# 8.0 SURFACE WATER HYDROLOGY

Surface water hydrology elements of concern to reclamation, closure, and post-closure activities include process water containment, stormwater control, conservation of downstream surface water flows, and the protection of surface water quality.

## 8.1 Process Water Containment and Stormwater Control

### *8.1.1 Operational Phase*

The open pit is considered a closed system with all direct rainfall and local runoff being treated as contact water and collected in a sump in the pit bottom. During operations, the captured water will be used for dust suppression or incorporated into the process circuit. Like the open pit, the heap leach facility will also be a closed system during the active life of the pad. All rainfall falling on the pad will be captured and collected by the solution collection and drainage system and incorporated into the process flows.

Similarly, the plant site will be a closed system with all precipitation and local runoff collected in the Process Water Tailings Storage (PWTS) pond. The PWTS pond will be constructed in the pre-production phase and is designed to provide lined storage for the equivalent of three days of process flows plus the 100-year, 24-hour storm event. The three day allowance for the storage of process flows provides some flexibility and emergency storage in case of a service interruption at the plant facilities. The PWTS pond location is shown on Figures 3 through 11.

During the operational phase, the surface of the tailings area, which is fairly impervious, will be sloped so that all precipitation that falls on top of the active area will remain on top and evaporate. Ponded water may also be pumped to the PWTS Pond (and used in the process) to limit infiltration into the tailings mass.

During the initial years, surface water runoff generated in the waste rock storage area will be managed by using internal stormwater controls and/or allowing stormwater runoff to infiltrate back into the waste rock pile. The southern and eastern slopes of the waste rock storage area are set back from basin divides by at least 100 feet. Runoff from these outer buttress slopes will be contained within mini basins located along the toe.

Stormwater diversions and culverts are planned for the west side of the waste rock and tailings storage facilities to divert runoff to the Central Drain area. The North Diversion, as shown on Figures 3 though 12, is planned to divert runoff from a 100-year, 24-hour storm event around the north dry stack tailings facility and plant site. As the Central Drain is built-up, an attenuation pond will form, allowing collected surface water to slowly feed into the drain. The attenuation pond will be sized to allow a 100-year, 24-hour event to drain within 30 days.

The location of the Storage and Recovery System is shown on Figures 4 through 8. This system will initially collect stormwater runoff from the waste rock area upstream of a planned haul road. Pumps may be installed to evacuate impounded water that has the potential to infiltrate into the downstream tailings mass.

### *8.1.2 Closure and Post-Closure*

All operational facilities associated with stormwater control not required for closure applications will be removed, the areas regraded, capped, and reseeded. Some sediment ponds may be left in place or new basins established to control sediments or for the establishment of stock

watering ponds, etc. The PWTS pond area will be closed per BADCT guidelines and graded to the Central Drain.

## 8.2 Conservation of Downstream Surface Water Flows

Augusta intends to use the Central Drain to maintain stormwater flows from this branch of Barrel Canyon into Davidson Canyon during the operational and closure phases. As illustrated in Figure 16, the Central Drain will be approximately 30 feet high and 300 feet wide. This drain will carry stormwater flows through the operational phase as well as through the post-closure Rosemont Ridge landform.

Above the Central Drain, a coarse rock zone will be extended upward to the top surface of Rosemont Ridge. Stormwater runoff from the top surface will be routed to this Infiltration Drain. Overflow protection is provided via a 300 foot wide coarse rock channel should the Infiltration Drain plug. At closure, upstream surface flows, except that contained within the open pit, will be routed to the Central Drain.

## 8.3 Preservation of Pre-mining Surface Water Quality

Current geochemical testing data suggests that runoff water from the outer slopes of the waste rock storage and tailings buttress areas will exhibit good water quality without elevated concentrations of metals and major ions. Therefore, it is anticipated that drainage from these waste rock slopes will be suitable for direct discharge into ambient receiving water bodies (*Geochemical Characterization Study*, Tetra Tech, June 2007).

In the operational phase, runoff from the waste rock storage facility will be sampled and tested for selected water quality parameters to verify these preliminary testing results. Sediment collection ponds will serve as a final control point prior to discharge to the environment. Suspended sediments will settle out in these collection ponds, and the clarified water will be released. A porous dam, constructed of large waste rock, is planned to be constructed at the outlet of Barrel Canyon to serve as the final monitoring point. Groundwater monitoring wells will also be located downstream of this dam. Surface water quality will meet the standards required under the appropriate discharge permit.