3 Resource Protection and Control Plans

3.1 Groundwater Protection Plan

Groundwater quality in Arizona is regulated under ADEQ's APP program. Rosemont Copper has initiated the APP process, and this section describes, in general, the groundwater protection components of the permit that will be implemented at the Project. A more detailed discussion of groundwater protection measures at the Project is provided by Tetra Tech (2007e).

The following components were incorporated into the Project design to ensure compliance with APP's BADCT requirements:

- Isolation and containment of process waters
- Primary and secondary containment structures, such as double liners in process impoundments and elevated, double-walled, or contained tanks
- Overflow protection and spill and leak detection systems
- Management of stormwater runoff to reduce sediment loads in stormwater discharges to premining conditions
- Management of process water for zero discharge

The groundwater protection design is enhanced with significant and ongoing geochemical analysis of the waste rock and tailings material, and the planned development of a groundwater monitoring program in compliance with APP requirements.

3.1.1 Potentially Discharging Facilities

3.1.1.1 Ponds

A description of ponds used in the surface water management program at the Project is provided in Section 2.9. These ponds include:

- The PWTS Pond (also referred to as the reclaim water pond)
- PLS, raffinate, and stormwater ponds associated with the heap leach facility
- The attenuation pond upgradient of the central drain
- A variety of smaller stormwater ponds and sediment traps designed to control sediment discharges from the Project.

3.1.1.2 Leach Pad

The leaching and SX/EW operations at the Rosemont Project will be consistent with other modern operations in Arizona that utilize lined leach pads. Drip emitters will minimize the potential for evaporation or overspray of leaching solutions. This will conserve groundwater and protect the ground and vadose zones that surround the leach pad. Solutions will be collected in ponds that are constructed

with double-liners and a leak detection system. The ponds will be operated to maintain at least three ft of freeboard above the normal operating range. In addition, stormwater from the leach pad area will be collected in a lined stormwater pond. The ponds associated with the leach circuit will be sized so that all solutions can be captured for a 24-hour leach facility drain down in case of power failure or process upsets. The ponds and heap leach pad facilities will meet the prescriptive BADCT requirements for these types of facilities as regulated by ADEQ.

Specific operating controls as discussed in ADEQ's BADCT manual are incorporated into the designs. Those controls include:

- Three ft of operating freeboard in addition to solutions management capabilities equal to those described above
- Double liners placed on low permeability geosynthetic clay liner (GCL) with leak detection sumps and capability to add a pump as necessary
- Overflow to a lined facility capable of managing a 100-year, 24-hour storm event, with a minimum of three ft of freeboard
- The leach pad is lined and placed on a low-permeability GCL with piping and drain fill above the liner to ensure drainage is maintained and hydraulic head on the liner is limited
- The prepared pad for leach material is graded to drain toward the ponds or lined collection ditch
- A collection ditch that surrounds the entire heap leach pad, drains to the PLS ponds, and provides secondary containment for a portion of the PLS piping system.

All PLS in the process ponds will be routed to the SX plant for processing. Each flow system is isolated, recycled, and contained in this process. The plant will be designed to be non-discharging and will be operated in a manner that isolates process solutions from the environment.

3.1.1.3 Dry-Stack Tailings Facility

As described above, the Rosemont Project will utilize dry-stack tailings technology. The advantages of dry tailings disposal over conventional tailings is the elimination of an engineered embankment and seepage containment system, the maximization of water conservation, and the minimization of water make-up requirements. Additionally, dry tailings will be confined to the Barrel Canyon drainage.

Section 2.9 describes a series of surface water management features, such as diversions and ponds, which are incorporated into the tailings facility design to minimize stormwater runon and infiltration into the dry-stack tailings. As such, the features will also function to minimize impacts to groundwater.

Tailings characterization was performed on two samples that were available from metallurgical testing (Tetra Tech, 2007a). Acid-base accounting (ABA), leachate analysis, whole rock analysis, and on-going

kinetic testing all strongly suggest that the tailings material will have a very limited potential for leaching metals and will have no significant risk of producing acid. Additional testing is currently being performed on a third test sample. Additional geochemical studies are ongoing. Seepage and stability analyses are also provided in the Dry Tailings Facility Design Report (Tetra Tech, 2007b).

3.1.1.4 Waste Rock Storage

As described above, waste rock deposition will be confined to the Barrel Canyon drainage, and a series of stormwater controls (Section 2.9) will function to minimize the discharge of sediments or other pollutants from the waste rock storage areas.

Geochemical testing completed to date indicates that only 3% of the waste rock samples show characteristics of being potentially acid generating (PAG). In addition to the material characterized as PAG, approximately 23% of the samples tested resulted in an "uncertain" acid generating potential. Both the samples identified as PAG and those that have uncertain acid generating potential appear to occur in a relatively limited area of the pit. As discussed in the Baseline Geochemical Characterization (Tetra Tech, 2007a), additional samples are being collected to cover a broad spatial distribution in an effort to define an exact area of concern. However, based on currently available data, it appears the PAG material may be managed through proper placement within the waste rock storage area.

Once all test work is completed, a mine waste management plan will be developed so that any materials that may be acid generating or could cause an impact to groundwater or surface water will be placed where they will not be exposed to water. A site-wide geochemical model is planned including possible mitigation and management strategies should ARD issues arise.

3.1.1.5 Open Pit

The hydrogeology and geochemistry of the open pit are being investigated to determine if passive containment will be achieved and maintained without management, or if discharge will need to be managed in the long term. Hydrogeologic and geochemical modeling is planned for this facility to verify the appropriate management and permitting scenario.

A series of geochemical tests were performed on samples that will be exposed to potential leaching at closure. Some samples were specifically targeted to areas within the open pit that would be exposed at closure. These samples will be used in the modeling to determine the potential overall water condition in the pit. The results available to date illustrate that, in the case of the samples available for analysis, and suspected as being exposed at closure, the acid generating potential will be limited. Humidity cell testing has been ongoing and will continue. As additional results become available these assumptions will be reviewed and updated.

3.1.1.6 Concentrator, SX/EW, and Other Process and Maintenance Facilities

Design plans are currently underway for the operational and maintenance facilities located at the plant site. These facilities are specifically designed to manage solutions so they are not discharged into the environment. Typical design criteria for tanks, concrete-floored buildings with curbs, and concrete sumps will be used to ensure the facilities are non-discharging. Pipelines will have a rigorous inspection program, be instrumented, or be double-walled so the non-discharging criteria can be applied. Finally, larger tanks will be constructed with secondary containment which will also be designed to be non-discharging.

3.1.1.7 Material Stockpiles

There are two types of stockpiles anticipated at this facility: those related to the process and those designed to contain growth media for reclamation purposes. The process related stockpiles will meet the definition of temporary storage and be managed inside the process areas. The growth media stockpiles will consist of soil and grubbed material that will be available for reclamation activities.

Neither type of stockpile will meet the definition of a discharging facility as defined by the APP program.

3.1.2 Pollutant Management Area (PMA)

3.1.2.1 PMA

As described in the ARS §49-244.1 and the APP program, the Pollutant Management Area (PMA) is the limit projected in the horizontal plane on which pollutants are or will be placed. The PMA is an imaginary line circumscribing potentially discharging facilities or activities at the site. Figure 3-1 depicts the currently proposed PMA in relation to the facilities currently under evaluation.

It is anticipated that the PMA boundary depicted may be modified as plans become better defined. The PMA boundary defined herein corresponds to the currently planned facilities and activities.

3.1.2.2 Point of Compliance (RP), Hydrologic Characterization (HC), and Pit Characterization (PC) Wells

Based on the current proposed PMA, the proposed point of compliance (RP) monitor wells, as described in ARS §49-244.2, are shown in Figure 3-1. In addition to the RP wells, hydrogeologic characterization (HC), and pit characterization (PC) wells are also shown on Figure 3-1. The PC wells located on private land are being installed prior to the issuance of the APP permit to characterize hydrogeologic conditions in the vicinity of the pit, to monitor ambient groundwater quality, and to determine groundwater characteristics for evaluation of pit dewatering requirements. The RP and HC wells (on USFS lands) are planned for installation to document ambient groundwater quality, monitor groundwater quality over time, and to define the hydrogeologic characteristics of the planned operational areas.

It is anticipated that some or all of the PC and HC wells will remain in place during the pre-operational period. However, they may be abandoned once they are encroached upon by mine activities or facilities.

3.1.2.3 Monitoring Plan

Water quality at the facility will be monitored as required by groundwater and stormwater permits and conditions of the approved MPO. Ambient groundwater quality will be determined for each RP monitor well using a suite of chemical analyses, as required by the APP program. Following the ambient groundwater quality assessment and selection of Aquifer Quality Limits and Alert Levels, subsequent monitoring of selected indicator constituents and parameters will be conducted on a quarterly basis. The quarterly samples will be used for a more comprehensive chemical analysis on a biennial basis. The APP program states that discharge from a facility may not degrade the water below background levels. The RP wells will be installed to establish an ambient groundwater quality baseline before potentially discharging facilities are installed. The HC and PC wells will be installed to characterize groundwater quality upgradient from the RP wells.

Groundwater monitoring procedures will be consistent with established ADEQ protocol. Laboratory chemical analyses will be conducted by state-certified laboratories. Results of groundwater monitoring will be reported to ADEQ on a quarterly basis, as required by the APP.

In the event that an Alert Level or Aquifer Quality Limit is exceeded at an RP monitor well, contingency plans, including verification sampling, will be implemented as required by the APP. If an exceedance is confirmed, additional contingency plans and corrective actions will be developed with ADEQ and implemented according to an ADEQ-approved schedule.