

**STATE OF ARIZONA**  
**AQUIFER PROTECTION PERMIT NO. P-100525**  
**PLACE ID 6376, LTF 63882**  
**SIGNIFICANT AMENDMENT**

**1.0 AUTHORIZATION**

In compliance with the provisions of Arizona Revised Statutes (A.R.S.) Title 49, Chapter 2, Articles 1, 2, and 3, Arizona Administrative Code (A.A.C.) Title 18, Chapter 9, Articles 1 and 2, A.A.C. Title 18, Chapter 11, Article 4 and amendments thereto, and the conditions set forth in this permit, the Arizona Department of Environmental Quality (ADEQ) hereby authorizes ASARCO LLC is hereby authorized to operate the ASARCO Ray Operations located near Kearny, Pinal County Arizona, over groundwater of the Mineral Creek/Salt River Basin, in Sections 34 and 35, Township 2 South, Range 13 East, and Sections 1-4, 9-16, 22-26, 35 and 36, Township 3 South, Range 13 East, and Sections 18, 19, 29, 30, and 31, Township 3 South, Range 14 East of the Gila and Salt River Base Line and Meridian.

This permit becomes effective on the date of the Water Quality Division Director's signature and shall be valid for the life of the facility (operational, closure, and post-closure periods), unless suspended or revoked pursuant to A.A.C. R18-9-A213. The permittee shall construct, operate and maintain the permitted facilities:

1. Following all the conditions of this permit including the design and operational information documented or referenced below; and
2. Such that Aquifer Water Quality Standards (AWQS) are not violated at the applicable point(s) of compliance (POC) set forth below or if an AWQS for a pollutant has been exceeded in an aquifer at the time of permit issuance, that no additional degradation of the aquifer relative to that pollutant and as determined at the applicable POC occurs as a result of the discharge from the facility.

**1.1 PERMITTEE INFORMATION**

**Facility Name:** ASARCO Ray Operations  
**Facility Address:** 27809 N. Mineral Creek Road  
Kearny, Arizona 85137  
**County:** Pinal County  
**Permitted Flow Rate:** 10,000,000 gallons per day (gpd) or more  
**Permittee:** ASARCO LLC  
**Permittee Address:** ASARCO LLC – Ray Operations  
Box 640  
Kearny, AZ 85137  
**Facility Contact:** General Manager  
**Emergency Phone No.:** (520) 356-2333  
**Latitude/Longitude:** 33° 09' 18" N / 110° 58' 56" W  
**Legal Description:** Sections 34 and 35, Township 2 South, Range 13 East; and Sections 1-4, 9-16, 22-26, 35, and 36 Township 3 South, Range 13 East; and Sections 18, 19, 29, 30, 31, and 32 Township 3 South, Range 14 East of the Gila and Salt River Base Line and Meridian.

**1.2 AUTHORIZING SIGNATURE**

\_\_\_\_\_  
**Trevor Baggione, Director**  
Water Quality Division  
Arizona Department of Environmental Quality  
Signed this \_\_\_\_ day of \_\_\_\_\_, 2017

**THIS PERMIT SUPERCEDES ALL PREVIOUS PERMITS**

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## **2.0 SPECIFIC CONDITIONS [A.R.S. §§ 49-203(4), 49-241(A)]**

### **2.1 Facility / Site Description [A.R.S. § 49-243(K)(8)]**

The ASARCO LLC (ASARCO) Ray Mine Operations are located in eastern Pinal County, along State Highway 177, approximately ten miles to the north of Kearny. The site consists of an open-pit mine and associated leach and barren rock deposition areas (RDAs), a mill that produces concentrate, a solvent extraction-electrowinning (SX-EW) plant that produces electrowinned copper cathodes from the leaching operations, and a tailings deposition facility for storage of tailings produced during the flotation process at the Ray Concentrator. Underground mining activities began in the area around 1880, and continued periodically until the mid-1940's. The Ray Mine has been in operation since 1911. In 1948 the Kennecott Copper Company (Kennecott) consolidated the remaining mining operations and began the development of the open-pit mine. ASARCO purchased the mine from Kennecott in 1986. The Ray porphyry copper deposit lies within the historical drainage of Mineral Creek, which bisected the deposit until late 1972. The water within the creek was diverted around the mine via an 18,181 foot long man-made diversion tunnel, which was driven into the Dripping Springs Mountain Range located to the east of the mine. A 13,300 foot extension of the diversion tunnel was completed in 2002, to better isolate the waters of Mineral Creek from mining, milling, and leaching operations.

The copper sulfide ores mined at the Ray Mine are taken to one of two crushing facilities on-site, and then conveyed to the Ray Concentrator or shipped off-site by rail to the Hayden Concentrator for milling to produce concentrates for smelting. The remaining material consists of leach rock material and barren rock. The leach rock material is taken to prepared RDAs and leached, and barren rock is hauled to separate RDAs where no leaching presently occurs.

The RDAs are typically constructed by end-dumping ore from trucks in 25 to 100 foot lifts. Ultimate RDA heights may exceed 1,000 feet. Leach solution (raffinate) is applied to the RDAs by flooding bermed cells on top of the RDAs; or spraying, trickling, or dripping solution onto the top of the RDAs. Solution can also occasionally be applied to an RDA face. Raffinate percolates through the RDA, reacting with the copper bearing ores, and ultimately flows out the toe of the RDA as pregnant leach solution (PLS). The PLS is captured by a downgradient collection system, typically an impoundment, and piped to the SX-EW Plant for the production of electrowinned copper cathodes.

Operational facilities, such as ditches and catchments, are integral parts of the RDAs and serve to manage process fluids within the RDAs. These facilities are transient in nature and move in conjunction with the lateral or vertical expansion of the RDA, as well as changing patterns of raffinate application. Moreover, during their existence, these facilities typically have variable liquid levels based on evaporation rates, impoundment elevation, rock placement, and raffinate application rates. The facilities may contain stormwater, process contact water, PLS, raffinate, or any combination thereof. ASARCO refers to these facilities as Dynamic Solution Management Facilities (DSMFs). These facilities exist only on permitted RDAs and are considered part of the RDAs for permitting purposes, rather than being separately permitted.

ADEQ has reviewed and approved the following:

- Expand the Rock Deposition Area (RDA) footprint for the eight (8) RDAs (1 Series RDA through 9 Series RDA).
- Add facility No. 11 Tank to the permit. The tank is an existing facility that is not in use. ASARCO proposes to use the tank as a Process Solution holding tank.
- Merge APP No. P-511619 with APP No. P-100525. APP No. P-511619 was a closure permit for detention ponds DP-1 through DP-22. Post closure monitoring in APP No. P-511619 was required to be conducted using point of compliance (POC) wells R-18, R-19 and R-22 under APP No. P100525. The detention ponds will be covered by the 7-Series RDA expansion.
- On July 15, 2016, ADEQ issued an Authority to Operate a Non-Municipal Solid Waste Landfill at Mining Operations to ASARCO, Ray Operations with a facility identification number B3.2, and the landfill is now covered under the General Permit established at R18-13-802.

The permitted facilities include 8 RDAs (incorporating the associated DSMFs); 29 primary and secondary process solution impoundments; 7 non-stormwater impoundments, 2 truck-wash impoundments, 1 tailing impoundment, and 1 non-municipal solid waste landfill. The facilities are identified by association with one of three hydrologic sub-areas (Sub Area A through Sub Area C) based on groundwater and surface water flow characteristics.

**Sub Area A** is defined as the portion of the mine upgradient of the open pit-induced hydrologic sink. The area is drained by Mineral Creek upstream and upgradient of the Ray Operations hydrologic sink and the inlet of the Mineral Creek Diversion Tunnel. The direction of subflow movement within Sub Area A is from the Dripping Spring and Tortilla Mountains toward Mineral Creek, and then downstream along Mineral Creek toward the Ray Operations open-pits in Sub Area B.

**2.1.1 4-Series RDA (A4RDA) (Leach Facility)**

This facility is an existing leach facility on the northwest portion of Sub Area A, with a planned approximate final surface area of 826 acres with a permitted height of 3,000 ft. Raffinate is applied to the facility, and pregnant leach solution (PLS) is collected in PLS impoundments at the downgradient leach facility toes, and pumped to the SX-EW Plant. DSMFs convey process fluids and materials through the RDA. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.2 9-Series RDA (A9RDA) (Leach Facility)**

This facility is an existing leach facility located on north of the Open Pit, with a planned approximate final surface area of 417 acres with a permitted height of 3,000 ft. Raffinate is applied to the facility, and PLS is collected in PLS impoundments at the downgradient leach facility toes, and pumped to the SX-EW Plant. DSMFs convey process fluids and materials through the RDA. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.3 5-Series RDA (A5RDA) (Leach Facility)**

This facility is an existing leach facility on the east side of Mineral Creek, with a planned approximate final surface area of 1002 acres with a permitted height of 3,000 ft. Raffinate is applied to the facility, and PLS is collected in PLS impoundments at the downgradient leach facility toes, and pumped to the SX-EW Plant. DSMFs convey process fluids and materials through the RDA. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.4 9 North Sump (A27) (Process Solution Impoundment)**

This unlined sump is constructed over bedrock, and receives PLS and stormwater runoff from the 9-Series RDA. It has a maximum storage capacity of approximately 2,264,749 cubic feet (cu ft) (16,941,500 gallons [gal]) and an approximate depth of 20 feet (ft). Stored solution is pumped to the 9-Series RDA. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.5 4F Impoundment (A28) (Process Solution Impoundment)**

This unlined impoundment has an approximate volume of 148,924,237 cu ft (1,114,030,656 gal) and an approximate depth of 188 ft. It is constructed over bedrock and receives mine water from the open Pit. Water is pumped from the impoundment to point of uses via a barge mounted pump. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**2.1.6 9 Sump (A4D.3) (Process Solution Impoundment)**

This sump is divided into two impoundments, 9 North and 9 South. These unlined impoundments are constructed on bedrock, and are designed to capture PLS from the 4-, 5-, and 9- Series RDAs. It has a maximum storage capacity of approximately 6,016,000 cu ft (45,002,805 gal) and an approximate

depth of 50 ft. Stored solution is pumped to the SX-EW Plant. The facility is located upgradient from the hydrologic sink and any groundwater flows into the capture zone of the Open Pit passive containment.

**Sub Area B** is the portion of the mine influenced by the hydrologic sink. The hydrologic conditions in Sub Area B of the Ray Operations consist of essentially a closed hydrologic system. The steep topography and open pit provide hydrologic controls that isolate mine operations and related discharges within Sub Area B. The groundwater in Sub Area B migrates through the fractured bedrock, along faults and locally through the Holocene Mineral Creek alluvium toward the open pit, and discharges to the surface in the walls and the floor of the pit.

**2.1.7 1-Series RDA (B1RDA) (Leach Facility)**

This facility is an existing leach facility located on the west side of the Open Pit, with a planned approximate final surface area of 321 acres with a permitted height of 3,000 ft. Raffinate is applied to the facility, and PLS is collected in PLS impoundments at the downgradient leach facility toes, and pumped to the SX-EW Plant. Tailings relocated from the inactive Belgravia Tailings Storage Facility were placed within the facility in 2013. DSMFs convey process fluids and materials through the RDA. The facility is located within the capture zone of the Open Pit passive containment.

**2.1.8 2-Series RDA(B2RDA) (Leach Facility)**

This facility is an existing leach facility located on the west side of the Open Pit, with a planned final approximate surface area of 1116 acres with a permitted height of 3,000 ft. Raffinate is applied to the facility, and PLS is collected in PLS impoundments at the downgradient leach facility toes, and pumped to the SX-EW Plant. Tailings relocated from the inactive Belgravia Tailings Storage Facility were placed within the facility in 2013. DSMFs convey process fluids and materials through the RDA. The facility is located within the capture zone of the Open Pit passive containment.

**2.1.9 3-Series RDA(B3RDA) (Leach Facility)**

This facility is an existing leach facility located on the west side of the Open Pit, with a planned approximate final surface area of 317 acres with a permitted height of 3,000 ft. Raffinate is applied to the facility, and PLS is collected in PLS impoundments at the downgradient leach facility toes, and pumped to the SX-EW Plant. DSMFs convey process fluids and materials through the RDA. The facility is located within the capture zone of the Open Pit passive containment.

**2.1.10 10 Pond (B33) (Non-Stormwater Impoundment)**

This lined impoundment has an approximate volume of 246,675 cu ft (1,845,256 gal), and an approximate depth of 17 feet. It is constructed on the 4-Series RDA, and collects reclaimed water for dust suppression and other operational needs. The facility is located within the capture zone of the Open Pit passive containment.

**2.1.11 Last Turn Stormwater Diversion Channel (B29) (Non-Stormwater Impoundment)**

This facility is an unlined channel consisting of a series of three impoundments with inter-connecting conveyances. The overall channel length is approximately 5,000 feet, the approximate volume is 1,611,720 cu ft (12,056,503 gal), and the channel depth ranges from 10-30 feet. It is constructed over bedrock and collects stormwater runoff from the upgradient leach facilities and run off from Highway 177. The facility is located within the capture zone of the Open Pit passive containment.

**2.1.12 1B Dam (Sulfide Sump) (B1B.1) (Process Solution Impoundment)**

This unlined impoundment has an approximate volume of 65,000 cu ft (486,234 gal) and an approximate depth of 16 feet. It is constructed over bedrock, and collects PLS from upgradient leach facilities, which is then pumped to the SX-EW Plant. The facility is located within the capture zone of the Open Pit passive containment.

**2.1.13 Maintenance Area Truck Wash – Light Vehicle (B30.1)**

This concrete wash pad is equipped with a sump that collects fluids from the light duty truck wash. Impounded fluids gravity flow into Big Dome Pond. The facility is located within the capture zone of the Open Pit passive containment.

**2.1.14 Maintenance Area Truck Wash – Heavy Vehicle (B30.2)**

This concrete wash pad is equipped with a sump that collects and recirculates the fluids from the heavy duty truck wash. In upset conditions impounded fluids gravity flow into Daltons Pond. The facility is located within the capture zone of the Open Pit passive containment.

**2.1.15 1A Dam (B1A.2) (Process Solution Impoundment)**

This unlined impoundment has an approximate volume of 7,800 cu ft (58,348 gal), and an approximate depth of 10 feet. It is constructed over bedrock, and collects PLS from upgradient leach dumps, which is then pumped to the SX-EW Plant. The facility is located within the capture zone of the Open Pit passive containment.

**2.1.16 Concentrator Non-Stormwater pond (B1A.3) (Process Solution Impoundment)**

This shotcrete lined impoundment has an approximate volume of 11,300 cu ft (84,530 gal), and an approximate depth of 6 feet. It is constructed over bedrock, and collects PLS from upgradient leach facilities, which is then pumped to the SX-EW Plant. The facility is located within the capture zone of the Open Pit passive containment.

**2.1.17 PM Bay Sump and Truck Wash (B1A.4) (Process Solution Impoundment)**

This facility is an unlined concrete pad and sump, constructed in the 1-Series RDA. It collects wash down water from haul trucks. The approximate maximum capacity of the sump is 20,000 cu ft (149,610 gal). Co-located at this facility is a heavy vehicle truck wash. The concrete wash pad is equipped with a sump that collects fluids from the truck wash. Impounded fluids overflow to the open pit. The facility is located within the capture zone of the Open Pit passive containment.

**2.1.18 Ray Concentrator Collection Pond (B5) (Process Solution Impoundment)**

This impoundment collects slurry from the Ray Concentrator during maintenance and upset conditions, and stormwater runoff from the warehouse outside laydown yard. It has a 60-mil HDPE liner, and an approximate volume of 124,000 cu ft (927,584 gal) with an approximate depth of 17 feet. Accumulated solutions are pumped to the Ray Concentrator Tailings Sump, Big Dome Pond, or back to the mill. The facility is located within the capture zone of the Open Pit passive containment.

**2.1.19 Dalton's Pond (B4.1) (Process Solution Impoundment)**

This impoundment collects surface runoff from surrounding areas of the property. It is lined with an 80-mil HDPE liner on the downstream face. It has an approximate volume of 326,000 cu ft (2,438,649 gal) with an approximate depth of 50 feet. Accumulated solution is pumped to Big Dome Pond. The facility is located within the capture zone of the Open Pit passive containment.

**2.1.20 Solid Waste Landfill (B3.2)**

The current footprint of the active area of the landfill is approximately 6.4 9.3 acres, and is contained within a 6050 -acre parcel that is covered under a 2016 restrictive covenant dated August 30, 2002. The landfill accepts only dry, non-hazardous solid waste generated from mine administration, operations, maintenance, and construction activities. It is governed by the terms of an Authority to Operate a Non-Municipal Solid Waste Landfill at Mining Operations issued by ADEQ pursuant to A.A.C. R18-13-802.

**Sub Area C** is the portion of the mine downgradient of the hydrologic sink. The Ray Mine is located near the Lower San Pedro (groundwater) Basin. The Lower San Pedro Basin area near the Ray Operations is bounded by the Dripping Spring Mountains on the east and the Tortilla Mountains on

the west. Groundwater movement is from the eastern and western margins of the basin, toward the basin axis defined by tributaries to Mineral Creek.

**2.1.21 7-Series RDA (C7RDA) (Leach Facility)**

This facility is an existing leach facility located on the west side of Mineral Creek, with a planned approximate final surface area of 723 acres with a permitted height of 3,000 ft. Raffinate is applied to the facility, and PLS is collected in PLS impoundments at the downgradient leach facility toes, and pumped to the SX-EW Plant. DSMFs convey process fluids and materials through the RDA.

**2.1.21.1 Detention Ponds DP-1 through DP-22**

Detention ponds 1 through 22 are located at the Asarco Ray 7E/7F Impoundment Area. Nineteen of the ponds were used to contain post-treatment discharge of effluent from the Goat Ranch Waste Water Treatment Facility. Three of the ponds (DP-14, DP-21, and DP-22) did not receive effluent and were not used for any other purpose. The treatment facility built in 1977 and operated until 1997, treated stormwater from the Big Dome Pond and Goat Ranch Pond. The detention ponds contained calcium sulfite silt and sediment from the treatment process. Closure activities for 19 of the detention ponds included the removal of the impounded sediments to the 7-Series Rock Deposition Area (RDA). The three ponds that didn't receive treated wastewater did not contain accumulated sediments.

The 22 detention pond are located within the future footprint of the expanded 7-Series RDA and will be covered by the rock deposited in the 7-Series RDA. The detention ponds are also within the sub-flow capture area of the Mineral Creek Retention Basin and associated pump-back system

**2.1.22 8-Series RDA (C8RDA) (Leach Facility)**

This facility is an existing leach facility located on the east side of Mineral Creek, with a planned approximate final surface area of 1217 acres with the northern portion permitted to a height of 3,000 ft. Raffinate is applied to the facility and PLS is collected in PLS and Stacker Dam impoundments at the downgradient leach facility toes, and pumped to the SX-EW Plant. DSMFs convey process fluids and materials through the RDA.

**2.1.23 Suzie D Impoundment (C31) (Non-stormwater Impoundment)**

The Suzie D Impoundment is an unlined non-storm water impoundment constructed in a natural drainage channel. The Suzie D Impoundment will receive pumped mine water from various sumps located on site. The main source of water will be mine water collected in the bottom of the Amanda Pit. Water stored in Suzie D Impoundment will be pumped via barge mounted pump to desired points, primarily the 8 series RDAs for use in the leaching process.

**2.1.24 Lower Suzie D Impoundment (C7) (Process Solution Impoundment)**

This impoundment receives inflows from stormwater runoff from the 8-Series RDA. It is unlined, with an approximate volume of 29,000 cu ft (216,935 gal), and an approximate depth of 12 feet. Accumulated fluid is pumped to Big Dome Pond. An HDPE overflow pipe transfers overflow to Big Dome Pond.

**2.1.25 7A Dam (C7A.7) (Process Solution Impoundment)**

This unlined impoundment collects PLS from the 7-Series RDA. It has an approximate capacity of 460,000 cu ft (3,441,039 gal), with a depth of 16 feet. Accumulated PLS is pumped to the SX-EW Plant. To avoid overtopping, an HDPE pipe transmits excess fluid by gravity flow to Big Dome Pond.

**2.1.26 Electrowinning Dam (C9) (Process Solution Impoundment)**

This unlined impoundment collects fluid from the wet scrubbers and process areas of the EW Plant. The approximate capacity is 36,000 cu ft (269,299 gal), with a depth of 10 feet. Captured fluids are

pumped back into the leach circuit. An HDPE overflow pipe transmits excess fluid by gravity flow to the Lower Slimes Dam.

**2.1.27 8 Series Pond (C3.3) (Process Solution Impoundment)**

This impoundment is excavated into alluvium, and lined by low permeability slimes. It collects PLS from portions of the 8-Series RDA and has an approximate capacity of 73,000 cu ft (546,078 gal), with a depth of 4 feet. Accumulated fluids are pumped to the SX-EW Plant.

**2.1.28 7C Pond (C7C.2) (Process Solution Impoundment)**

This unlined impoundment collects occasional inflows of PLS from the 7-Series RDA. This impoundment collects PLS at the base of the RDA, and percolates along the alluvium/bedrock interface to the 7C Dam. The facility has an approximate capacity of 111,000 cu ft (830,338 gal) with a depth of 30 feet.

**2.1.29 7B Dam (C7B.1) (Process Solution Impoundment)**

This unlined impoundment collects PLS from the 7-Series RDA. It has an approximate capacity of 538,000 cu ft (4,024,519 gal), with a depth of 16 feet. Accumulated PLS is pumped to the SX-EW Plant. To avoid overtopping, an HDPE pipe transmits excess fluid by gravity flow to Big Dome Pond.

**2.1.30 Upper Slimes Pond (C3) (Process Solution Impoundment)**

This impoundment collects PLS from upgradient leach facilities, is constructed over bedrock, and is lined with low permeability slimes from thickener tank residue. The approximate impoundment volume is 375,000,000 cu ft (2,805,194,805 gal), with a depth of approximately 30 feet. Accumulated PLS is pumped to the SX-EW Plant.

**2.1.31 Middle Slimes Dam (C3.2) (Process Solution Impoundment)**

This PLS impoundment is constructed over bedrock, lined with low permeability slimes from thickener tank residue. The approximate impoundment volume is 11,000 cu ft (82,286 gal), with a depth of approximately 5 feet. This impoundment collects PLS seepage from the Upper Slimes Pond. Overflow is gravity fed by HDPE pipe to the Lower Slimes Dam. Accumulated PLS seepage flows by gravity to the SX-EW Plant.

**2.1.32 Middle Slimes Pond (C3.2b) (Process Solution Impoundment)**

This impoundment collects PLS seepage from Upper Slimes Pond. The approximate impoundment capacity is 114,000 cu ft (852,779 gal) with a depth of approximately 12 feet. Overflow from the facility is gravity fed by pipe to the Lower Slimes Dam.

**2.1.33 Lower Slimes Dam (C11) (Process Solution Impoundment)**

This unlined impoundment is constructed over bedrock, and collects PLS from the 8-Series RDA, Upper and Lower Slimes Ponds, and overflow from the EW and Middle Slimes Dams. The approximate capacity is 209,000 cu ft (1,563,429 gal), with a depth of 22 feet. To prevent overtopping, an HDPE pipe conveys excess solution by gravity feed to Big Dome Pond. Accumulated fluids are pumped to the SX-EW Plant.

**2.1.34 7C Dam (C7C.1) (Process Solution Impoundment)**

This unlined impoundment collects PLS from the 7-Series RDA. It has an approximate capacity of 94,000 cu ft (703,169 gal), with a depth of 16 feet. Accumulated PLS is pumped to the SX-EW Plant. To avoid overtopping, an HDPE pipe transmits excess fluid by gravity flow to Big Dome Pond.

**2.1.35 Big and Little Dome Ponds and Truck Wash (C1) (Process Solution Impoundment)**

These two adjoining impoundments are lined with 80-mil HDPE liners. The approximate capacities are 1,760,000 cu ft (13,165,714 gal) and 353,000 cu ft (2,640,623 gal), with approximate depths of 16 and 12 feet, respectively. The facilities collect sewage treatment plant effluent; stormwater

runoff and overflows from the 7-Series Dams, Sulfide Sump, Suzie D Dam, and the Lower Slimes Dam; as well as flows from shop drains, showers, and the metals laboratory. Pumps are installed to transfer fluids to appropriate storage/uses elsewhere. Co-located at the Little Dome Pond is a heavy vehicle truck wash. This concrete wash pad is equipped with a sump that collects fluids from the heavy duty truck wash. Impounded fluids gravity flow into Little Dome Pond.

**2.1.36 7D Dam (C7D.1) (Process Solution Impoundment)**

This unlined impoundment collects PLS from the 7-Series RDA. It has an approximate capacity of 746,000 cu ft (5,580,468 gal), with a depth of 18 feet. Accumulated PLS is pumped to the SX-EW Plant. To avoid overtopping, an HDPE pipe transmits excess fluid by gravity flow to Big Dome Pond.

**2.1.37 7E Raffinate Storage Pond (C34) (Process Solution Impoundment)**

This lined impoundment has an approximate volume of 9,003,933 cu ft (67,354,094 gal), and an approximate depth of 23 feet. This facility collects raffinate for use in the 7-Series RDA. This facility overflows to the Goat Ranch Lined Pond.

**2.1.38 Stacker Dam (C12) (Process Solution Impoundment)**

This unlined impoundment has an approximate capacity of 125,000 cu ft (935,065 gal), with a depth of 11 feet. It collects PLS from the 8-Series RDA. Accumulated PLS is pumped to the SX-EW Plant. An HDPE overflow pipe transmits excess fluid by gravity feed to the Goat Ranch Lined Pond.

**2.1.39 Retention Basin (C35) (Non-Stormwater Impoundment)**

This unlined facility is used to temporarily contain stormwater runoff and unforeseen emergency spills. It has an overall storage volume of 3,354,000 cu ft (25,089,662 gal), with a depth of 25 feet. In addition to a dam and pump-back system, the facility includes a bedrock sump and pumpback system about 50 feet upgradient of the dam, with dedicated 500 gallon per minute (gpm) and 2,000 gpm pumps. Impounded fluids are pumped back into the Ray Pit, Big Dome Pond, or Dalton's Pond.

**2.1.40 Goat Ranch Lined Pond (C20.1) (Process Solution Impoundment)**

This facility is lined using a geosynthetic clay liner. It collects solutions from the Stacker Dam, 7D Dam, and Big Dome Pond, via HDPE overflow pipes. It has an approximate volume of 2,850,000 cu ft (21,319,481 gal), with an average depth of 16 feet. Accumulated fluids are pumped back and reused in operations.

**2.1.41 Elder Gulch Tailings Facility (C36) (Tailings Impoundment)**

This facility receives tailings from the Tailings Thickener (C37). HDPE pipes are located throughout the impoundment and convey fluids to lined underdrains at the toe of the facility and convey them to the Seepage Collection Pond (C38). (See AMEC October 25, 2010 Elder Gulch TSF Expansion Final Report and AMEC January 10, 2011 Elder Gulch TSF Expansion Operating, Maintenance, and Surveillance Manual).

**2.1.42 Tailings Thickener (C37) (Process Solution Impoundment)**

This facility consists of a 400-foot diameter thickener for dewatering tailings prior to deposition onto the Tailings Facility (C36). Flotation tailings are pumped to the thickeners and thickened tailings are pumped to the Tailings Facility.

**2.1.43 Seepage Collection Pond (C38) (Non-Stormwater Impoundment)**

This facility is designed to contain 8.3-acre feet of seepage from the underdrain channels in the Tailings Facility (C36), seepage from the tailings facility, and surface runoff. Accumulated fluids are pumped from the impoundment to process water storage tanks. An HDPE lined spillway conveys emergency overflows to a 15-acre foot unlined impoundment where fluids are pumped back and reused in operations.

**2.1.44 Contact Stormwater Pond (C39) (Non-Stormwater Impoundment)**

At build-out, this facility is designed to contain 38-acre feet of contact stormwater runoff from the Tailings Facility (C36). Accumulated fluids are pumped back and reused in operations.

**2.1.45 Tailings Booster Station 1 Pond (C40) (Process Solution Impoundment)**

This facility is designed to contain tailings line drainage during shut-down events. Accumulated fluids are pumped back and reused in operations.

**2.1.46 Tailings Booster Station 2 Ponds (C41) (Process Solution Impoundment)**

This facility consists of an initial and overflow impoundment connected by three 24-inch HDPE pipes. The approximate capacities are 14,679 cubic feet (109,800 gallons) and 123,000 cubic feet (920,040 gallons), with approximate depths of 4.5 and 7 feet, respectively. The facility collects liquids during periods of downtime, maintenance and/or emergency. Excess liquids are pumped to the Tailings Facility (C36).

**2.1.47 Mill Pond (C32) (Non-Stormwater Impoundment)**

This facility is a proposed lined impoundment located east of Mineral Creek. It will have a capacity of 508,410 cu ft (3,802,890 gal) at high water level and an approximate depth of 10 feet. This facility will collect contact stormwater runoff from the mill area.

**2.1.48 Tank No. 11 (C46) (Process Solution Impoundment)**

Tank No. 11 is an existing tank that is constructed of reinforced concrete with polyurethane foam layer and a polyurea coating. The base is constructed with asphalt over a base course, and coated with a protective seal. The tank is 250 feet diameter and is about 10 feet tall with a 2.5 inch thick asphalt pavement over base course. Prior to introduction of raffinate, Tank No. 11 shall be lined with 80-mil HDPE liner along the concrete walls and concrete base.

**Annual Registration Fee [A.R.S. § 49-242 and A.A.C. R18-14-104]**

The annual registration fee for this permit is payable to ADEQ each year. The permitted flow for fee calculation is 10,000,000 gallons per day (gpd) or more. If the facility is not constructed or is incapable of discharge, the permittee may be eligible for reduced fees under the rule. Send all correspondence requesting reduced fees to the Groundwater Section. Please reference the permit number, LTF number, and the reason for requesting reduced fees under the rule.

**Annual Registration and Disposal Fees [A.R.S. § 49-747(C) and A.R.S. 49-836]**

The annual registration fee for the Non-Municipal Solid Waste Landfill is established by A.R.S. § 49-747(C). Landfill disposal fees are established by A.R.S. § 49-836 based on the amount of waste landfilled. The fees are payable to ADEQ each year.

**Financial Capability [A.R.S. § 49-243(N) and A.A.C. R18-9-A203]**

The permittee has demonstrated financial capability under A.R.S. § 49-243(N) and A.A.C. R18-9-A203. The estimated dollar amount for facility closure and post-closure costs for ASARCO Ray Mine Operations is \$21,651,571 and \$4,869,569 respectively. The financial assurance mechanism was demonstrated through A.A.C. R-18-9-A203(C)(1), a financial test for self-assurance and a letter from ASARCO's Chief Financial Officer.

**2.2 Best Available Demonstrated Control Technology (BADCT) [A.R.S. § 49-243(B) and A.A.C. R18-9-A202(A)(5)]**

**2.2.1 The facilities list and BADCT descriptions:**

**Sub Area A Facilities**

**2.2.1.1 Series RDA (A4RDA) (Leach Facility)**

**Individual BADCT:** Existing and proposed leach east of Mineral Creek - This rock deposition area (RDA) is constructed over relatively low hydraulic conductivity natural geologic formations, using end dumping method of construction. The side slopes are formed at an angle of repose of the material deposited. Small concrete dams, keyed into bedrock, shall be located downgradient of the RDA for the PLS impoundment. Similar construction arrangement for the PLS impoundment shall be affected at the proposed leaching east and west sides of Mineral Creek. Hydraulic conductivity for the existing leach east side of Mineral Creek ranges from  $5.5 \times 10^{-5}$  to  $4.6 \times 10^{-5}$  cm/sec.

**2.2.1.2 9-Series RDA (A9RDA) (Leach Facility)**

**Individual BADCT:** Existing and proposed leach east and west side of Mineral Creek - This RDA is constructed over relatively low hydraulic conductivity natural geologic formations, using end dumping method of construction. The side slopes are formed at an angle of repose of the material deposited. Small concrete dams, keyed into bedrock, shall be located downgradient of the RDA for the PLS impoundment. Similar construction arrangement for the PLS impoundment shall be affected at the proposed leaching east and west sides of Mineral Creek. Hydraulic conductivity for the existing leach east side of Mineral Creek ranges from  $5.5 \times 10^{-5}$  to  $4.6 \times 10^{-5}$  cm/sec; west side of Mineral Creek, it ranges from  $5.5 \times 10^{-5}$  to  $4.0 \times 10^{-7}$  cm/sec; and for the proposed leach east and west side of Mineral Creek, it ranges from  $4.5 \times 10^{-5}$  to  $4.0 \times 10^{-7}$  cm/sec

**2.2.1.3 5-Series RDA (A5RDA) (Leach Facility)**

**Individual BADCT:** Existing and proposed leach west of Mineral Creek - This RDA is constructed over relatively low hydraulic conductivity natural geologic formations, using end dumping method of construction. The side slopes are formed at an angle of repose of the material deposited. Small concrete dams, keyed into bedrock, shall be located downgradient of the RDA for the PLS impoundment. Similar construction arrangement for the PLS impoundment shall be affected at the proposed leaching east and west sides of Mineral Creek. Hydraulic conductivity for the existing leach west side of Mineral Creek ranges from  $5.5 \times 10^{-5}$  to  $4.0 \times 10^{-7}$  cm/sec.

**2.2.1.4 9 North Sump (A27) (Process Solution Impoundment)**

**Individual BADCT:** Facility is an unlined, surface impoundments constructed over bedrock. The hydraulic conductivity of underlying bedrock ranges from  $5.5 \times 10^{-5}$  to  $4.0 \times 10^{-7}$  cm/sec. The facility shall have sufficient storage to contain flows from the 10-year, 24-hour storm event. No geologic hazards are known to exist in the vicinity of this impoundment. All potential discharge and overflow shall report to the Ray Pit - a passive containment, located down gradient of this facility. Pumps and associated equipment shall be maintained in good working order.

**2.2.1.5 4F Impoundment (A28) (Process Solution Impoundment)**

**Individual BADCT:** Facility is an unlined, surface impoundment constructed over bedrock. The hydraulic conductivity of underlying bedrock ranges from  $5.5 \times 10^{-5}$  to  $4.0 \times 10^{-7}$  cm/sec. The facility shall have sufficient storage to contain the 100 year, 24 hour storm event. No geologic hazards are known to exist in the vicinity of this impoundment. Any leakage and potential overflow will report to the Ray Pit – a passive containment, located downgradient of the facility. A minimum of 2 ft of freeboard shall be maintained.

**2.2.1.6 9 Sump (A4D.3) (Process Solution Impoundment)**

**Individual BADCT:** Facility is an unlined, surface impoundment excavated into bedrock. The bedrock (Pinal Schist) has an average hydraulic conductivity of  $4.0 \times 10^{-7}$  cm/sec. The facility is located downgradient of the existing portal entrance and immediately adjacent to the Ray Pit and Ray Pit induced passive containment. The impoundment is designed to capture PLS from the 4-Series, 5-Series, and 9-Series RDAs. The impoundment has a maximum storage capacity of approximately  $45 \times 10^6$  gallons. Overflow reports directly to

the Ray Pit. The combined capacity of the impoundment and the Ray Pit far exceeds the capacity required to contain run off from a 100-year, 24-hour storm event. The Mineral Creek Diversion Tunnel extension and diversion structure at the New Mineral Creek Tunnel Inlet shall provide additional discharge controls so that all potential discharge and overflow will report to the Ray Pit - a passive containment, located downgradient of the facility.

### **Sub Area B Facilities**

#### **2.2.1.7 1-Series RDA (B1RDA) (Leach Facility)**

**Individual BADCT:** The RDA is constructed with leachable material being deposited over steep and relatively lower hydraulic conductivity ( $4.0 \times 10^{-7}$  cm/sec) natural geologic formations using end dumping method. The material is deposited at an angle of repose employing large haulage trucks. Small dams, keyed into bedrock a minimum of 2 feet, shall be located downgradient of the active RDAs to collect PLS. Subsurface and surface flow shall be collected in the open-pit induced passive containment. Stormwater control shall be provided by the open-pit passive containment for storms in excess of the 100-year, 24-hour storm event. Mineral Creek Diversion Tunnel extension and diversion structure at the New Mineral Creek Tunnel Inlet shall provide additional discharge controls so that all potential discharge will report to the Ray Pit - a passive containment.

#### **2.2.1.8 2-Series RDA(B2RDA) (Leach Facility)**

**Individual BADCT:** The RDA is constructed with leachable material being deposited over steep and relatively lower hydraulic conductivity ( $4.0 \times 10^{-7}$  cm/sec) natural geologic formations using end dumping method. The material is deposited at an angle of repose employing large haulage trucks. Small dams, keyed into bedrock a minimum of 2 feet, shall be located downgradient of the active RDAs to collect PLS. Subsurface and surface flow shall be collected in the open-pit induced passive containment. Stormwater control shall be provided by the open-pit passive containment for storms in excess of the 100-year, 24-hour storm event. Mineral Creek Diversion Tunnel extension and diversion structure at the New Mineral Creek Tunnel Inlet shall provide additional discharge controls so that all potential discharge will report to the Ray Pit - a passive containment.

#### **2.2.1.9 3-Series RDA(B3RDA) (Leach Facility)**

**Individual BADCT:** The RDA is constructed with leachable material being deposited over steep and relatively lower hydraulic conductivity ( $4.0 \times 10^{-7}$  cm/sec) natural geologic formations using end dumping method. The material is deposited at an angle of repose employing large haulage trucks. Small dams, keyed into bedrock a minimum of 2 feet, shall be located downgradient of the active RDAs to collect PLS. Subsurface and surface flow shall be collected in the open-pit induced passive containment. Stormwater control shall be provided by the open-pit passive containment for storms in excess of the 100-year, 24-hour storm event. Mineral Creek Diversion Tunnel extension and diversion structure at the New Mineral Creek Tunnel Inlet shall provide additional discharge controls so that all potential discharge will report to the Ray Pit - a passive containment.

#### **2.2.1.10 10 Pond (B33) (Non-Stormwater Impoundment)**

**Individual BADCT:** Facility B33 is a non-storm water impoundment constructed with a 80-mil thick HDPE liner over compacted material, with an engineered anchor trench. The facility is constructed in relatively low hydraulic conductivity ( $4.0 \times 10^{-7}$  cm/sec) natural geologic formations. The impoundment shall have sufficient capacity to contain a 10-year/24-hour storm event. Any overflow reports to the open-pit which is a passive containment comprising Sub-area B. The pond will be operated with a minimum of 2ft freeboard.

#### **2.2.1.11 Last Turn Stormwater Diversion Channel (B29) (Non-Stormwater Impoundment)**

**Individual BADCT:** Facility B29 is an unlined surface impoundment consisting of a series of three impoundments with inter-connecting conveyances. The facility is constructed in relatively low hydraulic conductivity ( $4.0 \times 10^{-7}$  cm/sec) natural geologic formations. The Facility collects stormwater runoff from the upgradient leach facilities and run off from Highway 177. The impoundments shall have sufficient capacity to contain a 10-year/24-hour storm event. Any overflow reports to the open-pit which is a passive containment comprising Sub-area B. Mineral Creek Diversion Tunnel extension and diversion structure at the New Mineral Creek Tunnel Inlet shall provide additional discharge controls so that all potential discharge will report to the Ray Pit - a passive containment. A minimum of 2 ft of freeboard shall be maintained.

**2.2.1.12 1B Dam (Sulfide Sump) (B1B.1) (Process Solution Impoundment)**

**Individual BADCT:** Unlined surface impoundments constructed over bedrock. The hydraulic conductivity of underlying bedrock ranges from  $5.5 \times 10^{-5}$  to  $4.0 \times 10^{-7}$  cm/sec. The facility shall have sufficient storage to contain flows from the 10-year, 24-hour storm event.

**2.2.1.13 Maintenance Area Truck Wash – Light Vehicle (B30.1)**

**Individual BADCT:** Concrete-lined sumps, constructed in relatively low hydraulic conductivity ( $4.0 \times 10^{-7}$  cm/sec) natural geologic formations. The impoundments shall receive wash water from the truck wash.

**2.2.1.14 Maintenance Area Truck Wash – Heavy Vehicle (B30.2)**

**Individual BADCT:** Concrete-lined sumps, constructed in relatively low hydraulic conductivity ( $4.0 \times 10^{-7}$  cm/sec) natural geologic formations. The impoundments shall receive wash water from the truck wash.

**2.2.1.15 1A Dam (B1A.2) (Process Solution Impoundment)**

**Individual BADCT:** Unlined surface impoundments constructed over bedrock. The hydraulic conductivity of underlying bedrock ranges from  $5.5 \times 10^{-5}$  to  $4.0 \times 10^{-7}$  cm/sec. The facility shall have sufficient storage to contain flows from the 10-year, 24-hour storm event.

**2.2.1.16 Concentrator Non-Stormwater pond (B1A.3) (Process Solution Impoundment)**

**Individual BADCT:** Unlined surface impoundments constructed over bedrock. The hydraulic conductivity of underlying bedrock ranges from  $5.5 \times 10^{-5}$  to  $4.0 \times 10^{-7}$  cm/sec. The facility shall have sufficient storage to contain flows from the 10-year, 24-hour storm event.

**2.2.1.17 PM Bay Sump and Truck Wash (B1A.4) (Process Solution Impoundment)**

**Individual BADCT:** Facility B1A.4 is an unlined impoundment, constructed on the 1-Series RDA and collects PLS from the 1-Series and 7-Series RDAs. The impoundment shall serve as an operational control, collecting solution from these RDAs and gravity feeds, via HDPE pipeline to 1B Dam (Sulfide Sump). The impoundment is an integral part of the 1-Series RDA, in that, all potential discharge reports to the Ray Pit - a passive containment comprising Sub-area B.

**2.2.1.18 Ray Concentrator Collection Pond (B5) (Process Solution Impoundment)**

**Prescriptive BADCT:** Facility B5 is constructed with a composite liner, using a 60-mil HDPE geomembrane overlying a 12-inch thick, low permeability compacted soil. The impoundment shall be operated with a minimum of 2 feet of freeboard. The impoundment shall receive slurries from the Ray Concentrator during upset conditions and storm run-off from the warehouse outside laydown yard. A variable capacity pump returns the fluids to the Ray Concentrator Tailings Sump. A floating barge pump transfers collected flows either

to the Big Dome Pond or back to the mill. Containment of flows from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.

**2.2.1.19 Dalton's Pond (B4.1) (Process Solution Impoundment)**

**Individual BADCT:** Facility B4.1 is excavated in alluvium on the west side and in bedrock on the east side, and has compacted earthen embankments, with an 80-mil HDPE liner on the downstream face. To avoid overtopping, the solution is pumped to Big Dome Pond. Big Dome Pond shall be operated with a minimum of 2 feet of freeboard. The pond shall collect surface run-off from the surrounding area of the facility. Any potential seepage from the facility shall be directed to the Retention Basin by the under-drain system constructed in conjunction with the Mineral Creek Lined Channel.

**2.2.1.20 Solid Waste Landfill (B3.2)**

**Individual BADCT:**

The Solid Waste Landfill is an unlined facility located within the pollutant management area of this aquifer protection permit. The landfill has obtained authorization for disposal of solid waste pursuant to the Disposal General Permit: Non-Municipal Solid Waste Landfills at Mining Operations (A.A.C. R18-13-802).

**Sub Area C Facilities**

**2.2.1.21 7-Series RDA (C7RDA) (Leach Facility)**

**Individual BADCT:** The 7-Series RDA is constructed over relatively low hydraulic conductivity natural geologic formations, using end dumping method of construction. The hydraulic conductivity of the bedrock underlying the RDA ranges from  $1.3 \times 10^{-4}$  cm/sec to  $3.4 \times 10^{-6}$  cm/sec. The side slopes are formed at an angle of repose of the material deposited.

**2.2.1.21.1 Detention Ponds DP-1 through DP-22**

**Individual BADCT:**

Closure of detention ponds DP-14, DP-21 and DP-22 has achieved discharge reduction through clean closure since the ponds were not used for effluent disposal and did not contain accumulated sediments.

Discharge reduction in the remaining 19 detention ponds has been partially achieved through removal of the accumulated sediments. Final closure will be achieved when the detention ponds are covered by the 7-Series RDA and closure of the 7-Series RDA.

**2.2.1.22 8-Series RDA (C8RDA) (Leach Facility)**

**Individual BADCT:** The 8-Series RDA is constructed over relatively low hydraulic conductivity natural geologic formations, using end dumping method of construction. The hydraulic conductivity of the bedrock underlying the RDA ranges from  $1.3 \times 10^{-4}$  cm/sec to  $3.4 \times 10^{-6}$  cm/sec. The side slopes of the RDA are formed at the angle of repose of the material deposited. Small concrete dams, keyed into bedrock, shall be located downgradient of the RDA for PLS collection.

**2.2.1.23 Suzie D Impoundment (C31) (Non-stormwater Impoundment)**

**Individual BADCT:** Facility C31 is an unlined non-storm water impoundment constructed in a natural drainage channel underlain by shallow alluvium and the Big Dome conglomerate with hydraulic conductivity ranging from  $5.5 \times 10^{-5}$  to  $4.0 \times 10^{-7}$  cm/sec. The Suzie D Impoundment cut-off wall will be keyed into existing rock Slope on the impoundment will be minimum 3 horizontal to 1 vertical (angle of repose). The Suzie D Impoundment will

receive pumped mine water from various sumps located on site. The main source of water will be mine water collected in the bottom of the Amanda Pit.

**2.2.1.24 Lower Suzie D Impoundment (C7) (Process Solution Impoundment)**

**Individual BADCT:** Facility C7 is an unlined impoundment of concrete/earthen structure keyed into bedrock (Big Dome conglomerate). To avoid overtopping, an HDPE overflow pipe shall be located 11 inches below the dam crest elevation. The overflow pipe conveys excess solution to the Big Dome Pond by gravity feed. The Big Dome Pond shall be operated with a minimum of 2 feet of freeboard.

**2.2.1.25 7A Dam (C7A.7) (Process Solution Impoundment)**

**Individual BADCT:** Impoundment comprised of a reinforced concrete wall keyed into bedrock a minimum of 5 feet. The impoundment is located in relatively low hydraulic conductivity (ranging from  $1.3 \times 10^{-4}$  to  $3.4 \times 10^{-6}$  cm/sec) natural geologic formations. The impoundments shall collect PLS at the toes of the associated RDAs. To avoid overtopping of the dams, an HDPE overflow pipe of sufficient diameter shall be located 25 inches below the dam crest elevations.

**2.2.1.26 Electrowinning Dam (C9) (Process Solution Impoundment)**

**Individual BADCT:** Facility C9 is an unlined impoundment, constructed behind a concrete/earthen dam and has a reinforced concrete headwall keyed into bedrock. The impoundment is located in a relatively low hydraulic conductivity geologic formation (Big Dome conglomerate) with an average hydraulic conductivity of  $3.4 \times 10^{-6}$  cm/sec. A concrete sump located about 100 feet downstream of the dam shall be designed to capture and pumpback any spillage from the EW Plant. EW Dam overflow is routed to the Lower Slimes Dam via gravity through an HDPE pipeline. A pumpback system shall be incorporated in the EW Building, immediately downgradient from the EW Dam to intercept any overflow from the dam.

**2.2.1.27 8 Series Pond (C3.3) (Process Solution Impoundment)**

**Individual BADCT:** Facility C3.3 is an unlined impoundment excavated within the alluvium. The bottom of the pond is comprised of man-made fill and alluvium/colluvium and has accumulated relatively low hydraulic conductivity slimes ( $1 \times 10^{-6}$  cm/sec) at the base of the impoundment. The pond shall collect PLS from the 8-Series RDA.

**2.2.1.28 7C Pond (C7C.2) (Process Solution Impoundment)**

**Individual BADCT:** Facility C7C.2 is an unlined pond constructed over relatively low hydraulic conductivity ( $1 \times 10^{-6}$  cm/sec) material at the base of the impoundment. Containment of surface or subsurface flows and run-off from the 100year 24hr storm event shall be provided by the Retention Basin located downstream within the confines of Sub-area C.

**2.2.1.29 7B Dam(C7B.1) (Process Solution Impoundment)**

**Individual BADCT:** Impoundment comprised of a reinforced concrete wall keyed into bedrock a minimum of 5 feet. The impoundment is located in relatively low hydraulic conductivity (ranging from  $1.3 \times 10^{-4}$  to  $3.4 \times 10^{-6}$  cm/sec) natural geologic formations. The impoundments shall collect PLS at the toes of the associated RDAs. To avoid overtopping of the dams, an HDPE overflow pipe of sufficient diameter shall be located 25 inches below the dam crest elevations.

**2.2.1.30 Upper Slimes Pond (C3) (Process Solution Impoundment)**

**Individual BADCT:** Facility C3 is constructed over Big Dome conglomerate with the bottom of the pond lined with low permeability ( $1 \times 10^{-6}$  cm/sec) slimes - leached residue slurry from the thickener tanks. Containment of surface or subsurface flows and the run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream

within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.

**2.2.1.31 Middle Slimes Dam (C3.2) (Process Solution Impoundment)**

**Individual BADCT:** Facility C3.2 is an impoundment created by a reinforced concrete headwall intercepting the drainage path immediately downstream of the toe of the fill embankment. The bottom of the pond is comprised of relatively low permeability ( $1 \times 10^{-6}$  cm/sec) fine grained slimes over Big Dome conglomerate with limited alluvium. The impoundment shall collect solution which seeps through the embankment of the Upper Slimes Pond. The solution from the impoundment is pumped to the SX-EW Plant. To avoid overtopping, an HDPE overflow pipe shall be located 3 feet 2 inches below the dam crest elevation to convey solution by gravity through the Lower Middle Slimes Pond to the Lower Slimes Dam.

**2.2.1.32 Middle Slimes Pond (C3.2b) (Process Solution Impoundment)**

**Individual BADCT:** Facility C3.2b is constructed over Big Dome conglomerate (average hydraulic conductivity of  $3.4 \times 10^{-6}$  cm/sec) with limited alluvium. An overflow pipe shall be located 2 feet below the crest of the Pond to convey solution to the Lower Slimes Dam by gravity-feed. Containment of surface and sub-surface flows and the run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.

**2.2.1.33 Lower Slimes Dam (C11) (Process Solution Impoundment)**

**Individual BADCT:** Facility C11 is an impoundment created by a concrete dam keyed into a relatively low hydraulic conductivity bedrock (Big Dome conglomerate with an average hydraulic conductivity of  $3.4 \times 10^{-6}$  cm/sec). To avoid overtopping, an HDPE overflow pipe shall be located 2 feet below the dam crest elevation. The overflow pipe conveys excess solution by gravity feed to the Big Dome Pond. The Big Dome Pond shall be operated with a minimum of 2 feet of freeboard.

**2.2.1.34 7C Dam (C7C.1) (Process Solution Impoundment)**

**Individual BADCT:** Impoundment comprised of a reinforced concrete wall keyed into bedrock a minimum of 5 feet. The impoundment is located in relatively low hydraulic conductivity (ranging from  $1.3 \times 10^{-4}$  to  $3.4 \times 10^{-6}$  cm/sec) natural geologic formations. The 7C Dam shall have a pumpback system located downgradient of the 7C Dam and the Big Dome Pond. The impoundment shall collect PLS at the toes of the associated RDAs. To avoid overtopping of the dams, an HDPE overflow pipe of sufficient diameter shall be located 25 inches below the dam crest elevation and 8 inches below the dam crest elevation of 7C Dam.

**2.2.1.35 Big and Little Dome Ponds and Truck Wash (C1) (Process Solution Impoundment)**

**Individual BADCT:** Facility C1 is comprised of two adjoining impoundments located in the Mineral Creek alluvium and is constructed using an 80-mil HDPE liner. The ponds shall be operated with a minimum of 2 feet of freeboard observed at the Big Dome Pond. The facilities shall impound mostly sewage treatment plant effluent and stormwater run-off and overflow from the 7-Series Dams, sulfide sump, Suzie D Dam and the Lower Slimes Dam. Two pumps shall be installed at the Big Dome Pond to transfer stormwater to either the open pit in Sub-area B or to the Retention Basin in Sub-area C. An additional diesel-generated pump shall be available at the Big Dome Pond in the event of emergency. Containment of surface and subsurface flows and the run-off from the 100-year, 24-hour storm event shall be provided by the Retention Basin, located downstream within the confines of Sub-area C, through a series of lined and unlined impoundments and concrete-lined side channels.

**2.2.1.36 7D Dam (C7D.1) (Process Solution Impoundment)**

**Individual BADCT:** Impoundment comprised of a reinforced concrete wall keyed into bedrock a minimum of 5 feet. The impoundment is located in relatively low hydraulic conductivity (ranging from  $1.3 \times 10^{-4}$  to  $3.4 \times 10^{-6}$  cm/sec) natural geologic formations. To minimize discharge at the 7D Dam, static head reduction shall be used such that the impoundment is operated with a fluid depth not to exceed 12 feet. The impoundment fluid level may be temporarily increased for solution management. To avoid overtopping of the dams, an HDPE overflow pipe of sufficient diameter shall be located 25 inches below the dam crest elevation.

**2.2.1.37 7E Raffinate Storage Pond (C34) (Process Solution Impoundment)**

**Individual BADCT:** Facility C34 is an impoundment located in the Mineral Creek alluvium and is constructed using an 80-mil HDPE liner over a 60 mil secondary liner. A Leachate Collection and Recovery System (LCRS) is provided by a geonet layer between the primary and secondary liner. PLS collects to a drainage aggregate layer at a lowpoint in the pond. A 10-inch HDPE pipe, carrying the 1.5 inch pump suction line, shall be used to penetrate the drainage aggregate and pump out any liquid collected in the sump. The facility shall be operated with a minimum of 2 feet of freeboard.

**2.2.1.38 Stacker Dam (C12) (Process Solution Impoundment)**

**Individual BADCT:** Facility C12 is an unlined impoundment, created behind a concrete dam and has a reinforced concrete headwall keyed into bedrock. The impoundment is located in a relatively low hydraulic conductivity geologic formation (Big Dome conglomerate) with an average hydraulic conductivity of  $3.4 \times 10^{-6}$ . To avoid overtopping, an HDPE overflow pipe shall be located 10 inches below the dam crest elevation. The overflow pipe conveys excess solution to the Goat Ranch Lined Pond (C20.1) by gravity feed. The Goat Ranch Lined Pond shall be operated with a minimum of 2 feet of freeboard. The facility shall collect PLS at the toe of the 8-Series RDA. The dam shall have a pump-back system and an emergency overflow catchment immediately downstream.

**2.2.1.39 Retention Basin (C35) (Non-Stormwater Impoundment)**

**Individual BADCT:** Facility C35 is an unlined impoundment constructed with an earthen embankment. The earthen embankment is comprised of the following components:

- A 15 foot wide low permeability (hydraulic conductivity equal to or less than  $1 \times 10^{-6}$  cm/sec) core wall constructed into bedrock;
- A minimum of 5 foot wide chimney drain fill, upgradient of the low permeability core wall;
- Two vertical riser pipes installed into the chimney drain material to facilitate dewatering of the embankment fill and alluvium;
- Riprap (D50 = 2 ft) on the upstream and downstream faces of the embankment to reduce the erosion potential; and
- The ogee portion of the embankment crest is lined with concrete to limit erosion of the clay core material.

**2.2.1.40 Goat Ranch Lined Pond (C20.1) (Process Solution Impoundment)**

**Individual BADCT:** Facility C20.1 is a single-lined impoundment using geosynthetic-clay liner (GCL). The impoundment is underlain by the Mineral Creek alluvium with a hydraulic conductivity of  $1.33 \times 10^{-3}$  cm/sec. The facility shall receive solutions from the Stacker Dam, 7D Dam and Big Dome Pond via gravity through HDPE pipelines. The impoundment shall have sufficient capacity to contain the stormwater runoff from the 100-year, 24-hour storm event, with a minimum of 2 feet of freeboard.

**2.2.1.41 Elder Gulch Tailings Facility (C36) (Tailings Impoundment)**

**Individual BADCT:** Facility C36 is constructed above a rockfill dam and is constructed, operated, and monitored as described and depicted in the October 25, 2010 AMEC Earth and

Environmental “ASARCO LLC Ray Mine Complex, Elder Gulch TSF Expansion Final Report” and the January 10, 2011 AMEC Earth and Environmental “ASARCO LLC Ray Mine Complex, Elder Gulch TSF Expansion Operation, Maintenance, and Surveillance Manual.” A high capacity granular drain system placed in the main drainages beneath the rockfill dam and impoundment consists of ½” – 3” drain rock over sand and gravel filter over 100-mil HDPE liner. Underdrains in the dam embankment from the final upstream toe of the dam to the seepage collection pond shall be lined with textured 100-mil HDPE. Underdrains beyond the final upstream toe will not be lined.

**2.2.1.42 Tailings Thickener (C37) (Process Solution Impoundment)**

**Individual BADCT:** Facility C37 consists of a 400-foot diameter tailings thickener. The thickener is underlain with 60-mil HDPE and has a peripheral lined berm to contain the entire contents of the thickener.

**2.2.1.43 Seepage Collection Pond (C38) (Non-Stormwater Impoundment)**

**Individual BADCT:** Facility C38 shall be constructed to contain 8.3-acre feet from the underdrain channels, and surface runoff. Liner design consists of an 80-mil HDPE liner placed over a 2-foot-thick silty (and slightly clayey sand layer), compacted to 95 percent of maximum dry density. Accumulated fluids are pumped to process water storage tanks. An HDPE lined spillway conveys emergency overflow to a 15-ac ft unlined impoundment.

**2.2.1.44 Contact Stormwater Pond (C39) (Non-Stormwater Impoundment)**

**Individual BADCT:** Facility C39 shall be constructed to contain all runoff from the drainage channels during a 24-hour/100 year flood event. Liner design consists of a two-foot thick silty and slightly clayey sand layer compacted to 95 percent of maximum dry density and located downgradient of the starter dam.

**2.2.1.45 Tailings Booster Station 1 Pond (C40) (Process Solution Impoundment)**

**Individual BADCT:** Facility C40 is a 60-mil HDPE lined temporary containment area to drain the tailings line in case of shutdown shall be constructed to retain gravity backflow from the tailings pipeline between the thickeners and the floatation cell.

**2.2.1.46 Tailings Booster Station 2 Ponds (C41) (Process Solution Impoundment)**

**Individual BADCT:** Facility C41 consists of an initial and overflow impoundment connected by three 24-inch HDPE pipes. The initial pond is fitted with a 60-mil HDPE liner and the overflow pond is fitted with an 80 mil HDPE liner.

**2.2.1.47 Mill Pond (C32) (Non-Stormwater Impoundment)**

**Individual BADCT:** Facility C32 is a lined impoundment constructed over a compacted subgrade. The pond collects contact stormwater from the mill area. This facility is constructed with 2 Horizontal: 1 Vertical side slopes. The impoundment volume is approximately 3,802,890 gallons with total operational depth of 10 feet. The pond shall be operated with a minimum of 2 feet of freeboard.

**2.2.1.48 Tank No. 11 (C46)**

**Individual BADCT:** Tank No. 11 shall be lined with 80-mil HDPE liner along the concrete walls and concrete base. The HDPE liner shall be adhered to the tank walls with a tack coat and the end seams shall be welded to the tank walls. The liner shall extend approximately 7 feet onto the concrete tank floor, tacked and welded to secure the liner to the bottom of the tank. A stainless steel batten bar shall be installed along the top edge of the exterior wall, and the bottom of the interior wall. Following installation of the HDPE liner, three coats of VT-40 polyurea sealant shall be applied. There shall be a 2 foot overlap of the polyurea sealant onto the HDPE liner and the existing asphalt tank floor.

### **2.2.2 Site-specific Characteristics**

The passive containment created by the Ray Open Pit has been deemed to satisfy the requirements of A.R.S. § 49-243(G). The passive containment created by the open pit is hydrologically isolated to the extent that it does not allow pollutant migration from within the capture zone. This passive containment is an integral part of the BADCT for all facilities located within Sub-Area B, which is defined by the capture zone. Due to the isolated nature, within the Mineral Creek Basin, of the facilities located in Sub-Area A, any groundwater flow originating from Sub-Area A will flow into the capture zone of the passive containment created by the open pit, and the passive containment is therefore also an integral part of the BADCT for the facilities located within Sub-Area A. BADCT evaluation of the existing facilities located in Sub-Area C involved the following factors:

Current discharge control technology (DCT) and site factors;  
Aquifer loading;  
Technically feasible alternative DCTs; and,  
Cost vs. discharge reduction.

### **2.2.3 Pre-operational Requirements**

Prior to introduction of raffinate to Tank No. 11, a hydrostatic test shall be conducted as per the compliance schedule in Section 3.0. The test shall consist of filling the tank with water or raffinate to approximately 3 feet deep, and allowing it to stand for a minimum of 24 hours. If after, 24 hours, there is a drop in water level of greater than 1 inch, the tank shall be filled to original 3 feet water depth and held for 1 hour. After 1 hour of hold time, if there is a drop in water level of greater than 1 inch, additional testing and repairs shall be completed. This test shall be conducted by a third party contractor.

### **2.2.4 Operational Requirements**

1. The pollution control structures shall be inspected for the items listed in Section 4.2, Tables 4.2.1, 4.2.2 and 4.2.3 Facility Inspection (Operational Monitoring).
2. If any damage of the pollution control structures that could cause or contribute to an unauthorized discharge is identified during inspection, proper repair procedures shall be performed. All repair procedures and materials used shall be documented in the facility log book as per Section 2.7.2 and reported to ADEQ in the event of a violation or exceedance as per Section 2.7.3.

## **2.3 Discharge Limitations [A.R.S. §§ 49-201(14), 49-243 and A.A.C. R18-9-A205(B)]**

The permittee shall operate and maintain all permitted facilities listed below to prevent unauthorized discharges pursuant to A.R.S. § 49-201(12) resulting from failure or bypassing of BADCT pollutant control technologies including liner failure<sup>1</sup>, uncontrollable leakage, overtopping (e.g., exceeding the maximum storage capacity, defined as a fluid level exceeding the crest elevation of a permitted impoundment), berm breaches that result in an unexpected loss of fluid, or accidental spills. The discharge limitations in this section are not applicable to any discharge caused by precipitation in excess of the 100-year/24 hour storm event or process overflow during a power outage exceeding 24 hours in duration.

See Section 2.6.3 regarding specific contingency actions to be taken in the event of a discharge limitation exceedance.

The permittee shall not allow overtopping by exceeding the maximum storage capacity of permitted impoundments or ponds and shall maintain the design freeboard in each during operation. During

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<sup>1</sup> Liner failure in a single-lined impoundment is any condition that would result in leakage exceeding 550 gallons per day per acre.

unusual conditions, such as, but not limited to, storm events in excess of the design storm, the permittee shall implement appropriate emergency measures referred to in the contingency plan, Section 2.6.

**2.3.1 Rock Deposition Areas (RDAs)**

The RDAs are designed and authorized for use in leaching of ore. The RDAs shall be constructed and operated in accordance with the BADCT outlined in Section 2.2.1, Facility list and BADCT description, and the ultimate heights shall not exceed those listed in Section 2.1 and Table 4.1.1.

**2.3.2 Process Solution Impoundments**

The Process Solution Impoundments are designed and authorized to receive raffinate, pregnant leach solution (PLS), stormwater, process water, seepage and process upset events.

Sub Area A	Sub Area C (cont.)
9 North Sump (A27)	8 Series Pond (C3.3)
4F Impoundment (A28)	7C Pond (C7C.2)
9 Sump (A4D.3)	7B Dam (C7B.1)
<b>Sub Area B</b>	Upper Slimes Pond (C3)
1B Dam (Sulfide Sump) (B1B.1)	Middle Slimes Dam (C3.2)
1A Dam (B1A.2)	Middle Slimes Pond (C3.2b)
Concentrator Non-Stormwater Pond (B1A.3)	Lower Slimes Dam (C11)
PM Bay Sump and Truck Wash (B1A.4)	7C Dam (C7C.1)
Ray Concentrator Collection Pond (B5)	Big and Little Dome Ponds and Truck Wash (C1)
Dalton's Pond (B4.1)	7D Dam (C7D.1)
<b>Sub Area C</b>	7E Raffinate Storage Pond (C34)
Lower Suzie D Impoundment (C7) )	Stacker Dam (C12)
7A Dam (C7A.7)	Goat Ranch Lined Pond (C20.1)
Electrowinning Dam (C9)	Tailings Booster Station 1 Pond (C40)
Tank No. 11	Tailings Booster Station 2 Ponds (C41)
	Tailings Thickener (C37)

**2.3.3 Non-Stormwater Impoundments**

The Non-Stormwater Ponds and Impoundments are designed and authorized to receive stormwater runoff and run-on, seepage, pit water, and process solutions as a result of storm events or process upset events.

Sub Area A	Sub Area C
None	Suzie D Impoundment (C31)
	Retention Basin (C35)
<b>Sub Area B</b>	Seepage Collection Pond (C38)
Last Turn Stormwater Diversion Channel (B29)	Contact Stormwater Pond (C39)
10 Pond (B33)	Mill Pond (C32)

**2.3.4 Tailings Thickener (C37)**

The Tailings Thickener is restricted to receiving only tailings material from the Ray Concentrator.

**2.3.5 Elder Gulch Tailings Facility (C36)**

The permittee is restricted to a maximum deposition of 65,400 tpd, by dry weight of tailings from the Ray Operations' copper flotation process. Total deposition of tailings over the life of the facility shall not cause the ultimate dam height to exceed an elevation of 2,590 feet above mean sea level.

If the permittee wishes to deposit a greater quantity of tailings, or modify the ultimate height of the dam, the permittee shall apply for a permit amendment pursuant to Section 6.9.

All tailings deposited at the Elder Gulch Tailings Facility (C36) shall be derived from the flotation process at the Ray Concentrator.

**2.4 Point of Compliance [A.R.S. § 49-244]**

The Point of Compliance (POCs) are established by the following monitoring location:

POC Locations	ADWR Registration Number	Latitude (North)	Longitude (West)
R-18	55-534853	33° 07' 34"	110° 58' 35"
R-19	55-534852	33° 07' 34"	110° 58' 35"
R-22	55-543974	33° 07' 33"	110° 58' 36"
R-2	55-525710	33° 07' 17.3"	110° 58' 14.9"
R-2a	55-533677	33° 07' 09.8"	110° 57' 53.7"
R-3	55-525711	33° 07' 07.5"	110° 57' 32.3"
R-4	55-525712	33° 07' 03.9"	110° 57' 07.0"
R-4a	55-534346	33° 07' 40.8"	110° 56' 56.3"

Groundwater monitoring is required at the point of compliance well(s) in Section 4.2, Table 4.2.4 for Quarterly Compliance Monitoring and Table 4.2.5 for Biennial Compliance Monitoring.

The Director may amend this permit to designate additional points of compliance if information on groundwater gradients or groundwater usage indicates the need.

**2.5 Monitoring Requirements [A.R.S. § 49-243(B) and (K)(1), A.A.C. R18-9-A206(A)]**

Unless otherwise specified in this permit, all monitoring required in this permit shall continue for the duration of the permit, regardless of the status of the facility. Unless otherwise provided, monitoring shall commence the first full monitoring period following permit issuance. All sampling, preservation and holding times shall be in accordance with currently accepted standards of professional practice. Trip blanks, equipment blanks and duplicate samples shall also be obtained, and Chain-of-Custody procedures shall be followed, in accordance with currently accepted standards of professional practice. Copies of laboratory analyses and Chain-of-Custody forms shall be maintained at the permitted facility. Upon request, these documents shall be made immediately available for review by ADEQ personnel.

**2.5.1 Routine Discharge Monitoring**

None required by this permit.

**2.5.2 Facility / Operational Monitoring**

The operational monitoring requirements for the facilities referenced in Section 2.2.1 are listed in Section 4.2, Tables 4.2.1, 4.2.2, and 4.2.3.

**2.5.3 Groundwater Monitoring and Sampling Protocols**

Static water levels shall be measured and recorded prior to sampling. ASARCO may conduct groundwater monitoring and sampling using one or a combination of the following methods:

1. Wells shall be purged of at least three borehole volumes (as calculated using the static water level) or until field parameters (pH, temperature, conductivity) are stable, whichever represents the greater volume.
2. Using the low-flow purging method as described in the Arizona Water Resources Research Center, March 1995 *Field Manual for Water Quality Sampling*. The well must be purged until indicator parameters stabilize. Indicator parameters include pH, temperature, and conductivity.

If evacuation results in the well going dry, the well shall be allowed to recover to 80 percent of the original borehole volume, or for 24 hours, whichever is shorter, prior to sampling. If after 24 hours

there is not sufficient water for sampling, the well shall be recorded as “dry” for the monitoring event. An explanation for reduced pumping volumes, a record of the volume pumped, and modified sampling procedures shall be reported and submitted with the Self-monitoring Report Form (SMRF).

#### **2.5.3.1 POC Well Replacement**

In the event that one or more of the designated POC wells should become unusable or inaccessible due to damage, exceedance of an alert level (AL) for water level as required by Section 2.6.2.3.4(3), or any other event, a replacement POC well shall be constructed and installed upon approval by ADEQ. If the replacement well is fifty feet or less from the original well, the ALs and/or aquifer quality limits (AQLs) calculated for the designated POC well shall apply to the replacement well. Otherwise the ALs and/or AQLs shall be set following the provisions in Sections 2.5.3.2 and 2.5.3.3 of this permit.

#### **2.5.3.2 Alert Levels for POC Wells**

Alert levels shall be calculated for all parameters identified in Section 4.2, Tables 4.2.4 and 4.2.5 for which a numeric aquifer water quality standard (AWQS) has been adopted and that is identified as “reserved”. To document the ambient sampling program, the permittee shall submit the ambient groundwater monitoring data in tabulated form to the ADEQ APP Program for review. Copies of all laboratory analytical reports, field notes, the Quality Assurance/Quality Control (QA/QC) procedures used in collection and analysis of the samples, and a report including the statistical calculation of the Alert Levels (ALs) and Aquifer Quality Limits (AQLs) for all parameters required in Section 4.2, Tables 4.2.4 and 4.2.5, shall be included. The permittee may submit a report with the calculations for each AL and AQL included in the permit for review and approval by ADEQ, or the permittee may defer calculation of the ALs and AQLs to the Groundwater Section (GWS). The ALs shall be established and calculated by the following formula, or another valid statistical method submitted to the GWS in writing and approved for this permit by the GWS.

$$AL = M + KS$$

Where M = mean, S= standard deviation, and K = one-sided normal tolerance interval with a 95% confidence level (Lieberman, G.J. (1958) Tables for One-sided Statistical Tolerance Limits: Industrial Quality Control, Vol. XIV, No. 10). Obvious outliers should be excluded from the data used in the AL calculation.

The following criteria shall be met in establishing ALs for new wells in the permit:

1. The AL will be calculated for a parameter using the analyses from a minimum of eight consecutive quarterly sample rounds. Subject to ADEQ approval, additional rounds of sampling may be requested by the Permittee.
2. Any data where the PQL exceeds 80% of the AWQS shall not be included in the AL calculation.
3. If a parameter is below the detection limit, the permittee must report the value as “less than” the numeric value for the PQL or detection limit for the parameter, not just as “non-detect”. For those parameters, the permittee shall use a value of one-half the reported detection limit for the AL calculation.
4. If the analytical results from more than 50% of the samples for a specific parameter are non-detect, then the AL shall be set at 80% of the AWQS.
5. If the calculated AL for a specific constituent and well is less than 80% of the AWQS, the AL shall be set at 80% of the AWQS for that constituent in that well.

#### **2.5.3.3 Aquifer Quality Limits for POC Wells**

AQLs shall be established in the permit for all parameters identified in Section 4.2, Tables 4.2.4 and 4.2.5 for which a numeric AWQS has been adopted and that is identified as “reserved”. For each required parameter in each individual POC well, the AQL shall be established as follows:

1. If the calculated AL is less than the AWQS, then the AQL shall be set equal to the AWQS.
2. If the calculated AL is greater than the AWQS, then the AQL shall be set equal to the calculated AL value, and no AL shall be set for that constituent at that monitoring point.

#### **2.5.4 Surface Water Monitoring and Sampling Protocols**

Routine surface water monitoring is not required under the terms of this permit.

#### **2.5.5 Analytical Methodology**

All samples collected for compliance monitoring shall be analyzed using Arizona state-approved methods. If no state-approved method exists, then any appropriate EPA-approved method shall be used. Regardless of the method used, the detection limits must be sufficient to determine compliance with the regulatory limits of the parameters specified in this permit. If all methods have detection limits higher than the applicable limit, the permittee shall follow the contingency requirements of Section 2.6 and may propose "other actions" including amending the permit to set higher limits. Analyses shall be performed by a laboratory licensed by the Arizona Department of Health Services, Office of Laboratory Licensure and Certification, unless exempted under A.R.S. § 36-495.02. For results to be considered valid, all analytical work shall meet quality control standards specified in the approved methods. A list of Arizona state-certified laboratories can be obtained at the address below:

Arizona Department of Health Services  
Office of Laboratory Licensure and Certification  
250 North 17<sup>th</sup> Avenue  
Phoenix, Arizona 85007  
Phone: (602) 364-0720

#### **2.5.6 Installation and Maintenance of Monitoring Equipment**

Monitoring equipment required by this permit shall be installed and maintained so that representative samples required by the permit can be collected. If new groundwater wells are determined to be necessary, the construction details shall be submitted to the Groundwater Section for approval prior to installation and the permit shall be amended to include any new monitoring points.

#### **2.5.7 Compliance Groundwater Quality Monitoring for POCs**

Quarterly compliance groundwater monitoring in each POC well shall commence within the first calendar quarter after completion of the ambient groundwater sampling period. The parameters to be analyzed for quarterly compliance monitoring are listed in Section 4.2, Table 4.2.4. In addition to quarterly compliance groundwater monitoring for parameters listed in Section 4.2, Table 4.2.4 for POC wells; an extended list of parameters shall be monitored at POC wells R-18, R-19 and R-22 once every two years (biennial). For the biennial monitoring events, the additional parameters listed in Section 4.2, Table 4.2.5 shall be analyzed. The biennial sampling parameters shall be in addition to the regularly scheduled quarterly sampling parameters.

#### **2.5.8 Passive Containment Demonstration**

Based on supporting documentation provided in the Application, the permittee has satisfactorily predicted that the Ray open-pit mine will create a passive containment capture zone, as per A.R.S. § 49-243(G). A post-audit of the approved groundwater flow model shall be conducted by December 18, 2013 (5 years from the date of issuance of the original permit) and every 5 years thereafter. The results of the post-audit shall be submitted to the ADEQ GWS for review in a report that summarizes the original passive containment demonstration and any updates or revisions made to the model. Factors to be evaluated in the post-audit include groundwater inflow, the estimated static water level in the pit, the estimated time to reach static water level, and any potential for the water level in the pit to rise to an elevation where the hydraulic gradient reverses and the pit ceases to function as a

hydrologic sink. The report shall include a table listing groundwater elevations from piezometer and monitor wells current at the time of the post-audit, used to demonstrate the configuration of the passive containment, and a potentiometric contour map based on groundwater elevations used in the post-audit passive containment demonstration.

Every five years thereafter (beginning on December 18, 2018), the permittee shall compare the current groundwater data to the previous model predictions. The assumptions about mine development and infiltration shall be reviewed in terms of the actual changes in pit configuration, leaching areas, leach rates, sump locations, water balance, annual precipitation and storm events. The resulting compilation shall be compared to predictions provided by the groundwater flow model for the previous calibration period. A report summarizing the original passive containment demonstration and the revisions made to the model shall be submitted to the ADEQ GWS for review. Each post-audit report shall include a revised table of groundwater elevation for the piezometer and monitor wells used in the demonstration and a revised potentiometric contour map for the passive containment capture area. ADEQ will determine whether a full model recalibration is required. If a recalibration is necessary, a report summarizing the revisions and/or changes to the model shall be submitted to the ADEQ GWS.

## **2.6 Contingency Plan Requirements**

**[A.R.S. § 49-243(K)(3), (K)(7) and A.A.C. R18-9-A204 and R18-9-A205]**

### **2.6.1 General Contingency Plan Considerations**

At least one copy of this permit and the approved contingency and emergency response plan submitted in the application on August 16, 2012, shall be maintained at the location where day-to-day decisions regarding the operation of the facility are made. The permittee shall be aware of and follow the contingency and emergency plans.

Any AL exceedance or any violation of an AQL, DL, or other permit condition shall be reported to ADEQ following the reporting requirements in Section 2.7.3, unless more specific reporting requirements are set forth in Sections 2.6.2 through 2.6.5.

Some contingency actions involve verification sampling. Verification sampling shall consist of the first follow-up sample collected from a location that previously indicated a violation or the exceedance of an AL. Collection and analysis of the verification sample shall use the same protocols and test methods to analyze for the pollutant or pollutants that exceeded an AL or violated an AQL. Where verification sampling is specified in this permit, it is the option of the permittee to perform such sampling. If verification sampling is not conducted within the timeframe allotted, ADEQ and the permittee shall presume the initial sampling result to be confirmed as if verification sampling had been conducted.

The permittee is responsible for compliance with contingency plans relating to the exceedance of an AL or violation of a DL, AQL or any other permit condition. The permittee is subject to enforcement action for the failure to comply with any contingency actions in this permit.

### **2.6.2 Exceeding of Alert Levels and Performance Levels**

#### **2.6.2.1 Exceeding of Performance Levels Set for Operational Conditions**

##### **1. Performance Levels Set for Freeboard**

In the event that freeboard performance levels in a surface impoundment as specified in Section 2.2.1 and Tables 4.2.1, 4.2.2, and 4.2.3 are not maintained, the permittee shall:

- a. As soon as practicable, cease or reduce discharging to the impoundment to prevent overtopping. Remove and properly dispose or recycle to other operations the excess fluid in the impoundment until the water level is restored at or below the permitted freeboard limit.
- b. Within 5 days of discovery, evaluate the cause of the incident and adjust operational

conditions as necessary to avoid future occurrences.

- c. Record in the facility log, the amount of fluid removed, a description of the removal method, and the disposal arrangements. The facility log shall be maintained according to Section 2.7.2 (Operational Inspection / Log Book Recordkeeping). Record each freeboard incident and actions taken and notify ADEQ through inclusion in the annual report required by part 2.7.4.
- d. The facility is no longer on alert status once the operational indicator no longer indicates that the freeboard performance level is being exceeded. The permittee shall, however, complete all tasks necessary to return the facility to its pre-alert operating condition.

#### **2.6.2.2 Exceeding of Alert Levels (ALs) Set for Discharge Monitoring**

##### **2.6.2.2.1 Alert Levels for Indicator Parameters**

Not applicable.

##### **2.6.2.2.2 Alert Levels for Pollutants with Numeric Aquifer Water Quality Standards**

1. If an AL for a pollutant set in Section 4.2, Table 4.2.4 or 4.2.5 has been exceeded, the permittee shall request that the laboratory verify the sample results within five (5) days. If the analysis does not confirm that an exceedance has occurred, the permittee may assume that there is no exceedance and no further action is required under this subsection. If the exceedance is confirmed, the permittee may conduct verification sampling for that parameter within 5 days of becoming aware of an AL exceedance. The permittee may use the results of another sample taken between the date of the last sampling event and the date of receiving the result as verification.
- 2(a). If verification sampling confirms the AL exceedance or if the permittee opts not to perform verification sampling, then the permittee shall increase the frequency of monitoring for that parameter to monthly. In addition, the permittee shall immediately initiate an investigation of the cause of the AL exceedance, including inspection of all relevant discharging facilities and related pollution control devices, review of any operational and maintenance practices that might have resulted in an unexpected discharge, and hydrologic review of groundwater conditions including upgradient water quality from existing wells.
- 2(b). If the verification sample does not confirm that an exceedance has occurred, the permittee shall notify ADEQ of the results and assume there has been no exceedance. No further action will then be required under this subsection.
3. The permittee shall initiate actions identified in the approved contingency plan referenced in Section 3.0 and specific contingency measures identified in Section 2.6 to resolve any problems identified by the investigation which may have led to an AL exceedance. To implement any other corrective action the permittee shall obtain prior approval from ADEQ according to Section 2.6.6. Alternatively, the permittee may submit a technical demonstration, subject to written approval by the Groundwater Section, that although an AL is exceeded, pollutants are not reasonably expected to cause a violation of an AQL. The demonstration may propose a revised AL or monitoring frequency for approval in writing by the Groundwater Section.
4. Within 30 days after confirmation of an AL exceedance, the permittee shall submit the laboratory results to the Water Quality Compliance Section along with a summary of the findings of the investigation, the cause of the AL exceedance, and actions taken to resolve the problem.

5. Upon review of the submitted report, the Department may amend the permit to require additional monitoring, increased frequency of monitoring, or other actions.
6. The increased monitoring required as a result of an AL exceedance may be reduced to the regular frequency, if the results of three (3) sequential sampling events demonstrate that no parameters exceed the AL.
7. If the increased monitoring required as a result of an AL exceedance continues for more than six (6) sequential sampling events, the permittee shall submit a second (2<sup>nd</sup>) report documenting an investigation of the continued AL exceedance within 30 days of the receipt of laboratory results of the sixth (6<sup>th</sup>) sampling event.

**2.6.2.2.3 Alert Levels to Protect Downgradient Users from Pollutants without Numeric Aquifer Water Quality Standards**

Not applicable.

**2.6.3 Discharge Limitations Violations**

**2.6.3.1 Liner Failure, Containment Structure Failure, or Unexpected Loss of Fluid For a Reason other than Overtopping**

In the event of liner failure, containment structure failure, or unexpected loss of fluid as described in Section 2.3, the permittee shall take the following actions:

1. As soon as practicable, cease or minimize all discharges to the surface impoundment as necessary to prevent any further releases to the environment.
2. Within 24-hours of discovery, notify ADEQ Water Quality Compliance Section.
3. Within five days of discovery of a failure that resulted in a discharge to the subsurface, collect representative samples of the fluid remaining in the surface impoundment. Samples shall be analyzed for the parameters specified in Section 4.2, Table 4.2.4. Within 30 days of the incident, submit a copy of the analytical results to ADEQ Water Quality Compliance Section.
4. Within 15 days of discovery, initiate an evaluation to determine the cause for the incident. Identify the circumstances that resulted in the failure and assess the condition of the surface impoundment and liner system. Implement corrective actions as necessary to resolve the problems identified in the evaluation. Initiate repairs to any failed liner, system, structure, or other component as needed to restore proper functioning of the surface impoundment. The permittee shall not resume discharging to the surface impoundment until repairs of any failed liner or structure are performed. Repair procedures, methods, and materials used to restore the system(s) to proper operating condition shall be described in the facility log/recordkeeping file and available for ADEQ review.
5. As soon as practicable, remove fluid remaining in the surface impoundment as necessary to prevent further releases to the subsurface and/or to perform repairs. Record in the facility log/recordkeeping file the amount of fluid removed, a description of the removal method, and other disposal arrangements. The facility log/recordkeeping file shall be maintained according to Section 2.7.2 (Operation Inspection / Log/Recordkeeping File).
6. Within 30 days of discovery of the incident, submit a report to ADEQ as specified in Section 2.7.3.2 (Permit Violation and AL Status Reporting). Include a description of the actions performed in Subsections 1 through 5 listed above. Upon review of the report, ADEQ may request additional monitoring or remedial actions.
7. Within 60 days of discovery, conduct an assessment of the impacts to the subsoil and/or groundwater resulting from the incident. If soil or groundwater is impacted such that it could cause or contribute to an exceedance of an AQL at the applicable point of compliance, submit to ADEQ, for approval, a corrective action plan to address such

impacts, including identification of remedial actions and/or monitoring, and a schedule for completion of activities. At the direction of ADEQ, the permittee shall implement the approved plan.

8. Within 30 days of completion of corrective actions, submit to ADEQ, a written report as specified in section 2.6.6 (Corrective Actions). Upon review of the report, ADEQ may amend the permit to require additional monitoring, increased frequency of monitoring, amendments to permit conditions, or other actions.

### **2.6.3.2 Overtopping of a Surface Impoundment**

If overtopping of fluid from a permitted surface impoundment occurs, and results in a discharge pursuant to A.R.S. § 49-201(12), the permittee shall:

1. As soon as practicable, cease or minimize all discharges to the surface impoundment to prevent any further releases to the environment.
2. Within 24-hours of discovery, notify ADEQ Water Quality Compliance Section.
3. Within five days, collect representative samples of the fluid contained in the surface impoundment. Samples shall be analyzed for the parameters specified in Section 4.2, Table 4.2.4. Within 30 days of the incident, submit a copy of the analytical results to ADEQ Water Quality Compliance Section.
4. As soon as practicable, remove and properly dispose of excess water in the impoundment until the water level is restored at or below the appropriate freeboard as described in Section 2.2. Record in the facility log, the amount of fluid removed, a description of the removal method, and the disposal arrangements. The facility log/recordkeeping file shall be maintained according to Section 2.7.2 (Operation Inspection / Log/Recordkeeping File).
5. Within 30 days of discovery, evaluate the cause of the overtopping and identify the circumstances that resulted in the incident. Implement corrective actions and adjust operational conditions as necessary to resolve the problems identified in the evaluation. Repair any systems as necessary to prevent future occurrences of overtopping.
6. Within 30 days of discovery of overtopping, submit a report to ADEQ as specified in section 2.7.3.2 (Permit Violation and AL Status Reporting). Include a description of the actions performed in Subsections 1 through 5 listed above. Upon review of the report, ADEQ may request additional monitoring or remedial actions.
7. Within 60 days of discovery, and based on sampling in Subsection 3 above, conduct an assessment of the impacts to the subsoil and/or groundwater resulting from the incident.
8. If soil or groundwater is impacted such that it could cause or contribute to an exceedance of an AQL at the applicable point of compliance, submit to ADEQ for approval, a corrective action plan to address such impacts, including identification of remedial actions and/or monitoring, and a schedule for completion of activities. At the direction of ADEQ, the permittee shall implement the approved plan.
9. Within 30 days of completion of corrective actions, submit to ADEQ, a written report as specified in Section 2.6.6 (Corrective Actions). Upon review of the report, ADEQ may amend the permit to require additional monitoring, increased frequency of monitoring, amendments to permit conditions, or other actions.

### **2.6.3.3 Inflows of Unexpected Materials to a Surface Impoundment**

The types of materials that are expected to be placed in the permitted surface impoundments are specified in Section 2.3 (Discharge Limitations). If any unexpected materials flow to a permitted surface impoundment, the permittee shall:

1. As soon as practicable, cease all unexpected inflows to the surface impoundment(s).
2. Within 24-hours of discovery, notify ADEQ Water Quality Compliance Section.
3. Within five days of the incident, identify the source of the material and determine the cause for the inflow. Characterize the unexpected material and contents of the affected

impoundment, and evaluate the volume and concentration of the material to determine if it is compatible with the surface impoundment liner. Based on the evaluation of the incident, repair any systems or equipment and/or adjust operations, as necessary to prevent future occurrences of inflows of unexpected materials.

4. Within 30 days of an inflow of unexpected materials, submit a report to ADEQ as specified in section 2.7.3.2 (Permit Violation and AL Status Reporting). Include a description of the actions performed in Subsections 1 through 3 listed above. Upon review of the report, ADEQ may request additional monitoring or remedial actions.
5. Upon review of the report, ADEQ may amend the permit to require additional monitoring, increased frequency of monitoring, amendments to permit conditions, or other actions.

#### **2.6.3.4 Exceeding of Discharge Limitation for Tailings Deposition Rate**

1. If the DL set in Section 2.3.5 has been exceeded, the permittee shall immediately investigate to determine the cause of the DL being exceeded. The investigation shall include a review of recent process logs, reports, and other operational control information to identify the cause of the exceedance.
2. The permittee shall initiate actions to return to compliance with the DL as soon as practicable.
3. Within 30 days of a DL being exceeded, the permittee shall submit to the ADEQ Water Quality Compliance Section, a summary of the findings of the investigation, the cause of the DL being exceeded, and actions taken to resolve the problem.
4. Upon review of the submitted report, the Department may amend the permit to require additional monitoring, increased frequency of monitoring, amendments to permit conditions or other actions.

#### **2.6.4 Aquifer Quality Limit Violation**

1. If an AQL set in Section 4.2, Table 4.2.3 and 4.2.4 has been exceeded, the permittee shall request that the laboratory verify the sample results within five (5) days. If the analysis does not confirm that an exceedance has occurred, the permittee may assume that there is no exceedance and no further action is required under this subsection. If the exceedance is confirmed, the permittee may conduct verification sampling for the parameter within 5 days of becoming aware of an AQL exceedance. The permittee may use the results of another sample taken between the date of the last sampling event and the date of receiving the result as verification.
- 2(a). If verification sampling confirms that the AQL is violated for the parameter or if the permittee opts not to perform verification sampling, then the permittee shall increase the frequency of monitoring to monthly. In addition, the permittee shall immediately initiate an evaluation for the cause of the violation, including inspection of all relevant discharging units and related pollution control devices, and review of any operational and maintenance practices that might have resulted in unexpected discharge.

The permittee also shall submit a report according to Section 2.7.3, which includes a summary of the findings of the investigation, the cause of the violation, and actions taken to resolve the problem. A verified exceedance of an AQL will be considered a violation unless the permittee demonstrates within 30 days that the exceedance was not caused or contributed to by pollutants discharged from the facility. Unless the permittee has demonstrated that the exceedance was not caused or contributed to by pollutants discharged from the facility, the permittee shall consider and ADEQ may require corrective action that may include control of the source of discharge, cleanup of affected soil, surface water or groundwater, and mitigation of the impact of pollutants on existing uses of the aquifer. Corrective actions shall either be specifically identified in this permit, included in an ADEQ approved contingency plan, or separately approved according to Section 2.6.6.

- 2(b). If the verification sample does not confirm that an exceedance has occurred, the permittee shall

notify ADEQ of the results and assume there has been no exceedance. No further action will then be required under this subsection.

3. Upon review of the submitted report, the Department may amend the permit to require additional monitoring, increased frequency of monitoring, or other actions.
4. The permittee shall notify any downstream or down-gradient users who may be directly affected by the discharge.
5. The increased monitoring required as a result of an AQL exceedance may be reduced to the regular frequency, if the results of three (3) sequential sampling events demonstrate that no parameters exceed the AL.

**2.6.5 Emergency Response and Contingency Requirements for Unauthorized Discharges pursuant to A.R.S. §49-201(12) and pursuant to A.R.S. § 49-241 that are not addressed elsewhere in Section 2.6**

**2.6.5.1 Duty to Respond**

The permittee shall act immediately to correct any condition resulting from a discharge pursuant to A.R.S. § 49-201(12) if that condition could pose an imminent and substantial endangerment to public health or the environment.

**2.6.5.2 Discharge of Hazardous Substances or Toxic Pollutants**

In the event of any unauthorized discharge pursuant to A.R.S. § 49-201(12) of suspected hazardous substances (A.R.S. § 49-201(19)) or toxic pollutants (A.R.S. § 49-243(I)) on the facility site, the permittee shall promptly isolate the area and attempt to identify the discharged material. The permittee shall record information, including name, nature of exposure and follow-up medical treatment, if necessary, on persons who may have been exposed during the incident. The permittee shall notify the Groundwater Section within 24 hours of discovering the discharge of hazardous material which (a) has the potential to cause an AWQS or AQL exceedance, or (b) could pose an endangerment to public health or the environment.

**2.6.5.3 Discharge of Non-hazardous Materials**

In the event of any unauthorized discharge pursuant to A.R.S. § 49-201(12) of non-hazardous materials from the facility, the permittee shall promptly attempt to cease the discharge and isolate the discharged material. Discharged material shall be removed and the site cleaned up as soon as possible. The permittee shall notify the Groundwater Section within 24 hours of discovering the discharge of non-hazardous material which has the potential to cause an AQL exceedance, or could pose an endangerment to public health or the environment.

**2.6.5.4 Reporting Requirements**

The permittee shall submit a written report for any unauthorized discharges reported under Sections 2.6.5.2 and 2.6.5.3 to the Groundwater Section within 30 days of the discharge or as required by subsequent ADEQ action. The report shall summarize the event, including any human exposure, and facility response activities and include all information specified in Section 2.7.3. If a notice is issued by ADEQ subsequent to the discharge notification, any additional information requested in the notice shall also be submitted within the time frame specified in the notice. Upon review of the submitted report, ADEQ may require additional monitoring or corrective actions.

**2.6.6 Corrective Actions**

Specific contingency measures identified in Section 2.6 and in the approved contingency plan referenced in Section 5.0 have already been approved by ADEQ and do not require written approval to implement.

With the exception of emergency response actions taken under Section 2.6.5, the permittee shall obtain written approval from the Groundwater Section prior to implementing a corrective action to accomplish any of the following goals in response to exceedance of an AL or violation of an AQL, DL, or other permit condition:

1. Control of the source of an unauthorized discharge;
2. Soil cleanup;
3. Cleanup of affected surface waters;
4. Cleanup of affected parts of the aquifer;
5. Mitigation to limit the impact of pollutants on existing uses of the aquifer.

Within 30 days of completion of any corrective action, the operator shall submit to the Groundwater Section, a written report describing the causes, impacts, and actions taken to resolve the problem.

## **2.7 Reporting and Recordkeeping Requirements [A.R.S. § 49-243(K)(2) and A.A.C. R18-9-A206(B) and R18-9-A207]**

### **2.7.1 Self-monitoring Report Form**

1. The permittee shall complete the Self-Monitoring Report Form (SMRF) provided by ADEQ, and submit the completed report to the Groundwater Section. The permittee shall use the format devised by ADEQ.
2. The permittee shall complete the SMRF to the extent that the information reported may be entered on the form. If no information is required during a reporting period, the permittee shall enter "not required" on the form, include an explanation, and submit the form to the Groundwater Section.
3. The tables contained in Section 4.2 list the monitoring parameters and the frequencies for reporting results on the SMRF:
  - Table 4.2.4 Quarterly Compliance Groundwater Monitoring and Reporting Requirements for POC Wells
  - Table 4.2.5 Biennial Compliance Groundwater Monitoring and Reporting Requirements

The parameters listed in the above identified tables from Section 4.2 are the only parameters for which SMRF reporting is required.

4. In addition to the SMRF, the information contained in A.A.C. R18-9-A206(B)(1) shall be included for exceeding an AL or violation of an AQL, DL, or any other permit condition being reported in the current reporting period.

### **2.7.2 Operation Inspection / Log Book Recordkeeping**

A signed copy of this permit shall be maintained at all times at the location where day-to-day decisions regarding the operation of the facility are made. A log book (paper copies, forms, or electronic data) of the inspections and measurements required by this permit shall be maintained at the location where day-to-day decisions are made regarding the operation of the facility. The log book shall be retained for ten years from the date of each inspection, and upon request, the permit and the log book shall be made immediately available for review by ADEQ personnel. The information in the log book shall include, but not be limited to, the following information as applicable:

1. Name of inspector;
2. Date and shift inspection was conducted;
3. Condition of applicable facility components;
4. Any damage or malfunction, and the date and time any repairs were performed;
5. Documentation of sampling date and time; and
6. Any other information required by this permit to be entered in the log book.

Monitoring records for each measurement shall comply with A.A.C. R18-9 A206(B)(2).

### **2.7.3 Permit Violation and Alert Level Status Reporting**

1. The permittee shall notify the Groundwater Section in writing (see Section 2.7.5) within five days (except as provided in Section 2.6.5) of becoming aware of a violation of any permit condition, AQL, or DL, or of an AL exceedance for which notification requirements are not specified in Sections 2.6.2 through 2.6.5.
2. The permittee shall submit a written report to the Groundwater Section within 30 days of becoming aware of the violation of any permit condition, AQL, or DL. The report shall document all of the following:
  - a. Identification and description of the permit condition for which there has been a violation and a description of the cause;
  - b. The period of violation including exact date(s) and time(s), if known, and the anticipated time period during which the violation is expected to continue;
  - c. Any corrective action taken or planned to mitigate the effects of the violation, or to eliminate or prevent a recurrence of the violation;
  - d. Any monitoring activity or other information which indicates that any pollutants would be reasonably expected to cause a violation of an AWQS;
  - e. Proposed changes to the monitoring which include changes in constituents or increased frequency of monitoring; and
  - f. Description of any malfunction or failure of pollution control devices or other equipment or processes.

### **2.7.4 Annual Groundwater Reporting**

The permittee shall submit an annual groundwater monitoring summary report to the Groundwater Section. This report shall be due at the same time as the SMRF form for the last quarterly sampling event for the year. The report shall include, but not be limited to the following:

1. A description of any deviations from standard sampling protocols during the reporting period.
2. A summary of all exceedances of ALs, AQLs, or discharge limitations that occurred during the reporting period.
3. Graphical time versus concentration plots of field pH, sulfate, total dissolved solids, and any parameter which exceeded an applicable AL or AQL in the past eight quarters at each POC well, and tabulated sampling data for all wells required to be sampled by this permit during the last eight quarters.
4. An updated table of all monitor wells and piezometers in the Pollutant Management Area including, but not limited to, location of well, depth of well, depth to water.
5. A summary of any groundwater monitor wells replaced in the reporting period including, but not limited to, location of well, depth of well, depth to water, and screened interval.

### **2.7.5 Reporting Location**

All Self-Monitoring Report Forms (SMRFs) shall be submitted to:

Arizona Department of Environmental Quality  
Groundwater Section  
Mail Code 5415B-3  
1110 West Washington Street  
Phoenix, Arizona 85007  
Phone (602) 771-4571

Or

Through the myDEQ portal accessible on the ADEQ website at:  
<http://www.azdeq.gov/welcome-mydeq>

All other documents required by this permit to be submitted to the Groundwater Section shall be directed to:

Arizona Department of Environmental Quality  
Groundwater Section  
Mail Code 5415B-3  
1110 West Washington Street  
Phoenix, Arizona 85007  
Phone (602) 771-4999

**2.7.6 Reporting Deadline**

The following table lists the quarterly report due dates:

Monitoring conducted during quarter:	Quarterly Report due by:
January-March	April 30
April-June	July 30
July-September	October 30
October-December	January 30

The following table lists the semi-annual and annual report due dates:

Monitoring conducted:	Report due by:
Semi-annual: January-June	July 30
Semi-annual: July-December	January 30
Annual: January-December	January 30

**2.7.7 Changes to Facility Information in Section 1.0**

The Groundwater Section shall be notified within ten days of any change of facility information including Facility Name, Permittee Name, Mailing or Street Address, Facility Contact Person, or Emergency Telephone Number.

**2.8 Temporary Cessation [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A209(A)]**

The permittee shall give written notice to the Groundwater Section before ceasing operation of the facility for a period of 60 days or greater.

At the time of notification the permittee shall submit for ADEQ approval a plan for maintenance of discharge control systems and for monitoring during the period of temporary cessation. Immediately following ADEQ approval, the permittee shall implement the approved plan. If necessary, ADEQ shall amend permit conditions to incorporate conditions to address temporary cessation. During the period of temporary cessation, the permittee shall provide written notice to the Groundwater Section of the operational status of the facility every three years. If the permittee intends to permanently cease operation of any facility, the permittee shall submit closure notification, as set forth in Section 2.9 below.

**2.9 Closure [A.R.S. §§ 49-243(K)(6), 49-252 and A.A.C. R18-9-A209(B)]**

For a facility addressed under this permit, the permittee shall give written notice of closure to the Groundwater Section of the intent to cease operation without resuming activity for which the facility was designed or operated. Submittal of SMRFs is still required; report "closure in process" in the comment section.

**2.9.1 Closure Plan**

Within 90 days following notification of closure, the permittee shall submit for approval to the Groundwater Section, a closure plan which meets the requirements of A.R.S. § 49-252 and A.A.C. R18-9-A209(B)(3).

If the closure plan achieves clean closure immediately, ADEQ shall issue a letter of approval to the permittee. If the closure plan contains a schedule for bringing the facility to a clean closure configuration at a future date, ADEQ may incorporate any part of the schedule as an amendment to this permit.

**2.9.1.1 Closure Plan for the Detention Ponds DP-1 through DP-22**

The closure activities to be conducted include covering of the detention ponds by the 7-Series RDA and closure of the 7-Series RDA. Any variation from the approved plan shall be submitted to the Department for approval.

**2.9.2 Closure Completion**

Upon completion of closure activities, the permittee shall give written notice to the Groundwater Section indicating that the approved closure plan has been implemented fully and providing supporting documentation to demonstrate that clean closure has been achieved (soil sample results, verification sampling results, groundwater data, as applicable). If clean closure has been achieved, ADEQ shall issue a letter of approval to the permittee at that time. If any of the following conditions apply, the permittee shall follow the terms of post-closure stated in this permit:

1. Clean-closure cannot be achieved at the time of closure notification or within one year thereafter under a diligent schedule of closure actions;
2. Further action is necessary to keep the facility in compliance with the AWQS at the applicable POC;
3. Continued action is required to verify that the closure design has eliminated discharge to the extent intended;
4. Remediation or mitigation measures are necessary to achieve compliance with Title 49, Ch. 2; and
5. Further action is necessary to meet property use restrictions.

**2.10 Post-closure [A.R.S. §§ 49-243(K)(6), 49-252 and A.A.C. R18-9 A209(C)]**

Post-closure requirements, if needed, shall be established based on a review of facility closure actions and will be subject to review and approval by the Groundwater Section.

In the event clean closure cannot be achieved pursuant to A.R.S. § 49-252, the permittee shall submit for approval to the Groundwater Section a post-closure plan that addresses post-closure maintenance and monitoring actions at the facility. The post-closure plan shall meet all requirements of A.R.S. §§ 49-201(30) and 49-252 and A.A.C. R18-9-A209(C). Upon approval of the post-closure plan, this permit shall be amended or a new permit shall be issued to incorporate all post-closure controls and monitoring activities of the post-closure plan.

**2.10.1 Post-closure Plan**

A specific post-closure plan may be required upon the review of the closure plan.

**2.10.2 Post-closure Completion**

Not required at the time of permit issuance.

**3.0 COMPLIANCE SCHEDULE [A.R.S. § 49-243(K)(5) and A.A.C. R18-9-A208]**

Unless otherwise directed, for each compliance schedule item listed below, the permittee shall submit the required information, including a cover letter that lists the compliance schedule items, to the Groundwater Section.

No.	Description	Due by:	Permit Amendment Required?
1	<p>Closure Plan for the facilities being closed under June 26, 2012 Amendment Application. Facilities include:</p> <ol style="list-style-type: none"> <li>1. Imp. Behind Stacker Dam (C22.1)</li> <li>2. 3 Unlined Middle Slimes Ponds (C3.2b)</li> <li>3. Crusher Cooling Water Imp (C15.13)</li> </ol> <p>These facilities had been integrated into larger operating facilities, actual closure will not occur until the larger facilities are closed. Upon completion of closure activities, provide a closure report for each facility indicating the closure activities and results of sampling. Refer to Section 2.9 (Closure).</p>	At final mine closure.	Yes
2	<p>As built plans for the 4F Impoundment. Include certification that the facility was constructed in accordance with plans approved by ADEQ and QA/QC documentation completed for liner and subgrade preparation. The final construction report shall be certified by the on-site construction manager and shall be sealed by a registered professional engineer.</p>	Submit within 90 days of completion of construction.	No
3	<p>As built plans for the Suzie D Impoundment. Include certification that the facility was constructed in accordance with plans approved by ADEQ and QA/QC documentation completed for liner and subgrade preparation. The final construction report shall be certified by the on-site construction manager and shall be sealed by a registered professional engineer.</p>	Submit within 90 days of completion of construction.	No
4	<p>As built plans for the Mill Pond. Include certification that the facility was constructed in accordance with plans approved by ADEQ and QA/QC documentation completed for liner and subgrade preparation. The final construction report shall be certified by the on-site construction manager and shall be sealed by a registered professional engineer.</p>	Submit within 90 days of completion of construction.	No
5	<p>As built plans for the 7E Raffinate Storage Pond. Include certification that the facility was constructed in accordance with plans approved by ADEQ and QA/QC documentation completed for liner and subgrade preparation. The final construction report shall be certified by the on-site construction manager and shall be sealed by a registered professional engineer.</p>	Submit within 90 days of completion of construction.	No

6	Post-audit of the approved groundwater flow model. The post-audit report shall be submitted to the ADEQ for review and approval as described in Section 2.5.8 of the permit.	By December 18, 2018, and every five years thereafter until mine closure	No
7	The permittee shall submit a demonstration that the financial assurance mechanism listed in Section 2.1, Financial Capability, is being maintained as per A.R.S. 49-243.N.4 and A.A.C. R18-9-A203(H) for all estimated closure and post-closure costs including updated costs submitted under Section 3.0, No. 8 below. The demonstration shall include a statement that the closure and post-closure strategy has not changed, the discharging facilities listed in the permit have not been altered in a manner that would affect the closure and post-closure costs, and discharging facilities have not been added.	2 years from the date of permit signature, and every 2 years thereafter, for the duration of the permit.	No
8	The permittee shall submit updated cost estimates for facility closure and post-closure, as per A.A.C. R18-9-A201(B)(5) and A.R.S. 49-243.N.2.a, and an updated financial assurance demonstration for the updated cost estimate as per A.A.C. R18-9-A203 (C) (1).	Every 6 years from the date of permit signature, for the duration of the permit.	Yes
9	The permittee shall submit as-built drawings, following completion of the proposed improvements, including cleanup of the tank floor, lining of the Tank No. 11, and providing results of the proposed hydrostatic testing.	Following completion of Tank No. 11 upgrades.	No
10	Permittee shall submit closure report for activities described in Sections 2.1.21.1, 2.2.21.1, 2.9.1.1 and 2.10.	90 days after completion of closure activities	Yes

## **4.0 TABLES OF MONITORING REQUIREMENTS**

### **4.1 Facility List**

- TABLE 4.1.1 Permitted Rock Deposition Areas
- TABLE 4.1.2 Permitted Impoundments
- TABLE 4.1.3 Removed Facilities List

### **4.2 Compliance (Or Operational) Monitoring**

- TABLE 4.2.1 Sub Area A - Required Inspections and Operational Monitoring
- TABLE 4.2.2 Sub Area B - Required Inspections and Operational Monitoring
- TABLE 4.2.3 Sub Area C - Required Inspections and Operational Monitoring
- TABLE 4.2.4 Quarterly Compliance Groundwater Monitoring and Reporting Requirements for POC Wells
- TABLE 4.2.5 Biennial Compliance Groundwater Monitoring and Reporting Requirements
- TABLE 4.2.6 Deposition Monitoring for Elder Gulch Tailings Facility

**4.1 FACILITY LIST**

**TABLE 4.1.1**  
**PERMITTED ROCK DEPOSITION AREAS<sup>2</sup>**

<b>Name</b>	<b>Number</b>	<b>Latitude (N)</b>	<b>Longitude (W)</b>	<b>Area (ac)</b>
<b>Sub Area A</b>				
4-Series RDA	A4RDA	33° 11' 39"	111° 00' 32"	826
9-Series RDA	A9RDA	33° 11' 55"	110° 59' 51"	417
5-Series RDA	A5RDA	33° 11' 42"	110° 59' 04"	1002
<b>Sub Area B</b>				
1-Series RDA	B1RDA	33° 09' 28"	110° 59' 29"	321
2-Series RDA	B2RDA	33° 09' 57"	111° 00' 34"	1116
3-Series RDA	B3RDA	33° 11' 03"	111° 01' 08"	317
<b>Sub Area C</b>				
7-Series RDA	C7RDA	33° 08' 36"	110° 59' 04"	723
8-Series RDA	C8RDA	33° 08' 57"	110° 57' 54"	1217

<sup>2</sup> Rock Deposition Areas (Leach Facility)

4.1 FACILITY LIST

TABLE 4.1.2  
PERMITTED IMPOUNDMENTS

Name	Number	Latitude (N)	Longitude (W)	Type	Volume (cu-ft)	Depth (ft)
<b>Sub Area A</b>						
9 North Sump	A27	33° 12' 21"	110° 59' 59"	PS <sup>3</sup>	2,264,749	20
4F Impoundment	A28	33° 12' 02"	111° 00' 30"	PS	148,924,237	188
9 Sump	A4D.3	33° 11' 28"	111° 00' 05"	PS	6,016,000	50
<b>Sub Area B</b>						
10 Pond	B33	33° 11' 09"	111° 00' 06"	NSW <sup>4</sup>	246,675	17
Last Turn Stormwater Diversion Channel	B29	33° 10' 36"	111° 01' 03"	NSW	1,611,720	10-30
1B Dam (Sulfide Sump)	B1B.1	33° 09' 42"	110° 58' 54"	PS	65,000	16
Maintenance Area Truck Wash - Light Vehicle	B30.1	33° 09' 32"	110° 58' 43"	Misc <sup>5</sup>	--	--
Maintenance Area Truck Wash - Heavy Vehicle	B30.2	33° 09' 32"	110° 58' 43"	Misc	--	--
1A Dam	B1A.2	33° 09' 32"	110° 59' 00"	PS	7,800	10
Concentrator Non-Stormwater Pond	B1A.3	33° 09' 32"	110° 58' 58"	PS	11,300	6
PM Bay Sump and Truck Wash	B1A.4	33° 09' 26"	110° 59' 08"	PS	20,000	
Ray Concentrator Collection Pond	B5	33° 09' 20"	110° 58' 44"	PS	124,000	17
Dalton's Pond	B4.1	33° 09' 21"	110° 58' 36"	PS	326,000	50
<b>Sub Area C</b>						
Tank No. 11	C46	33° 08' 53"	110° 58' 13"	PS	431,244	11
Suzie D Impoundment	C31	33° 09' 28"	110° 57' 45"	NSW	77,040,653	193
Lower Suzie D Impoundment	C7	33° 09' 08"	110° 58' 26"	PS	29,000	12
7A Dam	C7A.7	33° 08' 59"	110° 58' 42"	PS	460,000	16
Electrowinning Dam	C9	33° 08' 55"	110° 58' 29"	PS	36,000	10
8 Series Pond	C3.3	33° 08' 57"	110° 58' 07"	PS	73,000	4
7C Pond	C7C.2	33° 08' 47"	110° 59' 28"	PS	111,000	30
7B Dam	C7B.1	33° 08' 41"	110° 58' 45"	PS	538,000	16
Upper Slimes Pond	C3	33° 08' 43"	110° 58' 01"	PS	375,000,000	30
Middle Slimes Dam	C3.2	33° 08' 43"	110° 58' 20"	PS	11,000	5
Middle Slimes Pond	C3.2b	33° 08' 41"	110° 58' 18"	PS	114,000	12
Lower Slimes Dam	C11	33° 08' 36"	110° 58' 24"	PS	209,000	22
7C Dam	C7C.1	33° 08' 36"	110° 58' 47"	PS	94,000	16
Big and Little Dome Ponds and Truck Wash	C1	33° 08' 39"	110° 58' 39"	PS	1,760,000 and 353,000	16 and 12
7D Dam	C7D.1	33° 08' 19"	110° 58' 37"	PS	746,000	18
7E Raffinate Storage Pond	C34	33° 08' 15"	110° 59' 15"	PS	9,003,933	23
Stacker Dam	C12	33° 08' 11"	110° 58' 19"	PS	125,000	11
Retention Basin	C35	33° 08' 02"	110° 58' 26"	NSW	3,354,000	25

<sup>3</sup> PS – Process Solution Impoundment

<sup>4</sup> NSW – Non Stormwater Impoundment. A non-stormwater pond receives inflow that does not qualify as stormwater regulated under the Arizona Mining MSGP (e.g., seepage from a tailing impoundment, waste dump, process area, etc.). Non-stormwater ponds also include secondary containment structures and overflow ponds that contain process solution for short periods of time due to process upsets or rainfall events

<sup>5</sup> Misc – Miscellaneous Impoundment

4.1 FACILITY LIST

**TABLE 4.1.2**  
**PERMITTED IMPOUNDMENTS (Continued)**

Goat Ranch Lined Pond	C20.1	33° 07' 43"	110° 58' 39"	PS	2,850,000	16
Elder Gulch Tailings Facility	C36	33° 07' 59"	110° 57' 21"	T <sup>6</sup>		
Tailings Thickener	C37	33° 07' 34"	110° 58' 17"	TT <sup>7</sup>		
Seepage Collection Pond	C38	33° 07' 40"	110° 58' 20"	NSW	1,014,948	
Contact Stormwater Pond	C39	33° 07' 35"	110° 58' 11"	NSW		
Tailings Booster Station 1 Pond	C40	33° 07' 33"	110° 58' 26"	PS		
Tailings Booster Station 2 Ponds	C41	33° 07' 51"	110° 57' 59"	PS	14,679 and 123,000	4.5 and 7
Mill Pond	C32	33° 08' 59"	110° 58' 30"	NSW	508,410	10

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<sup>6</sup> T – Tailings Impoundment

<sup>7</sup> TT – Tailings Thickener

4.1 FACILITY LIST

**TABLE 4.1.3  
REMOVED FACILITIES**

Facility Name (#)	Facility BADCT
Facilities to be closed through burial by the Valley-fill RDA and /or to cease operation without intent to resume activities	
Conveyor Impoundment (C17.2)	Facility has ceased operation without intent to resume activity for which it was designed. Impoundment is buried beneath the Conveyor Canyon RDA.
Heap Solution Pond (8D.1)	Facility has ceased operation without intent to resume activity for which it was designed. Impoundment is eliminated with the planned progression of the Elder Gulch tailings pond containment dike.
7A Test Dams	Facilities closed prior to 1986.
North Sump (B2)	Facility is mined out.
3B Dam (B3B.1)	Facility is mined out.
4A Dam (B4A.1)	Facility is mined out.
PCS Contaminated Soil Pile (4G.3)	Facility has ceased operation without intent to resume activity for which it was designed. All of the sample results were non-detect for all constituents. Based on the sample results, the soil was not a regulated material and remediation /disposal was not necessary.
Truck Wash (ID.2)	Facility is mined out.
Reclaim and Stormwater Pond (C16.6)	Facility no longer exists. Impoundment is buried under the haul road.
North Plant Pumping Station (B5)	Facility was located in the Ray Pit – passive containment, and was mined out.
4B Dam (A4B.3)	Facility no longer exists. Impoundment is buried under the 4-Series RDA.
4B Dam Overflow Catchments (A4B.4)	Facility no longer exists. Impoundment is buried under the 4-Series RDA.
4C Dam(A4C.1)	Facility no longer exists. Impoundment is buried under the 4-Series RDA.
2A Dam (B2A.1)	Consolidated with 2-Series RDA
3C Dam (B3C.1)	Consolidated with 3-Series RDA
5C Dam (B5C.1)	Facility is mined out
Sonora Creek Dams (B1D.3)	Consolidated with 1-Series RDA
Truck Wash Emergency Overflow Impoundment (B13.2)	Facility is mined out
Impoundment (B26.1)	Facility is mined out
7C Highway 177 Pond (n/a)	Remove – APP exempt
Impoundment Behind Stacker RDA (C22.1)	Buried under 8-Series RDA
7A Stormwater Overflow Impoundment (C7A.7a)	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
7A Sediment Trap Impoundment (C7A.7b)	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
7D Backup Catchments (C7D.2)	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
Suzie D Decant Pond (C8A.2)	Buried under 8-Series RDA
EW Dam Impoundment (C8.4)	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
Stacker Overflow Pond (C12.1)	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
Lower Slimes Overflow Pond (C11.1)	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
Secondary Containment and Stormwater Pond (C16.6)	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
Stormwater Diversion Ditch (C7C.4)	Closed – facility obsolete with construction of F-Wash

**4.1 FACILITY LIST**

**TABLE 4.1.3  
REMOVED FACILITIES (Continued)**

Dust Collection Pond (C10.7)	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
Crusher Cooling Water Impoundment (C15.13)	Closed – flows diverted to Retention Basin via Mineral Creek Side Ditch
3 Unlined Middle Slimes Ponds (C3.2B)	Closed - Facility ceased operation and has been removed
7A Booster Impoundment (C45)	Remove – APP exempt
4D Dam (A4D.1)	Facility is a part of the Valley-fill RDA, located upgradient of the Ray Pit - the passive containment. Process solution reporting to the facility will now report to the Mineral Creek Collection Impoundment.
4D Sediment Dam (A4D.2.a)	Facility is a part of the Valley-fill RDA, located upgradient of the Ray Pit - the passive containment. Process solution reporting to the facility will now report to the Mineral Creek Collection Impoundment.
4D Overflow Catchment (A4D.2.b)	Facility is a part of the Valley-fill RDA, located upgradient of the Ray Pit - the passive containment. Process solution reporting to the facility will now report to the Mineral Creek Collection Impoundment.
4X Dam (A4D.3)	Facility is a part of the Valley-fill RDA, located upgradient of the Ray Pit - the passive containment. Process solution reporting to the facility will now report to the Mineral Creek Collection Impoundment.
5E Dry Non-stormwater Impoundment (A5E.1)	Facility has ceased operation without intent to resume activity for which it was designed. Any flows from the 5E RDA will now report to the newly constructed Mineral Creek Collection Impoundment.
Big Surf Pond (7)	Notice of full implementation of ADEQ approved Closure Plan received by ADEQ on June 20, 2002.
Un-named Impoundment north of Big Surf Pond (7.1)	Notice of full implementation of ADEQ approved Closure Plan received by ADEQ on June 20, 2002.
Un-named Impoundment east of Big Surf Pond (7.2)	Notice of full implementation of ADEQ approved Closure Plan received by ADEQ on June 20, 2002.

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

**TABLE 4.2.1  
SUB AREA A  
REQUIRED INSPECTIONS AND OPERATIONAL MONITORING**

Facility Name (#)	Operational Requirements
<p><b>No Leaching Zone:</b></p>	<p>The no-leaching zone is defined as a portion of the area north of the 9-Series and north and east portions of the 5-Series RDAs, as shown on the site map included with this permit as Attachment 1. No leaching of ore or waste rock is permitted within the designated no-leaching zone. The permittee shall not stockpile any materials, other than those materials determined to be barren, within the designated no-leaching zone of the 9-Series and 5-Series RDAs. Barren materials is defined in this permit as those materials containing less than 0.1% copper and less than 0.5% sulfides, and that when subject to ADEQ approved static or kinetic leachability testing do not produce a leachate containing a contaminant(s) exceeding an AWQS. Only barren materials located in that area within the northeast wall of the open pit mine and described in ASARCO’s June 12, 2002 report entitled ASARCO’s, <i>Explanation of Barren Material To Be Placed In the No-Leach Zone</i>, may be placed in the no-leaching zone. These materials include post-mineral lithologies consisting of, in descending stratigraphic order, rhyodacite, Gila Conglomerate, and the upper 100-foot section of the Apache Leap dacite.</p> <p><b>Quarterly and after 2”-24hour rain event (as measured from the nearest rain gauge)</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Indications that non-barren material has been placed in the no-leach zone;</li> <li>- instability, including slides, sloughs or unusual settlement;</li> <li>- accumulation of debris in conveyances and diversions; and</li> <li>- impairment of access.</li> </ul>
<p><b>Leach RDAs Upgradient of the Capture Zone of the Passive Containment (Existing Leaching: east and west sides of Mineral Creek)</b></p>	
<p>4-Series RDA (A4RDA) 9-Series RDA (A9RDA) 5-Series RDA (A5RDA)</p>	<p><b>Quarterly and after 2”-24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- instability, including surface cracks, slides, sloughs or unusual settlement;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions; and</li> <li>- impairment of access.</li> </ul>
<p><b>Unlined Process Solution Impoundments Upgradient of the Capture zone of the Passive Containment (Ponds, Dams, Sumps, Impoundments and Associated Conveyance Systems; west and east sides of Mineral Creek)</b></p>	
<p>9 North Sump (A27) 4F Impoundment (A28) 9 Sump (A4D.3)</p>	<p><b>Quarterly and after 2”-24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions; and</li> <li>- impairment of access.</li> <li>- for facilities equipped with pumps, inspect pumps and structures for pump operation and structural integrity.</li> </ul>

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

**TABLE 4.2.2  
SUB AREA B  
REQUIRED INSPECTIONS AND OPERATIONAL MONITORING**

Facility Name (#)	Operational Requirements
<b>Leach RDAs within the Capture zone of the Passive Containment (Existing Leaching: west of Open pits)</b>	
1-Series RDA (B1RDA) 2-Series RDA (B2RDA) 3-Series RDA (B3RDA)	<b>Quarterly and after 2"-24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of: <ul style="list-style-type: none"> <li>- instability, including surface cracks, slides, sloughs or unusual settlement;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions; and</li> <li>- impairment of access.</li> </ul>
<b><u>Unlined</u> Process Solution Impoundments within the Capture zone of the Passive Containment (Non-stormwater , Sumps, Impoundments and Associated Conveyance Systems; east and west sides of Mineral Creek)</b>	
1A Dam (B1A.2) Concentrator Non-Stormwater Pond (B1A.3) 1B Dam (Sulfide Sump) (B1B.1)	<b>Quarterly and after 2"-24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of: <ul style="list-style-type: none"> <li>- Impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps: inspect pumps and structures for pump operation and structural integrity.</li> </ul>
<b><u>Lined</u> Process Solution Impoundments within the Capture zone of the Passive Containment (PLS Ponds, Dams, Sumps, Impoundments and Associated Conveyance Systems; west and east sides of Open Pit)</b>	
Ray Concentrator Collection Pond (B5) Dalton's Pond (B4.1)	<b>Quarterly and after 2"-24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of: <ul style="list-style-type: none"> <li>- Inspect for perforated or cut or damaged liner and impairment of anchor trench integrity;</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps: inspect pumps and structures for pump operation and structural integrity.</li> </ul>

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

**TABLE 4.2.2  
SUB AREA B  
REQUIRED INSPECTIONS AND OPERATIONAL MONITORING (Continued)**

<b><u>Unlined Non-Stormwater Impoundments within the Capture zone of the Passive Containment</u></b>	
Last Turn Stormwater Diversion Channel (B29)	<p><b>Quarterly and after 2”-24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions</li> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps, inspect pumps and structures for pump operation and structural integrity.</li> </ul> <p><b>Annually:</b> Remove excess sediments/sludge from the impoundment as needed to maintain at least 80 percent of design capacity.</p>
<b><u>Lined Non-Stormwater Impoundments within the Capture zone of the Passive Containment</u></b>	
10 Pond (B33)	<p><b>Quarterly and after 2”-24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Inspect for perforated or cut or damaged liner and impairment of anchor trench integrity;</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions</li> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps, inspect pumps and structures for pump operation and structural integrity.</li> </ul> <p><b>Annually:</b> Remove excess sediments/sludge from the impoundment as needed to maintain at least 80 percent of design capacity.</p>
<b><u>Miscellaneous Facilities within the Capture zone of the Passive Containment</u></b>	
PM Bay Sump and Truck Wash (B.1A.4)  Maintenance Area Truck Wash – Light Vehicle (B30.1)  Maintenance Area Truck Wash – Heavy Vehicle (B30.2)	<p><b>Quarterly and after 2”-24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps, inspect pumps and structures for pump operation and structural integrity.</li> </ul> <p><b>Monthly:</b> Remove sediments/sludge from the truck wash sump as needed to maintain at least 80 percent of designed capacity.</p>
Solid Waste Landfill (B3.2)	This facility is has obtained authorization for disposal of solid waste pursuant to the Disposal General Permit: Non-Municipal Solid Waste Landfills at Mining Operations (A.A.C. R18-13-802). Operational requirements are covered under the General Permit.

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

**TABLE 4.2.3  
SUB AREA C  
REQUIRED INSPECTIONS AND OPERATIONAL MONITORING**

Facility Name (#)	Operational Requirements
<b>Leach RDAs within the Hydrologic Influence of the Retention Basin and Cutoff Wall – Non-passive Containment (Existing Leaching east and west of Mineral Creek)</b>	
8-Series RDA (C8RDA) 7-Series RDA (C7RDA)	<p><b>Monthly and after 2”-24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- instability, including surface cracks, slides, sloughs or unusual settlement;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access;</li> <li>- at pump installations, inspect pumps and structures for pump operation and structural integrity, including inspection for preventative maintenance; and</li> <li>- where equipped, check programmable logic control (PLC) on the pumping system for functional reliability.</li> </ul>
<b>Unlined Process Solution Impoundments within the Hydrologic Influence of the Retention Basin and Cutoff Wall – Non-passive Containment (Ponds, Sumps, and Associated Conveyance Systems; east and west sides of Mineral Creek)</b>	
Lower Suzie D Impoundment (C7) 7A Dam (C7A.7) Electrowinning (EW) Dam (C9) 8-Series Pond (C3.3) 7C Pond (C7C.2) 7B Dam (C7B.1) Upper Slimes Pond (C3) Middle Slimes Dam (C3.2) Middle Slimes Pond (C3.2b) Lower Slimes Dam (C11) 7C Dam (C7C.1) 7D Dam (C7D.1) Stacker Dam (C12)	<p><b>Weekly:</b> Visually inspect and maintain freeboard where required (See The facilities list and BADCT descriptions - Section 2.2.1)</p> <p><b>Monthly and after 2”-24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps: inspect pumps and structures for pump operation and structural integrity.</li> </ul>
<b>Lined Process Solution Impoundments within the Hydrologic Influence of the Retention Basin and Cutoff Wall – Non-passive Containment (Ponds, Sumps, Impoundments and Associated Conveyance Systems; west and east sides of Mineral Creek)</b>	
7E Raffinate Storage Pond (C34)	<p><b>Weekly:</b> Visually inspect and maintain freeboard where required (See The facilities list and BADCT descriptions - Section 2.2.1) See BADCT – Section 4.1).</p> <p><b>Monthly and after 2”-24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Perforated or cut or damaged liner and impairment of anchor trench integrity;</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps: inspect pumps and structures for pump operation and structural integrity.</li> </ul>

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

**TABLE 4.2.3**  
**SUB AREA C**  
**REQUIRED INSPECTIONS AND OPERATIONAL MONITORING (Continued)**

<b><u>Lined Process Solution Impoundments outside the Hydrologic Influence of the Retention Basin and Cutoff Wall (Ponds, Sumps, Impoundments and Associated Conveyance Systems; west of Mineral Creek)</u></b>	
Goat Ranch Lined Pond (C20.1)	<p><b>Weekly:</b> Visually inspect and maintain freeboard of two (2) feet</p> <p><b>Monthly and after 2”-24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Perforated or cut or damaged liner and impairment of anchor trench integrity;</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- inspect pumps and structures for pump operation and structural integrity.</li> </ul>
<b><u>Lined Process Solution Impoundments outside the Hydrologic Influence of the Retention Basin (Ponds, Sumps, Impoundments and Associated Conveyance Systems; east and west of Mineral Creek)</u></b>	
<p>Tailings Thickener (C37)</p> <p>Tailings Booster Station 1 Pond (C40)</p> <p>Tailings Booster Station 2 Ponds (C41)</p>	<p><b>Weekly:</b> Visually inspect and maintain freeboard where required (See The facilities list and BADCT descriptions - Section 2.2.1).</p> <p><b>Monthly and after 2”-24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Perforated or cut or damaged liner and impairment of anchor trench integrity;</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- inspect pumps and structures for pump operation and structural integrity.</li> </ul>
<b><u>Lined Process Solution Impoundments within the Capture zone of the Retention Basin and Cutoff Wall – Non-passive Containment</u></b>	
Big and Little Dome Ponds and Truck Wash (C1)	<p><b>Weekly:</b> Visually inspect and maintain freeboard where required The facilities list and BADCT descriptions - Section 2.2.1).</p> <p><b>Monthly and after 2”-24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Perforated or cut or damaged liner and impairment of anchor trench integrity;</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- inspect pumps and structures for pump operation and structural integrity.</li> </ul> <p><b>Monthly:</b> Remove sediments/sludge from the truck wash sump as needed to maintain at least 80 percent of designed capacity.</p>

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

**TABLE 4.2.3  
SUB AREA C**

**REQUIRED INSPECTIONS AND OPERATIONAL MONITORING (Continued)**

<b><u>Unlined Non-Stormwater Impoundments – within the Capture zone of the Retention Basin and Cutoff Wall</u></b>	
Retention Basin (C35)	<p><b>Weekly:</b> Check for any evidence of equipment or structural damage. <b>Monthly and after 2” (as measured from the nearest rain gauge): - 24 hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- At pump installations, inspect pumps and structures for pump operation and structural integrity, including inspection for preventative maintenance, and</li> <li>- Check programmable logic control (PLC) on the pumping system for functional reliability.</li> </ul> <p><b>Quarterly and inches after 3”- 24hour rain event (as measured from the nearest rain gauge): :</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Evidence of loss of functionality;</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions; and</li> <li>- impairment of access.</li> </ul> <p><b>Annually:</b> Remove sediments/sludge from the impoundment as needed to maintain at least 80 percent of designed capacity.</p>
<b><u>Unlined Non-Stormwater Impoundments</u></b>	
Suzie D Impoundment (C31)  Contact Stormwater Pond (C39)	<p><b>Quarterly and after 2”- 24hour rain event (as measured from the nearest rain gauge):</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps, inspect pumps and structures for pump operation and structural integrity.</li> </ul> <p><b>Annually:</b> Remove excess sediments/sludge from the impoundment as needed to maintain at least 80 percent of design capacity.</p>
<b><u>Lined Process Solution Impoundments within the Capture Zone of the Retention Basin and Cutoff Wall – Non-passive Containment (Ponds, Sumps, Impoundments and Associated Conveyance Systems; west and east sides of Mineral Creek)</u></b>	
Tank No. 11	<p><b>Weekly:</b> Visually inspect and maintain a minimum of 2 feet freeboard</p> <p><b>Annually and after 2”-24hour rain event (as measured from the nearest rain gauge) when fluid level in the tank can be pumped to minimum levels:</b> Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Perforated, cut, or damaged liner and impairment of liner anchor trench mechanism;</li> <li>- condition of the seal after drying for a minimum of 12 hours;</li> <li>- accumulation of sediment in the tank no more than 0.5 feet shall be allowed to protect the existing liner, and if there is significant accumulation of sediment, it shall be cleaned up;</li> <li>- inspect pumps and structures for pump operation and structural integrity.</li> </ul>

4.2 COMPLIANCE (or OPERATIONAL) MONITORING

**TABLE 4.2.3**  
**SUB AREA C**  
**REQUIRED INSPECTIONS AND OPERATIONAL MONITORING (Continued)**

<b>Lined Non-Stormwater Impoundments – within the Capture zone of the Retention Basin and Cutoff Wall – Non-passive Containment</b>	
Mill Pond (C32)	<p><b>Quarterly and after 2”-24hour rain event (as measured from the nearest rain gauge):</b></p> <p>Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Inspect for perforated or cut or damaged liner and impairment of anchor trench integrity;</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions</li> <li>- impairment of access; and</li> <li>- for facilities equipped with pumps, inspect pumps and structures for pump operation and structural integrity</li> </ul> <p><b>Annually:</b> Remove sediments/sludge from the impoundment as needed to maintain at least 80 percent of designed capacity.</p>
<b>Lined Non-Stormwater Impoundments outside the Hydrologic Influence of the Retention Basin (Ponds, Sumps, Impoundments and Associated Conveyance Systems; east of Mineral Creek)</b>	
Seepage Collection Pond (C38)	<p><b>Quarterly and after 2”- 24hour rain event (as measured from the nearest rain gauge):</b></p> <p>Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- Perforated or cut or damaged liner and impairment of anchor trench integrity (for HDPE-lined impoundments) or cracking (clay-lined impoundments);</li> <li>- impairment of embankment integrity;</li> <li>- excessive erosion in conveyances and diversions;</li> <li>- accumulation of debris in conveyances and diversions;</li> <li>- impairment of access; and</li> <li>- inspect pumps and structures for pump operation and structural integrity.</li> </ul> <p><b>Annually:</b> Remove excess sediments/sludge from the impoundment as needed to maintain at least 80 percent of design capacity.</p>
<b>Tailing Impoundment – Non-passive Containment</b>	
Elder Gulch Tailings Facility (C36)	<p><b>Weekly:</b> Check for any evidence of equipment or structural damage.</p> <p><b>Monthly and after 2”-24hour rain event (as measured from the nearest rain gauge):</b></p> <p>Check for any evidence of:</p> <ul style="list-style-type: none"> <li>- At pump installations, inspect pumps and structures for pump operation and structural integrity, including inspection for preventative maintenance, and</li> <li>- Check liner at facility toe for perforated, cut, or damaged liner and impairment of anchor trench integrity.</li> </ul> <p><b>Annually:</b> Check facility height does not exceed 2,590 feet amsl.</p>

**4.2 COMPLIANCE (or OPERATIONAL) MONITORING**

**TABLE 4.2.4**  
**Quarterly Compliance Groundwater Monitoring**

<b>POC Locations</b>	<b>ADWR Registration Number</b>	<b>Latitude (North)</b>	<b>Longitude (West)</b>
R-18	55-534853	33° 07' 34"	110° 58' 35"
R-19	55-534852	33° 07' 34"	110° 58' 35"
R-22	55-543974	33° 07' 33"	110° 58' 36"
R-2	55-525710	33° 07' 17.3"	110° 58' 14.9"
R-2a	55-533677	33° 07' 09.8"	110° 57' 53.7"
R-3	55-525711	33° 07' 07.5"	110° 57' 32.3"
R-4	55-525712	33° 07' 03.9"	110° 57' 07.0"
R-4a	55-534346	33° 07' 40.8"	110° 56' 56.3"





**4.2 COMPLIANCE (or OPERATIONAL) MONITORING**

**TABLE 4.2.5**  
**Biennial Compliance Groundwater Monitoring<sup>8</sup>**

PARAMETER	R-18		R-19		R-22	
	AQL	AL	AQL	AL	AQL	AL
Adjusted Gross Alpha Particle Activity (pCi/L)	15.0	12.0	15.0	12.0	15.0	12.0
Radium 226 + Radium 228 (pCi/L)	5.0	4.0	5.0	4.0	5.0	4.0
Total Uranium (mg/L)	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor

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<sup>8</sup> One sample taken every two years

**4.2 COMPLIANCE (or OPERATIONAL) MONITORING**

**TABLE 4.2.6**  
**Deposition Monitoring for Elder Gulch Tailings Facility**

<b>Sampling Point Number</b>	<b>Maximum Deposition Limit</b>	<b>Sampling Frequency</b>	<b>Reporting Frequency</b>	<b>Latitude</b>	<b>Longitude</b>
A00554	65,400 dry tons per day	Daily Average	Quarterly	33° 07' 59" N	110° 57' 21" W

## **5.0 REFERENCES AND PERTINENT INFORMATION**

The terms and conditions set forth in this permit have been developed based upon the information contained in the following, which are on file with the Department:

1. APP Application dated: April 26, 2016
2. Contingency Plan, dated: August 16, 2012
3. Final Hydrologist Report dated: November 9, 2016
4. Final Engineering Report dated: March 2, 2017
5. Public Notice dated:
6. Responsive Summary, dated:

## **6.0 NOTIFICATION PROVISIONS**

### **6.1 Annual Registration Fees**

The permittee is notified of the obligation to pay an Annual Registration Fee to ADEQ. The Annual Registration Fee is based on the amount of daily influent or discharge of pollutants in gallons per day (gpd) as established by A.R.S. § 49-242.

### **6.2 Duty to Comply [A.R.S. §§ 49-221 through 263]**

The permittee is notified of the obligation to comply with all conditions of this permit and all applicable provisions of Title 49, Chapter 2, Articles 1, 2 and 3 of the Arizona Revised Statutes, Title 18, Chapter 9, Articles 1 through 4, and Title 18, Chapter 11, Article 4 of the Arizona Administrative Code. Any permit non-compliance constitutes a violation and is grounds for an enforcement action pursuant to Title 49, Chapter 2, Article 4 or permit amendment, suspension, or revocation.

### **6.3 Duty to Provide Information [A.R.S. §§ 49-243(K)(2) and 49-243(K)(8)]**

The permittee shall furnish to the Director, or an authorized representative, within a time specified, any information which the Director may request to determine whether cause exists for amending or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

### **6.4 Compliance with Aquifer Water Quality Standards [A.R.S. §§ 49-243(B)(2) and 49-243(B)(3)]**

The permittee shall not cause or contribute to a violation of an AWQS at the applicable POC for the facility. Where, at the time of issuance of the permit, an aquifer already exceeds an AWQS for a pollutant, the permittee shall not discharge that pollutant so as to further degrade, at the applicable point of compliance for the facility, the water quality of any aquifer for that pollutant.

### **6.5 Technical and Financial Capability [A.R.S. §§ 49-243(K)(8) and 49-243(N) and A.A.C. R18-9-A202(B) and R18-9-A203(E) and (F)]**

The permittee shall have and maintain the technical and financial capability necessary to fully carry out the terms and conditions of this permit. Any bond, insurance policy, trust fund, or other financial assurance mechanism provided as a demonstration of financial capability in the permit application, pursuant to A.A.C. R18-9-A203(C), shall be in effect prior to any discharge authorized by this permit and shall remain in effect for the duration of the permit.

### **6.6 Reporting of Bankruptcy or Environmental Enforcement [A.A.C. R18-9-A207(C)]**

The permittee shall notify the Director within five days after the occurrence of any one of the following:

1. the filing of bankruptcy by the permittee; or
2. the entry of any order or judgment not issued by the Director against the permittee for the enforcement of any environmental protection statute or rule.

### **6.7 Monitoring and Records [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A206]**

The permittee shall conduct any monitoring activity necessary to assure compliance with this permit, with the applicable water quality standards established pursuant to A.R.S. §§ 49-221 and 49-223 and §§ 49-241 through 49-252.

**6.8 Inspection and Entry [A.R.S. §§ 49-1009, 49-203(B), and 49-243(K)(8)]**

In accordance with A.R.S. §§ 41-1009 and 49-203(B), the permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to enter and inspect the facility as reasonably necessary to ensure compliance with Title 49, Chapter 2, Article 3 of the Arizona Revised Statutes, and Title 18, Chapter 9, Articles 1 through 4 of the Arizona Administrative Code and the terms and conditions of this permit.

**6.9 Duty to Modify [A.R.S. § 49-243(K)(8) and A.A.C. R18-9-A211]**

The permittee shall apply for and receive a written amendment before deviating from any of the designs or operational practices authorized by this permit.

**6.10 Permit Action: Amendment, Transfer, Suspension, and Revocation  
[A.R.S. §§ 49-201, 49-241 through 251, A.A.C. R18-9-A211, R18-9-A212 and R18-9-A213]**

This permit may be amended, transferred, suspended, or revoked for cause, under the rules of the Department. The permittee shall notify the Groundwater Section in writing within 15 days after any change in the owner or operator of the facility. The notification shall state the permit number, the name of the facility, the date of property transfer, and the name, address, and phone number where the new owner or operator can be reached. The operator shall advise the new owner or operators of the terms of this permit and the need for permit transfer in accordance with the rules.

**7.0 ADDITIONAL PERMIT CONDITIONS**

**7.1 Other Information [A.R.S. § 49-243(K)(8)]**

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, the permittee shall promptly submit the correct facts or information.

**7.2 Severability  
[A.R.S. §§ 49-201, 49-241 through 251, A.A.C. R18-9-A211, R18-9-A212 and R18-9-A213]**

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby. The filing of a request by the permittee for a permit action does not stay or suspend the effectiveness of any existing permit condition.

**7.3 Permit Transfer**

This permit may not be transferred to any other person except after notice to and approval of the transfer by the Department. No transfer shall be approved until the applicant complies with all transfer requirements as specified in A.A.C. R18-9-A212(B) and (C).