penetration testing indicates the overburden materials exhibit increased density with depth.

Borrow Materials

Tetra Tech investigated the Concha limestone and Bolsa Quartzite within the pit limits for potential rock quarrying to provide aggregate material. It is currently anticipated that borrow materials for concrete aggregate required for the initial construction will primarily be from the Concha limestone based on accessibility of the material. Field penetration testing indicates the overburden materials exhibit increased density with depth. Preliminary geochemical testing indicates the three rock types considered, depending on the rock type and conditions encountered in the field, are suitable for use in the heap leach facility. The site investigation identified potential borrow materials for use as subgrade fill under the heap leach facility.

The site investigation identified potential aggregate materials for use as subgrade fill under the heap leach facility.
Geotechnical Design Parameters and Analyses

Geotechnical parameters for surface soils and bedrock have been developed from the field investigation and laboratory testing program and include rock mass rating, shear strength, and foundation parameters. For bearing capacity, settlement, slope stability, and foundation liquefaction, preliminary and detailed foundation designs and loads, recommendations have been developed based on geotechnical analyses that have been performed for the various facility foundations.

General design recommendations are also given for cut and fill slopes, site preparation, and structural and controlled fill, access roads, erosion and drainage, corrosive soils, and seismic parameters.
Tetra Tech has completed baseline geochemical characterization associated with the Rosemont Project. The scope of this study was to determine the baseline geochemical characteristics of the waste rock and tailings materials. The following tasks were performed in support of the Project:

- A preliminary potential for contaminating discharge that shows the potential for environmental impacts;
- The assessment of geochemical behavior and geochemical risks of the waste rock and tailings materials; and
- The creation of a database of static and kinetic geochemical tests of waste rock collected from core and tailings collected from metallurgical tests.

This study is part of a phased approach to quantifying and mitigating geochemical risk that will ensure long-term groundwater protection.


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6.0 LEACHING FACILITY DESIGN

6.1 General

The Rosemont leaching facility will be constructed southeast of the proposed open pit within the Barrel drainage. The pad will be large enough to contain the currently-identified oxide ore reserve of 50 Mt's stacked to a maximum ore heap height of 300 feet. With an optional expansion, the pad was also designed to accommodate up to 50 Mt of additional storage. The lined leach pad will utilize gravity solution drainage via perforated drain pipelines to the downhill perimeter berm, including a collection system placed above the synthetic leach pad liner which will be installed directly above the groundwaters. The collection system will also be designed to intercept and drain the runoff from the surface of the pad. Additionally, the pad was designed to provide operational stability of the heap, with a minimum heap stability load factor of 1.5. The leaching facility was designed to minimize the potential for impacting groundwaters.

6.2 Location

The leach pad site was selected by Tetra Tech in a manner that considers the potential for impacting groundwaters. The selected site provides sufficient slope for gravity solution drainage and minimizes the potential for impacting groundwaters. The selected site also provides a stable foundation and drainage of rainfall into the leach pad. The selected site will also provide an overall ore slope of at least 2H:1V (horizontal to vertical). The 2H:1V sideslopes were determined based on stability analyses with a design basis of achieving a peak factor-of-safety against a 2H:1V slope of 2.0 with respect to the heap. The PH and V horizon line is oriented to vertical. The PH:V slopes will provide an overall ore slope of at least 2H:1V.

6.3 Capacity

The selected nominal ore stacking rate is 38,000 tons per day (tpd) of Run-of-Mine (ROM) ore to the leach pad, with no ore stockpiling. The leach pad design is based on a nominal 13.9 Mt of leach material stacked per year on the pad. The selected ore production schedule indicates a variable ore production schedule with the maximum rate occurring in Year 1. The selected ore production schedule includes a variable ore production schedule with the maximum rate occurring in Year 1. The selected ore production schedule includes a variable ore production schedule with the maximum rate occurring in Year 1. The selected ore production schedule includes a variable ore production schedule with the maximum rate occurring in Year 1. The selected ore production schedule includes a variable ore production schedule with the maximum rate occurring in Year 1.

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The PLS pond will include (from the bottom to the top): a layer of compacted bedding soil, a sodium bentonite geo-synthetic clay liner (GCL), a layer of compacted bedding soil, a sodium bentonite geo-synthetic clay liner (GCL), and a compacted bedding soil layer. The liner will include (from the bottom to the top): a layer of compacted bedding soil, a sodium bentonite geo-synthetic clay liner (GCL), and a compacted bedding soil layer.

### 6.6 Pad Liner System

During upset conditions, solution can flow by gravity from the pregnant pond to a lined storm pond located adjacent to the PLS pond. The storm pond has been designed to accommodate a volume of 2,500 gpm for a 100-year, 24-hour storm event. The storm pond will be fitted with a sump and well return pipe to pump pregnant solution to the PLS pond. Solution can flow by gravity from the pregnant pond to the storm pond located adjacent to the PLS pond. During upset conditions, such as a power outage, loss of operational flows plus 24-hour drawdown, downstream flows should be controlled by geomembrane lining to allow for a relatively level surface for matching of the PLS pond to the proposed leach pad area. The storm pond was sized to accommodate 8 hours of operational flows plus 24-hour drawdown.
The GCL liner provides an equivalent 1 foot minimum thickness of 1x10^-6 cm/sec or lower permeability soil layer.

Liner cover fill used for the 3-foot layer placed over the geomembrane pad liner will be a high-permeability crushed gravel product produced on-site using a portable crushing plant. Feed material will be supplied from within the mine pit area.

The solution collection system will consist of pipes placed within the 3-foot liner cover layer. Primary solution collection will be from 3-inch diameter perforated collector pipes placed at a spacing of about 30 feet across the entire lined pad. The perforated collector pipes will convey the pregnant solution to larger collector pipes which will convey the pregnant solution to the PLS pond.

The PLS and raffinate pond lining system will consist of the following (from the bottom to the top): a layer of compacted bedding soil; a GCL; a 1.5 millimeter (60 mil) LLDPE secondary geomembrane liner; a 1.5 millimeter (60 mil) LLDPE secondary geomembrane liner; a geomembrane liner; a leak detection layer consisting of a geonet; and a 2 millimeter (80 mil) HDPE primary geomembrane liner. The storm pond will be lined with a 2 millimeter (80 mil) HDPE primary geomembrane liner, The pond liner systems will consist of the following (from the bottom to the top): a layer of compacted bedding soil; a GCL; a 1.5 millimeter (60 mil) LLDPE secondary geomembrane liner; a geomembrane liner; a leak detection layer consisting of a geonet; and a 2 millimeter (80 mil) HDPE primary geomembrane liner.
The Rosemont dry stack tailings facility will receive dry tailings from the sulfide ore processing plant at a nominal rate of 75,000 dry tons per day. This material will be stacked behind containment buttresses constructed from pit run waste rock; consequently, this storage area will be active from late preproduction through the end of the mine's life (presently estimated at 19 years).

The deposition of dry tailings, waste rock, and overburden will be initiated with a series of perimeter buttresses that are designed to reduce visual impacts from State Highway 83 and surrounding areas. The staging of these buttresses will also allow reclamation to begin within 18 months of production. Dry tailings deposition will incorporate staged waste rock buttresses for screening and to improve mechanical and erosional stability of the tailings.

The results of the study indicated the dry tailings option as the most favorable placement for concurrent reclamation and potential dust control. Advantages of the dry tailings stack over conventional tailings is that it eliminates the need for an engineered embankment and seepage containment system, maximizes water recovery, and allows opportunities for concurrent reclamation and restoration. The dry tailings option will also eliminate the need for an engineered embankment and seepage containment system, maximizes water recovery, and allows opportunities for concurrent reclamation and restoration.

The deposition of dry tailings, waste rock, and overburden will be initiated within a series of staged construction areas that are designed to reduce visual impacts from State Highway 83 and surrounding areas. The staging of these buttresses will also allow reclamation to begin within 18 months of production.

Dry tailings facility design

7.0 

7.1 General

7.2 Location and Design Criteria

A siting study was conducted to evaluate alternative sites based on defined design and selection criteria, as well as estimated development costs, to identify the preferred tailings storage location and placement methods.

Design criteria and objectives for the dry tailings storage facility included:

- Provision of secure long-term storage of a minimum of 500 million tons (Mt), which is sufficient for the ore to be mined and processed during about 19 years of mine life (approximately 4 million tpd); and
- Location within the immediate general area of the mine (approximately 5 miles) from the proposed mine pit.

Design criteria and objectives for the dry tailings storage facility included:

- Establishment of an effective and efficient reclamation program, with a focus on
  - Geology, hydrogeology, seismology, and vegetation; and
  - Construction of shear-specific design that accounts for local factors including climate,
    - Compliance with all applicable regulations including Arizona BADC standards;
  - Dust suppression measures; and
  - Prevention of airborne release of tailings solids to the environment by provision of:
    - Radius from the proposed mine pit.

General

7.1

Dry tailings facility design

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7.3 Site Conditions and Geology

The selected dry tailings storage site is located just east of the proposed mill site in Barrel drainage. The elevated tailings storage facility is characterized by terrain sloping generally east from the plant area to the Barrel drainage which runs generally north south in this area. Vegetation at the tailings facility consists of a poor coverage of native grasses and shrubs.

A geotechnical investigation was performed under the direction of Tetra Tech to characterize the site soil and rock conditions and to provide engineering parameters for design and operation of the dry tailings facility.

The objectives of the test program were to provide input parameters for engineering analyses of the tailings facility, including slope stability, liquefaction potential, seepage (unsaturated flow modeling), as well as strength, consolidation, and permeability tests. The results from the geotechnical investigations allowed the selection of the tailings storage facility and the selection of the tailings disposal method for the dry tailings.

The proposed disposal method for the dry tailings involves transporting the dewatered tailings to a secure placement area via conveyor and stacking in relatively small lifts behind previously constructed waste rock buttresses.

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The tailings and waste rock material properties and the climate parameters were used to simulate the potential for discrete liquefied tailings layers encased in the tailings mass. The potential for liquefaction is assessed by applying reduced shear strengths to thin layers within the tailings mass at various levels to simulate these layers. The slope stability analysis indicated the design of the tailings stack operations can be continued with such modifications.

The slope stability analyses assumed the tailings stack will function properly and were performed using the stability factors of safety of 1.5 static and 1.1 pseudo-static (OBE earthquake) as recommended by the practice.

The slope stability analyses predicted the tailings stack can be constructed with stable 3H:1V inter-bench slopes and an overall slope of approximately 3.5H:1V to a local maximum height of approximately 600 feet.

The potential for liquefied tailings layers encased in the tailings mass does not result in an unacceptable reduction of the factor of safety against slope failure. However, as an added measure against potential deformation of the outer waste rock buttresses, compaction of the tailings below the buttresses is recommended. This will ensure the stability of the tailings below the waste rock buttresses is maintained. The compaction of the tailings will also help eliminate the suscepcion of liquefaction and potential failure of the facility.

### 7.6 Hydrologic Modeling

Hydrologic steady-state and transient modeling of the tailings storage facility was performed to estimate the quantity of water flowing through the tailings and waste rock mass, the time water spends in contact with reactive rocks within the facilities, and the airflow in the pore spaces.

Tailings and waste rock material properties and local climate parameters were used to simulate the hydrologic behavior of the materials. The models were run for three scenarios: the facility during operations, a worst-case operational scenario, and a closure scenario. Each scenario was run for a one-year period using average climate conditions. For the transient models, a one-year period was used to capture the potential effects of seasonal variations on hydrologic conditions.

Tailings and waste rock material properties and the climate parameters were used to simulate the hydrologic behavior of the materials. The models were run for three scenarios: the facility during operations, a worst-case operational scenario, and a closure scenario. Each scenario was run for a one-year period using average climate conditions. For the transient models, a one-year period was used to capture the potential effects of seasonal variations on hydrologic conditions.

The results of the models were used to assess the potential for groundwater flow and the impact on the stability of the tailings and waste rock mass. The models indicated that the potential for groundwater flow is minimal, and the tailings and waste rock mass are stable under the conditions simulated.

The models also indicated that the potential for lateral movement of the tailings is minimal, and the tailings and waste rock mass are stable under the conditions simulated. The models were used to optimize the design of the tailings and waste rock mass to ensure stability and prevent potential failures.
The balance between precipitation, evaporation, transpiration, runoff, storage, and percolation is a key output of the models. What percolates through the cover has the potential to become impacted leachate after traveling through the tailings. With average annual precipitation around 20 inches per year and about 100 inches of evaporation, there is a net negative atmospheric water balance. This factor was reflected in the results of the seepage modeling.

The operational model assumed that cover material would be placed along the surface of the waste rock buttresses and vegetated as part of the planned concurrent reclamation program. The results of the model indicate evaporation as the dominant component of the water balance. The infiltration and the storage of water in the tailings and waste rock mass were negative, suggesting that the precipitation that reached the tailings was approximately the same as the evaporation.

Modeled moisture contents within the tailings material decreased over time. The closure model results indicate negative storage and infiltration in the tailings mass upon closure - assuming a one foot thick cover composed of 10% organic material is placed over the tailings. This suggests that evaporation is the controlling component of the water balance, and that infiltration is removed from the system through plant transpiration or evaporation. The resulting moisture content within the tailings was approximately five percent, which is consistent with the laboratory-measured values for alluvial material found at the site.

Dry Stack Operations

The design developed for the tailings involves placement of an initial waste rock cover in the upper ridge area to lower water levels in the cover. The design developed for the tailings involves placement of an initial waste rock cover in the upper ridge area to lower water levels in the cover. The dry stack design involves placement of an initial waste rock cover in the upper ridge area to lower water levels in the cover. The dry stack design involves placement of an initial waste rock cover in the upper ridge area to lower water levels in the cover. The dry stack design involves placement of an initial waste rock cover in the upper ridge area to lower water levels in the cover.
allow temporary placement of tailings into the upper drainage area using dozers while the primary conveyor is ready for movement or maintenance.

The tailings facility consists of two separate areas referred to as the North Stack and the South Stack. The North Stack will be constructed in two phases and operated in Years 1 through 14 and can accommodate approximately 375 Mt of tailings. Phase 1 of the North stack will operate in Years 1 through 5 and Phase 2 will operate in Years 6 through 14. The South Stack will store the remaining 125 Mt of tailings and will be operated in Years 15 through 19.

7.8 Surface Water Control

Stormwater run-on to the North Stack will be limited by diverting the major drainage area into the North Stack tailings operation will be controlled by diverting the major drainage area to the PWTS pond as necessary to limit infiltration of surface water into the tailings mass.

A waste rock drain (Central Drain) will be constructed to convey surface water from the North and South Stack tailings operations. Material to construct the drain will be from competent and inert waste rock sources.

The Central Drain will be constructed to convey surface water from the North and South Stack tailings operations. The Central Drain will be designed to drain through the Central Drain through a spillway at the downstream end of the South Stack. Flows will exit the North Stack to convey surface water from the drainage above the process plant area. An attenuation pond, designed to temporarily store flows from the 100-year, 24-hour storm event, will be designed to drain through this Central Drain within 30 days. Flows will exit the downstream toe of the tailings facility and pass through a final compliance pond prior to release.

Surficial waste rock sediments will be captured in a sediment pond located on the south side of the tailings facility. Prior to placement of tailings in the South Stack area, the south face of the haul road fill will be sealed with a low permeability GCL and covered with a geomembrane to prevent infiltration of surface water into the tailings mass. The south face of the haul road fill will be sealed with a low permeability GCL and covered with a geomembrane to prevent infiltration of surface water into the tailings mass.
8.0 SITE WATER MANAGEMENT

8.1 General

A Project Site Water Management Plan (SWMP) has been developed to identify appropriate hydrologic methodology and develop design storm events and flows for the Project site for use in the design of the storm water management, water retention, and milling and process facilities. The overall intent of the SWMP is to demonstrate how storm flows and sediment yields will be managed during the active mine life. The main tasks performed included:

- Development of the 2-year, 5-year, 10-year, 50-year, 100-year and probable maximum precipitation (PMP) events using a methodology suitable for the site conditions. Annual average precipitation for Rosemont, estimated from various sources, ranges from approximately 15 inches to 22 inches. For feasibility design purposes, average climate data from the Western Regional Climate Center Canelo weather station were used for calibration.

- Generation of basin runoff peaks and volumes for use in design of storm water and sediment control facilities.

- Sizing of sediment control facilities to handle the 10-year design flow event and maintain total suspended solid concentrations equal to pre-mining levels.

- Sizing of culverts for the access and haul roads and diversion canals with sufficient capacity to pass the design storm event without overtopping.

- Generation of basin runoff peaks and volumes for use in design of storm water and sediment control facilities.

8.2 Site Conditions

The Project area is an arid region typical of the desert southwest. In general, the terrain is characterized as open grasslands with widely scattered shrubs and cacti. The semi-desert grasslands are characterized by grasses interspersed with dry shrubs and forbs. The higher elevation portions of the site are covered by the evergreen woodlands of Madrean evergreen woodlands and semi-desert woodlands.

Vegetation on the site generally consists of Madrean evergreen woodlands and semi-desert woodlands. The evergreen woodlands cover the higher elevation portions of the site and are characterized by trees interspersed with grasses and forbs. The semi-desert grasslands are characterized by grasses interspersed with dry shrubs and forbs. The higher elevation portions of the site are covered by the evergreen woodlands of Madrean evergreen woodlands and semi-desert woodlands.

8.3 Climatology

Meteorological records for the immediate vicinity of the Rosemont Project are of limited duration and are available for a period covering 50 to 75 years. The recorded data are limited in duration and are not reliable for periods of less than 10 years. Rainfall in several drought periods was less than average for the past 10 years, resulting in severe drought conditions. Annual average precipitation ranges from approximately 15 inches to 22 inches. For feasibility design purposes, average climate data from the Western Regional Climate Center Canelo weather station were used for calibration.

More than half of the recorded precipitation fell during the summer months of July, August, and September. The recorded data are limited in duration and are not reliable for periods of less than 10 years. Rainfall in several drought periods was less than average for the past 10 years, resulting in severe drought conditions. Annual average precipitation ranges from approximately 15 inches to 22 inches. For feasibility design purposes, average climate data from the Western Regional Climate Center Canelo weather station were used for calibration.

8.4 General

A Project Site Water Management Plan (SWMP) has been developed to identify appropriate hydrologic methodology and develop design storm events and flows for the Project site for use in the design of the storm water management, water retention, and milling and process facilities.
8.4 Project Facilities

The SWMP includes storm water management provisions for the open pit, leaching facilities, dry stack tailings facility, plant areas, waste rock storage facility, access roads, diversions, PWTS pond, and compliance points. Many of the proposed site facilities will change with time as mining progresses. In order to account for the changes that occur over time, the SWMP considered the progression of the facilities at baseline conditions, Year 0 (pre-production), Year 5, Year 10, Year 16, and ultimate mine conditions.

8.5 Hydrology

Flood frequency precipitation totals and temporal distributions were taken from a published rainfall atlas. Published procedures were used to estimate the 72-Hour General and 6-Hour Local Storms probable maximum precipitation estimates. The United States Corps of Engineers' program HEC-1 was used to generate design flows and route the flows through a storm event. Hydrologic calculations were performed using computer modeling.

8.6 Sediment Yields

The site water management facilities are intended to have sufficient capacity to handle runoff generated throughout the life of the site for a 100-year, 24-hour storm event. Sediment control facilities are designed to reduce the total suspended solids (TSS) load to the minimum practical level. For this feasibility study, the minimum practical level was defined as equal to the existing background TSS concentrations. The site-specific TSS concentration was estimated to be equal to the existing background concentration.

8.7 Sediment Controls

Based on the modeling results, sediment ponds were located and sized based on topography, available space, and the anticipated sediment generation expected of the contributing basin. The ponds are designed to be temporary structures that will be abandoned and another sediment dam constructed. Best management practices (BMPs) are recommended as a cost-effective method to help reduce surface erosion and lower TSS levels. If recommended, BMPs are employed.
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wherever construction activities will be occurring and soils are disturbed. For this study, it was assumed that the waste rock and dry tails storage areas will be terraced and graded inwards in order to decrease slopes and flow lengths. Silt fences or similar techniques were assumed to be applied whenever active construction occurs. Barb wire fences and erected for water quality to control dusting and siltation. The surface collection ponds will also be installed. The waste rock storage facility will be designed to allow for storage of up to 3 days of process flows. The above described measures were assumed to be applied whenever active construction occurs. It was also assumed that all of the existing desert shrubs and foliage should be left intact to decrease runoff and sediment loads.

8.8 Surface Water Management

The open pit will be treated as a closed system with all direct rainfall and local runoff being contained. The water collected from the surface and collected in a sump at the pit bottom, during the operational phase, will be used for dust suppression or incorporated into the process circuit. The waste rock facilities will be handled in a similar way as the dry tailings storage facility. Initially, screening buttresses will be constructed and material will be stacked in uniform lifts. Concurrent reclamation will progress up the slope areas to limit the potential for erosion and diversion channels will be used to direct runoff to sediment ponds, as needed. The waste rock facilities will be designed to store and release flows from the 100-year, 24-hour storm event, which is assumed to be 472.5 million gallons. The equivalent of 2 days of process flow will be stored in a closed system with all precipitation and local runoff collected in the waste rock facility. The collected water will be stored in the waste rock facility and used for dust suppression or incorporated into the process circuit. The water collected from the surface and collected in a sump at the pit bottom, during the operational phase, will be used for dust suppression or incorporated into the process circuit. The water collected from the surface and collected in a sump at the pit bottom, during the operational phase, will be used for dust suppression or incorporated into the process circuit. The water collected from the surface and collected in a sump at the pit bottom, during the operational phase, will be used for dust suppression or incorporated into the process circuit. The water collected from the surface and collected in a sump at the pit bottom, during the operational phase, will be used for dust suppression or incorporated into the process circuit.
Monitoring wells will be located downstream of the embankment. This is the final compliance point where groundwater and surface water flows can be monitored and tested prior to release to the downstream drainage.

Surface water quality will meet the standards required under either the Arizona Pollution Discharge Elimination System General Industrial Stormwater Permit or the National Pollution Discharge Elimination System General Industrial Stormwater Permit. The Arizona permit is currently being reviewed by the Supreme Court for validity and the National permit is expired so it is impossible to determine what standards may apply. Augusta has designed the facilities to control the release of potential pollutants and to manage sediment loading. Any additional standards will be complied with first through engineering controls and secondly through treatment once known.

To release to the downstream drainage compliance point, groundwater and surface water flows can be monitored and tested prior to release downstream of the embankment. This is the final monitoring well.
9.1 General

As a component of the overall environmental stewardship policy of Augusta Resource associated with the Rosemont Project, a reclamation plan has been developed to meet regulatory requirements, with a focus on creating a unique concurrent reclamation and closure approach. This approach provides a comprehensive strategy for managing and mitigating environmental impacts during the design and operation phases of the Project.

Major elements of the reclamation plan are dictated by the regulatory requirements contained in the Arizona Mined Land Reclamation Act, the U.S. Department of Agriculture Forest Service Plan of Operations regulations, and the Arizona Aquifer Protection Program. Although other regulatory requirements may contribute mitigation elements, these three regulatory programs form the framework for the reclamation plan.

Applicable design criteria for the overall approach to mining, processing, and the sequencing of material placement within the final landform (Rosemont Ridge) for optimum reclamation and closure conditions are addressed. The plan contains provisions for protection of the environment during the operations phase via best management practices primarily guided by the protection of surface water and groundwater resources. Sediment transport is addressed through design of stormwater control facilities and dust control measures.

The proposed reclamation/closure mitigation elements for Rosemont include employment of concurrent reclamation practices. Therefore, reclamation obligations will be incrementally reduced as the operation progresses.

9.2 Closure Concepts

The reclamation plan proposed for the Rosemont site has several key components, referred to herein as initiatives. These initiatives provide the physical and philosophical foundation for the reclamation plan and will remain constant throughout the operational life of the facility. These initiatives include: beginning with the end in mind (i.e., design of facilities with closure goals in mind); concurrent reclamation practices; constraining disturbances to a single drainage; minimizing downgradient hydrologic disturbances; and a comprehensive drainage plan.

One of the major initiatives of the Plan will be to facilitate concurrent reclamation of the outer shell of the waste rock and tailings storage areas, and to provide a perimeter buffer to mitigate the visual impact of the Project. Site revegetation will be based on work currently being performed by the University of Arizona, Department of Agriculture.

9.3 Post-Closure Land Uses

Post-mining reclamation objectives for the Rosemont property are expected to be consistent with currently existing patterns of use, such as dispersed recreation, wildlife habitat, and ranching. The visual impact of the Project is expected to be reduced by maintaining the overall design of the site in a manner that is consistent with current land use patterns in the area.
Current and probable post-mine recreational activities include horseback riding, hunting, prospecting, all-terrain vehicle and motorcycle riding, four-wheeling, hiking and bird-watching. Because Augusta is planning concurrent reclamation for the facility, it is anticipated that wildlife disruption to wildlife habitat and use will be minimal. It is expected that by year 10, leaching and drainage of the pad will have been completed, and appropriated land by year 10, leaching and drainage of the pad, and casing of the tailings ponds will be complete. Most of the area mined for the leaching operations will be placed on the pad and seeded. Measures will be in place to ensure that soil nutrients will be available early in the process, during pre-production and seeded.

9.4 Concurrent Reclamation Design

A unique concurrent reclamation plan will be initiated at the Rosemont facility from the initial topsoil stripping through conclusion of operations. Perimeter buttresses will be placed around the waste rock and all tailings storage areas. Placement of the perimeter buttresses will be placed around the waste rock and all tailings storage areas. Placement of the perimeter buttresses will be placed around the waste rock and all tailings storage areas. Placement of the perimeter buttresses will be placed around the waste rock and all tailings storage areas. Placement of the perimeter buttresses will be placed around the waste rock and all tailings storage areas. Placement of the perimeter buttresses will be placed around the waste rock and all tailings storage areas.
Following closure, the Central Drain will continue to act as a conduit for passing stormwater volumes and storm water.

The facilities are designed to isolate hazardous substances either in tanks, ponds, or containment areas.

9.5 Operating Considerations

Operations and maintenance necessary to ensure the integrity of the Project facility and systems whose failure could potentially endanger human health and the environment, are safeguarded for change.

Drainage, stormwater flows from the top surface of the reclaimed Rosemont Ridge drain. This is also taken to a lower basin on the reclaimed Rosemont Ridge.

Following closure, the Central Drain will continue to act as a conduit for passing stormwater in.