

**STATE OF ARIZONA**  
**AQUIFER PROTECTION PERMIT NO. P-101679**  
**PLACE ID No. 1567    LTF None**

**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, Phelps Dodge Sierrita, Inc. (PDSI) is hereby authorized to operate the Phelps Dodge Sierrita, Inc. Mine located in Green Valley, Arizona, Pima County, over groundwater of the Upper Santa Cruz Basin, in Sections 8, 9, 13, 16, 17, 19, 20, and 21, and parts of Sections 3-7, 10, 11, 14, 15, 18, and 24, in Township 18 South, Range 12 East; and Sections 17-20, 29, and parts of Sections 16, 21, 28, and 30 in Township 18 South, Range 13 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. R-18-9-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.

**1.0 PERMITTEE INFORMATION**

<b>Facility Name:</b>	Phelps Dodge Sierrita Incorporated (PDSI) Mine	
<b>Permittee:</b>	<b>Mailing Address:</b>	<b>Facility's Street Address:</b>
Phelps Dodge Sierrita Inc.	P.O. Box 527 Green Valley, AZ 85622-0257	6200 West Duval Mine Road Green Valley, AZ 85622
<b>Facility Contact:</b>	Michael Wood, Manager Environment, Land & Water	(520) 648-8700
<b>Emergency Telephone Number:</b>	(520) 648-8500	

**Latitude:**

**Longitude:**

**Legal Description:** Sections 8, 9, 13, 16, 17, 19, 20, and 21, and parts of Sections 3-7, 10, 11, 14, 15, 18, and 24, in Township 18 South, Range 12 East; and Sections 17-20, 29, and parts of Sections 16, 21, 28, and 30 in Township 18 South, Range 13 East, of the Gila and Salt River Base Line and Meridian.

**1.2 AUTHORIZING SIGNATURE**

\_\_\_\_\_  
**Joan Card, Director**  
**Water Quality Division**  
**Arizona Department of Environmental Quality**  
Signed this \_\_\_\_ day of \_\_\_\_\_, 2005

**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)]**

Phelps Dodge Sierrita, Inc. (PDSI) is operating an open pit mine and mineral concentration facility which is located approximately six (6) miles northwest of Green Valley, Arizona. Green Valley lies approximately twenty five (25) miles south of the city of Tucson, Arizona. PDSI operations (previously Cyprus Sierrita Corporation (CSC)) include conventional crushing and flotation followed by differential flotation, leaching and roasting of molybdenum disulfide, rhenium recovery, molybdenum disulfide production and packaging, molybdenum trioxide production and packaging, and leach dump, solvent extraction/electrowinning.

PDSI produces copper, molybdenum, and rhenium products. Copper and molybdenum disulfide is produced through conventional milling and froth flotation and pure copper is produced through solution extraction and electrowinning. Copper sulfate is produced through solution extraction and crystallization. Molybdenum trioxide is produced through roasting. Rhenium is also produced as a byproduct of the molybdenum roasting operations.

The Sierrita property consists of three open-pits (Sierrita pit, the Esperanza pit, and the Ocotillo pit), a 115,000-ton-per-day concentrator, two molybdenum roasting plants, a ferromolybdenum plant, a rhenium plant and an oxide and low grade sulfide dump leaching operation. Ore production from each pit is highly variable; however the aggregate production is limited to the capacity of the plant operation. The mine is capable of producing up to 250 million pounds of copper and, as a by-product, 25 million pounds of molybdenum annually. Domestic wastewater treatment is separately permitted under general permits, and is not permitted under this individual APP.

This permit authorizes the operation of the discharging facilities described below:

**2.1.1 Duval Canal Velocity Pond (D-64)(Non-Stormwater Impoundment)**

This new facility is an unlined flow-through structure, and receives stormwater run-off from the crushing and conveying area. It is sized for the 100 year, 24 hour storm event. Accumulated fluids drain into Duval Canal.

**2.1.2 Amargosa Pond (D-05)(Non-Stormwater Impoundment)**

This facility provides containment for stormwater run-off and upset conditions from Headwall No. 1, Bailey Lake, Raffinate Pond No. 2, and Drain Pond No. 2. It has a storage capacity of 49 acre-feet, and a depth of 25 feet. It has a single 80-mil HDPE liner, underlain by a compacted subgrade. Accumulated fluids are required to be pumped back into the leach circuit within 30 days.

**2.1.3 SX-1 Drain Pond (D-33)(Non-Stormwater Impoundment)**

This facility provides containment for any wash-down and run-off from the SX-1 Plant. It is double-lined, with two 60-mil HDPE liners, and a leakage collection and recovery system (LCRS). It has a storage capacity of 0.2 acre-feet, and an approximate depth of 7 feet. Accumulated fluids are pumped back into the SX-1 leach circuit.

**2.1.4 SX-1 Tank Farm Pond (D-34)(Non-Stormwater Impoundment)**

This facility provides containment for stormwater runoff and surface flows during upset conditions from the upgradient SX-1 Tank Farm Secondary Containment. It has a single 80-mil geomembrane liner, overlying a 3-inch gunnite layer, with a storage capacity of 0.12 acre-feet, and a depth of five feet. Accumulated fluid is pumped back into the SX-1 circuit.

**2.1.5 Headwall No. 1 (D-02)(PLS Impoundment)**

This facility provides containment for pregnant leach solution (PLS) from the oxide leach area. It is an unlined impoundment created by an earthen dam. The impoundment has a storage capacity of 3 acre-feet, and a maximum depth of 22 feet. Accumulated PLS is directed into Bailey Lake through an HDPE-lined channel. The facility is designed to overflow into Bailey Lake.

**2.1.6 Bailey Lake (D-03)(PLS Impoundment)**

The facility is designed to contain overflow and subsurface flow from Headwall No. 1, and excess fluid from the Moly Decant Tanks. It is an unlined impoundment behind an earthen dam, with a storage capacity of 135 acre-feet, and a maximum depth of 42.1 feet. Accumulated fluid is pumped to SX Plant Nos. 1 and 2. The facility is designed to overflow into Amargosa Pond through a concrete-lined spillway. A sump and pumpback system will be added downgradient to control seepage.

**2.1.7 Raffinate Pond No. 2 (D-10)(Raffinate Impoundment)**

This facility provides temporary storage for copper depleted leakage solution from SX Plants Nos. 1 and 2. It is double-lined, using two 60-mil HDPE liners with a LCRS, with a storage capacity of six acre-feet, and a maximum depth of 16 feet. Accumulated solution is pumped to the leach dumps for leaching operations.

**2.1.8 Drain Pond No. 2 (D-15)(Non-Stormwater Impoundment)**

This facility provides temporary containment for organics used in the SX Plants, and for upset conditions from Tank Farm 2. It is double-lined, using two 60-mil HDPE liners with a LCRS, with a storage capacity of one acre-foot, and a maximum depth of ten feet. Accumulated fluid is pumped to Raffinate Pond No. 2, the SX Strip Solution Tanks, or Headwall No. 1. It is designed to overflow into Amargosa Pond through a concrete-lined spillway.

**2.1.9 Moly Decant Tanks and Pad Area (D-39A)(Non-Stormwater Impoundment) <sup>1</sup>**

Facility consists of four partially below-ground steel-reinforced concrete walls with an adjacent steel-reinforced concrete drying pad. The adjacent drying pad is approximately 60 feet by 110 feet. Each Moly Decant Tank is 50 feet by 26 feet and 3-4 feet deep, with a soil/bentonite admix bottom. The impoundments provide containment of overflow from the molybdenum processing thickeners. Any excess fluid is pumped to Bailey Lake. The concrete pad is used to further dry the molybdenum concentrate. Once dry, concentrate is moved to the molybdenum roaster. Downgradient, two interceptor trenches, equipped with pump-back systems, capture any potential discharge and pump it back into the SX circuit.

**2.1.10 Sierrita Active Oxide Leach Area (D-17)(Leach Dump)**

This facility is an oxide leach dump. The facility covers an area of 446 acres. Raffinate is applied to the facility, and leachate is collected in the downgradient Headwall Nos. 1 and 3. Containment of the overflow and run-on from storm events is provided by Amargosa Pond and SW-3 Pond.

**1.0.0 Duval Canal (D-29)(Conveyance Channel)**

This facility is a solution conveyance channel lined with an 80-mil HDPE geomembrane. It is 4.25 miles long, 10 feet wide, and 6 feet deep, with a design flow capacity of 31,000 cubic feet per second (c.f.s.). The facility receives surface runoff from the Mill Site, overflow from Amargosa Pond and B Pond, seepage from B and C Sumps. Fluids are conveyed to the Sierrita Tailings Impoundment.

**2.1.12 Amargosa Spillway (D-48)(Conveyance Channel)**

This facility is a solution conveyance channel lined with an 80-mil HDPE geomembrane. It is 1,950 feet, 29 feet wide, and 3-5 feet deep, with a design flow capacity of 1,762 c.f.s.. The facility receives overflow from Amargosa Pond during upset conditions, and stormwater run-off from upgradient areas. Fluids are conveyed to Duval Canal.

**2.1.13 07 Pond (D-43)(Non-Stormwater Impoundment)**

This facility provides containment for stormwater runoff from the Ocotillo Waste Rock Pile, and native upgradient areas to the East. It has a 80-mil HDPE liner, a storage capacity of 24.9 acre-feet, and a depth of 25 feet. Accumulated fluids are pumped to the Raw Water Reservoir.

**2.1.14 New D Pond (D-45)(Non-Stormwater Impoundment)**

This facility provides containment for run-off from the closed CLEAR Plant and Copper Sulfate areas. The impoundment is single lined with an 80-mil HDPE liner, has a storage capacity of 14 acre-feet, and a depth of 8 feet. Accumulated fluids are gravity fed into Duval Canal through a 10-inch HDPE pipeline.

**2.1.15 Copper Sulfate Ponds 1 & 2 (D-59)(Non-Stormwater Impoundments)**

These facilities provide secondary containment for upset conditions in the Copper Sulfate Plant area. They are single lined, with 60-mil HDPE liners. Each impoundment has a storage capacity of 15,000 gallons, and a depth of seven feet. Accumulated fluid is pumped into the SX/Copper Sulfate circuit.

**2.1.16 Copper Sulfate Plant Tanks Secondary Containment Structures (D-65)(Non-Stormwater Impoundments)**

The facility provides secondary containment for seven above ground SX storage tanks, and runoff from the old plant area. The structure has a storage capacity of 14,000 gallons, and a depth of 8 inches. It is 118 feet long and 32 feet wide, with a 10-inch high curb around the perimeter. Accumulated fluids are pumped to Raffinate Pond #2.

**2.1.17 Tailing Pipeline Containment Structures (D-62A-F)(Non-Stormwater Impoundments)**

These facilities provide containment for breaches in the tailings slurry pipeline and reclaim pipeline. The six containment structures are soil compacted, with a depth of 8 inches. Structures A and B have a storage capacity of 1.462 million gallons, and C-F have a storage capacity of 1.815 million gallons.

**2.1.18 SX-3 Stormwater Pond (D-11)(Non-Stormwater Impoundment)**

This impoundment provides containment of stormwater run-off from native, upgradient terrain, upset conditions at Headwall No. 3, Raffinate Pond No. 3, SX-3 Drain Pond, and surface run-off from the Headwall No. 2 Area. The facility has a single 80-mil HDPE liner, a storage capacity of 52 acre-feet, and a depth of 17 feet. Accumulated solutions are pumped to Raffinate Pond No. 3, or, if needed, to Amorgosa Pond.

**2.1.19 SX-3 Drain Pond (D-31)(Non-Stormwater Impoundment)**

The impoundment receives leaching process solution (PLS, raffinate,organics) from the SX-3 Tank Farm Secondary Containment, and stormwater. It is double-lined with two 60-mil HDPE liners and a LCRS. The storage capacity is 2.6 acre-feet. Accumulated solutions are pumped back into the leach circuit. The facility is designed to overflow through a lined spillway into the SX-3 Stormwater Pond.

**2.1.20 Cat Pond 1 (D-42A)(Non-Stormwater Impoundment)**

The facility provides containment for stormwater run-off from the Sierrita Waste Rock Pile and upgradient native terrain, and upset conditions from Headwall No. 5. It is lined with an 80-mile HDPE liner, has a fluid storage capacity of 25.2 acre-feet, and a depth of 27 feet. Accumulated fluid is pumped into the leach circuit.

**2.1.21 Cat Pond 2 (D-42B)(Non-Stormwater Impoundment)**

The facility provides containment for stormwater run-off from the Sierrita Waste Rock Pile and upgradient native terrain. It is lined with an 80-mile HDPE liner, has a fluid storage capacity of 60.1 acre-feet, and a depth of 40 feet. Accumulated fluid is pumped into the leach circuit.

**2.1.22 Raffinate Pond No. 3 (D-04)(Process Solution Impoundment)**

This facility provides containment for stormwater run-off, during upset conditions from SX-3 Stormwater Pond, Headwall No.3, and Headwall No. 5, and subsurface flows pumped from Interceptor No. 3. It is designed to overflow through a lined spillway into SX-3 Stormwater Pond. It is double-lined with two 60-mil HDPE liners and LCRS, with a storage capacity of 16 acre-feet, and a maximum depth of 22 feet.

**2.1.23 Headwall No. 2 (D-46)(Process Solution Impoundment)**

This facility collects PLS from the oxide and sulfide leach areas. The headwall is lined with an 80-mil HDPE liner on the face of the dam, and is keyed into bedrock. Accumulated fluid is discharged into Raffinate Pond No. 3 using a 10-inch diameter HDPE pipeline. The facility is designed to overflow through Headwall No. 2 Channel into SX-3 Stormwater Pond.

**2.1.24 Headwall No. 3 (D-09)(Process Solution Impoundment)**

This facility collects PLS from the Sierrita Sulfide Active Leach Area, and upgradient stormwater runoff. It is partially lined with 80-mil HDPE liners, with a storage capacity of 15 acre-feet, and a maximum depth of 21 feet. Accumulated fluid is pumped through two 24-inch HDPE pipelines into a concrete vault, and then to Raffinate Pond No. 3. It is designed to overflow through a concrete-lined spillway into Stormwater No. 3 Pond.

**2.1.25 Headwall No. 5 (D-12)(Process Solution Impoundment)**

The facility receives potentially impacted stormwater commingled with PLS from the Sierrita Active Leach Area. It is partially lined with an 80-mil HDPE liner, has a storage capacity of 11.44 acre-feet, and a maximum depth of 20 feet. Accumulated fluid is pumped to Headwall No. 3.

**2.1.26 Sierrita Active Leach Area (D-18)(Leach Dump)**

This facility is a sulfide leach dump, covering a surface area of 446 acres. Raffinate is applied to the facility, and the PLS collected at Headwall No. 1 and/or Headwall No. 3. Stormwater overflow and run-on is contained in Amargosa Pond and SW-3 Pond.

**2.1.27 Headwall No. 2 Channel (D-08)(Solution Conveyance Channel)**

This facility provides conveyance for stormwater from upgradient native terrain, and during upset conditions from an upgradient booster station. It is 2,500 feet long, 10 feet wide at the base, and 2.5 feet deep. It is lined with a 60-mil HDPE liner, and has a flow capacity 420 c.f.s. Accumulated fluid is discharged at the east end of SX-3 Stormwater Pond.

**2.1.28 Rhenium Plant Sump (D-63)(Non-Stormwater Impoundment) <sup>1</sup>**

The facility is a single-lined secondary containment with a 90-mil PVC liner underlain by 6-inch thick steel reinforced concrete poured as part of the adjacent pad. A 100-mil HDPE rubber sheet cushion is laid down at the bottom of the impoundment beneath the 90-mil liner. The impoundment is 4 feet x 4 feet x 3.5 feet deep provides secondary containment during upset condition from the concrete pad which is used for temporary storage of packaged and sealed sodium perchlorate. Accumulated fluid in the impoundment during upset conditions is recovered into the Rhenium processing.

**2.1.29 Raw Water Reservoir (D-21)(Non-Stormwater Impoundment)**

The facility is a single-lined impoundment with a 3-foot thick compacted bentonite-amended soil liner with a hydraulic conductivity of approximately  $2 \times 10^{-8}$  cm/sec. The impoundment has a fluid storage capacity of 25 acre-feet, with a depth of 50 feet. The impoundment provides containment for plant make-up water pumped from the interceptor wellfield east of the tailing impoundment, reclaim water from the tailings, fresh water from Canoa wellfield and Esperanza wellfield and periodically stormwater from 07 Pond.

**1.0.0 Decant Ponds and Pad Area (D-20)(Process Solution Impoundments)**

This facility consists of reinforced concrete lined basins (6-inch thick concrete with polyethylene tape-sealed joints and PVC liner on the side walls) covered by gunnite. The pad area is 44 feet by 276 feet. The facility provides containment of overflow from the copper-moly thickeners and used for settling and recovery of solids. Reclaimed fluids are pumped to the reclaim pond on the Sierrita Tailing Impoundment.

**2.1.31 Tailing Thickeners (D-40)(Process Solution Impoundments)**

This facility consists of four circular walls, each with a diameter of 508 feet, and a maximum depth of 23 feet. The walls are constructed with concrete, the floor with 3 feet of compacted soil-bentonite admix with an average hydraulic conductivity of  $2.2 \times 10^{-8}$  cm/sec and average moisture content of 8.9%. The thickener area is underlain by Tertiary intrusives. The impoundments provide containment of the tailings before they are pumped out to the tailing disposal area.

**2.1.32 Drainage Channel West Plant Area (D-22)(Solution Conveyance Channel)**

This facility provides conveyance for stormwater run-off, and upset conditions from the West Plant Area. It is 5,370 feet long, 40-100 feet wide, and 4-10 feet deep, with a 60-mil HDPE liner. It is designed to flow into Duval Canal.

**2.1.33 Thickeners Area Drainage Channel (D-41)(Solution Conveyance Channel)**

This facility conveys stormwater run-off, and upset conditions of process solutions in the Sierrita Mill tailing thickener area. It is lined with a 60-mil HDPE liner, is 18 feet wide, with an average depth of 6 feet, and is designed to flow into Duval Canal.

**2.1.34 Sierrita Tailing Impoundment (D-01)(Tailing Impoundment)**

This tailings impoundment covers an area of 3,614 acres, with a 2,500 foot divider dam to separate it into north and south sections. Water accumulates toward the west side of the impoundment, and is pumped to the Raw Water Reservoir. Tailings are deposited such that the finer grained tailings slimes provide a low permeability coating of the floor of the impoundment, to minimize infiltration of fluids.

**2.1.35 Sierrita Tailing Impoundment Sediment Ponds (D-01 A-K)(Tailings Impoundments)**

The facility consists of eleven unlined sediment ponds with varying storage capacities. Caliche layers provide a zone of permeability relatively lower than the underlying alluvium. The sediment ponds provide containment for surface water run-off from the face of tailing dam along with the tailings that have been discharged off the tailing impoundment and deposited into these ponds. Accumulated fluid is allowed to evaporate. Water is pumped to the Raw Water Reservoir.

**2.1.36 Blue Algae Pond (D-58)(Tailings Impoundment)**

This facility consists of a single-lined impoundment with a 36-mil ultra violet (UV) protected polypropylene geomembrane liner and three 500-gallon tanks. The facility is located on top of the Esperanza Tailing Impoundment with relatively low permeability. The impoundment has a storage capacity of approximately 1 acre-foot with a depth of 6 feet. The impoundment provides containment of algae cultures used as a biological soil crust reducing fugitive dust from the tailing impoundment. Accumulated cultures are pumped out into the active tailing impoundment.

**2.1.37 West Waste Rock Piles (D-19)(Waste Rock Piles)**

These facilities store waste rock from mining operations. Run-on is diverted upstream of the piles, while run-off from precipitation falling on the piles gravity flows into Cat Ponds 1 and 2.

**2.1.38 Ocotillo Waste Rock Pile (D-36)(Waste Rock Pile)**

This facility stores waste rock from mining operations. The facility covers approximately 200-250 acres. Run-on is diverted upstream of the piles, while run-off from precipitation falling on the piles flows into 07 Pond through an HDPE-lined collection channel located at the toe of the pile.

**2.1.39 M Waste Rock Pile (D-47)(Waste Rock Pile)**

This facility stores waste rock from mining operations. Run-off from the facility enters the Sierrita-Esperanza Pit.

**2.1.40 V Waste Rock Pile (D-56)(Waste Rock Pile)**

This new facility stores waste rock from mining operations. The runoff from the facility follows the

natural drainage.

**2.1.41 Sierrita-Esperanza Pit (D-55)(Open Pit)**

This facility is an open pit created by mining operations. It has a surface area of 72 million square feet, and a depth of approximately 1,650 feet. The pit creates a passive containment with the groundwater boundary at an elevation of 3800 feet a.m.s.l. The storage capacity of the facility is about 500 million gallons. The pit receives surface stormwater, and overflow from SX-3 Stormwater Pond, Amargosa Pond, and the Truck Wash. Accumulated fluid is pumped to the SX Plant and the reclaim water system.

**2.1.42 Ocotillo Pit (D-60)(Open Pit)**

This facility is an open pit created by mining operations. It is approximately 1,800 feet in diameter. It provides containment for stormwater run-off discharging directly to the bottom of the pit. It is inaccessible due to overburden encroachment of the access ramp. PDSI plans to backfill this pit with waste rock, which will minimize the potential for discharge.

**2.1.43 Moly Satellite Pit (D-61)(Open Pit)**

This facility is a series of push-backs representing the beginnings of a new open pit, located immediately north of the Sierrita-Esperanza Pit. Accumulated stormwater is pumped to the solution storage area in the Sierrita-Esperanza Pit.

**2.1.44 Truck Wash (D-16)(Vehicle Wash)**

The facility is located near the maintenance shop on the south side of the Sierrita Pit. Trucks are washed off by high-pressure hoses with the water discharging through a metal grate to a concrete-lined sump for settling of solids. The water is then run through an oil water separator and discharged to the Sierrita Pit.

**2.1.45 Vehicle Wash (D-30)(Vehicle Wash)**

This facility consists of a concrete pad sloping toward a center drain and associated piping. The facility is located in the main plant area west of the Tailing Thickeners. High-pressure water is used to clean vehicles; no surfactants are used. Drainage goes directly to the West Plan Area Drainage Channel.

**2.1.46 Copper Concentrate Storage (D-35)(Storage Facility)**

The facility is an engineered concrete-reinforced pad with a 18-inch thick concrete containment berm underlain by 6-inches of compacted gravel. Facility is underlain by bedrock with relatively low hydraulic conductivity ranging from  $10^6$  cm/sec to  $10^4$  cm/sec.

**Footnote 1:** Some facilities use the term “tank” or “sump” in their descriptive title. These are listed among the discharging facilities covered by this permit because they do not meet the statutory definition of exempt facilities.

**Annual Registration Fee [A.R.S. § 49-242(D)]**

The Annual Registration Fee for this permit is established by A.R.S. § 49-242(D) and is payable to ADEQ each year. The design flow is 10,000,000 gallons or more.

**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 permittee shall maintain financial capability throughout the life of the facility. The estimated dollar amount demonstrated for financial capability is \$ 1 billion. The financial capability was demonstrated through A.A.C. R18-9-A203(D)(1)(h), utilizing a letter of credit for the Phelps Dodge Corporation.

**2.2 Best Available Demonstrated Control Technology (BADCT)**

**[A.R.S. § 49-243(B) and A.A.C. R18-9-A202(A)(5)]**

For facilities listed in Section 4.1, Table 4.1.1, design and construction details are described in the APP application and supplemental file documents. Also, this technical information outlines how each facility is operated to ensure the greatest degree of discharge reduction achievable through application of BADCT, processes, operating methods or other alternatives, including, where practicable, a technology permitting no discharge of pollutants. All permitted facilities shall be constructed, operated, and maintained in accordance with BADCT, as outlined in the application and Section 4, Table 4.1.1. All facilities have been evaluated for BADCT under APP requirements, except for those facilities for which information related to the BADCT evaluation is required to be submitted under the compliance schedule (Section 3.0). Facility D-30, Vehicle Wash, will require a facility upgrade or replacement to meet BADCT requirements. The following facilities may require upgrades to meet BADCT, depending upon ADEQ evaluation of submittals required under the compliance schedule: Bailey Lake (D-03), Sierrita Active Oxide Leach Area (D-17), Sierrita Active Sulfide Leach Area (D-18), West Waste Rock Pile (D-19), M Waste Rock Pile (D-47), "V" Waste Rock Pile (D-56), Sierrita Tailing Impoundment Basin (D-01 A-K), Sierrita Tailing Impoundment (D-01).

**2.2.1 Engineering Design**

The facilities list, with BADCT descriptions, is located in Section 4.1, Table 4.1.1.

Outlined below is the BADCT summary for permitted facilities in three principal drainages at the mine site, with other discharging facilities concentrated in the Mill Area and the tailings impoundments. Also included in the permitted facilities are the two vehicle washes used for cleaning mine haulage trucks and other vehicles.

The three (3) principal drainages are: (1) Amargosa Wash which trends east from the waste rock piles and flows into Demetrie Wash; (2) Demetrie Wash which trends southeast from the Sierrita mine-mill area across the southwest side of the Sierrita Tailings Impoundment to the confluence with the Santa Cruz River approximately seven miles southeast of the Sierrita Mill; and (3) Tinaja-Esperanza Wash which trends southeast from the waste rock piles. The three (3) washes are ephemeral tributaries to the Santa Cruz River.

**Amargosa Wash Drainage**

The major storage and surface impoundments in the Amargosa Drainage Area, including Amargosa Pond, Raffinate Pond No. 2, Drain Pond No. 2, SX-1 Drain Pond, SX-1 Tank Farm Pond, and the Amargosa Spillway are lined with geomembranes. Headwall No. 1 and Bailey Lake are unlined impoundments, with both facilities serving to collect subsurface drainage from the active oxide leach area. Duval Canal (conveyance channel) is now completely lined with the recent installation of an HDPE geomembrane along the previously unlined portion of the canal between Demetrie Wash to the Sierrita Tailings Impoundment. Amargosa Pond collects overflow from Headwall No. 1, Bailey Lake, Raffinate Pond No. 2, Drain Pond No. 2, and SX-1 Tank Farm Pond. Collected solutions are pumped to Raffinate Pond No. 2, Bailey Lake, or the LTO Box which returns liquids to the leach circuit.

**Demetrie Wash Area**

All the facilities contained in the Demetrie Wash Area are non-stormwater, lined impoundments, with the exception of Tailing Pipeline Containment Structures. The containment structures, which are compacted to 95 percent maximum dry density, within 3 percent of optimum moisture content, provide secondary containment in the event there is a breach in the reclaim pipeline or tailing slurry pipeline. The newly constructed, single-lined Copper Sulfate Ponds 1 and 2 provide secondary containment during upset conditions in the Copper Sulfate Plant area.

**Esperanza Wash Drainage**

The solutions applied to the leach areas tend to move laterally in the subsurface because of the low permeability zone beneath the veneer of alluvium. Natural topography promotes surface drainage into the washes where solution is captured by headwalls. Headwall Channel No. 2, Headwall No. 3, and Headwall No. 5 are partially



lined facilities and have either a cut-off trench or headwall keyed into bedrock or interceptor trench to capture subsurface flows. Each of the non-storm water facilities, Headwall No. 2 Channel, and Raffinate Pond No. 3, are lined facilities.

Raffinate Pond No. 3 receives solutions pumped from Headwalls 2, 3, and 5, subsurface flow from Interceptor No. 3, and upset solutions and stormwater pumped from SX-3 Stormwater Pond. Solution from Raffinate Pond No. 3 is pumped either to Bailey Lake (Amargosa Wash Drainage) or back to the leach area. SX-3 Stormwater Pond can accept overflow flows from Raffinate Pond No. 3, Headwall No. 3, and SX-3 Drain Pond via lined channels. Solutions can be pumped to Amargosa Pond when needed. CAT Ponds 1 and 2 are non-stormwater ponds with lined spillways to manage stormwater from upgradient native terrain, run-off from the Sierrita Waste Rock Pile, and overflows from Headwall No. 5 during upset conditions.

### **Mill Area**

All of the permitted facilities in the Mill Site Area are lined with geomembrane or soil-bentonite admix or concrete-lined. The concrete-lined Decant Ponds and Pad Area captures overflow from the copper-moly thickeners and returns it to the Sierrita milling process. The Tailings Thickeners are four (4) tanks with concrete walls and a soil/bentonite liner at the base; the liquid content is deposited in the Tailings Impoundment. The Raw Water Reservoir has a 3-ft thick soil/bentonite liner and is used to store water from the Canoa wellfield, decant water from the decant ponds, water from the tailings thickeners, and water recovered from the tailings.

### **Tailings Impoundments**

The Sierrita Tailings Impoundment has low permeability slimes coating the floor of the impoundment to reduce seepage. Caliche layers near ground surface are common in the area. Diversion channels to the west and upgradient divert surface water run-on. Duval Canal controls interior stormwater runoff into the Tailings Impoundment. Run-off on the exterior flows to catchment basins. Twenty-four (24) interceptor wells are installed east and south of the impoundment to capture potentially impacted groundwater. There is quarterly monitoring of piezometers and inclinometers along the dam to ensure dam safety.

### **Vehicle Washes**

The vehicle washes use concrete slabs for waste wash-water, with the water from the Truck Wash discharged to the Sierrita Pit, and from the Vehicle Wash to the West Plant drainage channel. The Vehicle Wash will be upgraded or replaced to include an oil/water separator so that the facility meets BADCT requirements.

## **1.0.0 Site Specific Characteristics**

The passive containment created by the Sierrita-Esperanza Pit is used as an integral part of BADCT for the following facilities:

Truck Wash (D-16), Sierrita Active Oxide Leach Area (D-17), Sierrita Active Leach Area (D-18), West Waste Rock Piles (D-19), and M Waste Rock Pile (D-47), and Moly Satellite Pit (D-61).

### **1.1.1 Pre-Operational Requirements**

Not applicable.

### **2.2.4 Operational Requirements**

At a minimum, permitted facilities shall be inspected for performance levels listed in Section 4.2, Table 4.2.1. Results of these inspections and monitoring activities shall be documented and maintained at the mine location for at least ten (10) years, and as required by Section 2.7.2 of this permit.

If damage is identified during an inspection that could cause or contribute to an unauthorized discharge, proper repairs shall be promptly performed. A summary of the repairs, including a description of the procedures and materials used shall be maintained with the inspection records noted above.

The Action Leakage Rates and Rapid and Large Leakage Rates shall be determined as required in the Compliance Schedule for the following facilities:

<b>Table 2.2.4 Leakage Rates for LCRS Facilities</b>		
<b>Facility Name (#)</b>	<b>Action Leakage Rate (GPD)</b>	<b>Rapid and Large Leakage Rate (GPD)</b>
Raffinate Pond No. 3 (D-04)	Reserved	Reserved
Raffinate Pond #2	Reserved	Reserved
Drain Pond No. 2 (D-15)	Reserved	Reserved
SX-3 Drain Pond (D-31)	Reserved	Reserved
SX-1 Drain Pond (D-33)	Reserved	Reserved

GPD = Gallons per day.

**2.2.5 Construction, Closure, or Evaluation Requirements Under Compliance Schedules**

For closure of existing facilities, construction completion, or evaluations to verify effectiveness of BADCT demonstrations for existing facilities listed in the Compliance Schedule (see Section 3.0), PDSI shall submit the original and one (1) copy of the work plan for approval to the Arizona Department of Environmental Quality (ADEQ) Water Permits Section, Mining Unit (WPS-MU) at the address shown in Section 2.7.5. One (1) copy of the work plan, less attachments, shall be provided to the ADEQ Water Quality Compliance Section, Enforcement Unit (WQCS/EU) at the address shown in Section 2.7.5.

Work plan submittals shall follow sound engineering practice recognized industry-wide, and shall include defining the issue, describing the work to be performed, including any construction specification(s), and describing any sampling and testing protocols used in the construction quality assurance plans. Work plans shall be submitted as soon as practicable, but not less than one (1) month prior to initiation of the work plan. Work plan initiation shall not commence until approval from the WPS-MU is obtained.

**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 to prevent unauthorized discharges resulting from failure or bypassing of BADCT pollutant control technologies including liner failure, uncontrollable leakage, overtopping, berm breaches, accidental spills, or other unauthorized discharges. The permittee shall not exceed the maximum storage capacity of any permitted facility and shall maintain the freeboard specified in Section 4.0, Table 4.1.1 in each permitted impoundment at all times during normal operation. If an unauthorized discharge occurs, the permittee shall follow the provisions of Sections 2.6.3 and 2.6.5.

**2.3.1 Leaching Facilities**

The Leaching Facilities are designated and authorized for use in leaching of ore. The permittee shall maintain the permitted Leaching Facilities to ensure that there are no uncontrollable leaks, berm breaches, accidental spills, or other unauthorized discharges into the environment. The Leaching Facilities shall be constructed and operated in accordance with the BADCT outlined in Section 4.1, Table 4.1.1, and the ultimate heights shall not exceed those set forth in the approved permit application and engineering study.

**2.3.2 Pregnant Leach Solution (PLS) Ponds and Impoundments**

The PLS Ponds and Impoundments are designated and authorized to receive pregnant leach solution, stormwater,

process water and process upset events. The permittee shall maintain these permitted impoundments to ensure that there are no liner failures, uncontrollable leaks, overtopping, berm breaches, accidental spills, or other unauthorized discharges. Appropriate freeboard shall be maintained during normal operation.

**2.3.3 Non-Stormwater Impoundments**

The permitted non-stormwater impoundments shall be maintained to ensure that there are no liner failures, uncontrollable leaks, overtopping, berm breaches, accidental spills, or other unauthorized discharges. They are authorized to receive stormwater runoff and run-on, and process solutions. Appropriate freeboard shall be maintained during normal operation.

**2.4 Point(s) of Compliance (POC) [A.R.S. § 49-244]**

There are fifteen (15) established POC well locations. The permittee shall install two (2) additional POC wells per the Compliance Schedule (Section 3.0). Table 2.4.1 lists the POC wells:

<b>Table 2.4.1 POINTS OF COMPLIANCE (POC) FOR SIERRITA MINE <sup>1</sup></b>					
<b>Well Number</b>	<b>Designation <sup>5</sup></b>	<b>Cadastral Location <sup>2</sup></b>	<b>Latitude North <sup>2</sup></b>	<b>Longitude West <sup>2</sup></b>	<b>ADWR Number <sup>3</sup></b>
<b>MH-14*</b>	Hazardous / Non-Hazardous	(D-18-13) 16bcc2	31° 51§ 48.8”	111° 01§ 28.8”	55-528098
<b>MH-15W*</b>	Hazardous / Non-Hazardous	(D-18-13) 21cbc	31° 50§ 44”	111° 01§ 28.5”	55-528093
<b>MH-16W*</b>	Hazardous / Non-Hazardous	(D-18-13) 28cbb3	31° 49§ 58.3”	111° 01§ 28.7”	55-528099
<b>MH-18</b>	Hazardous / Non-Hazardous	(D-18-12) 20cdd	31° 50§ 28.4”	111° 08§ 26”	55-561874
<b>MH-19</b>	Hazardous / Non-Hazardous	(D-18-12) 21ccc	31° 50§ 29.1”	111° 07§ 43.7”	55-561878
<b>MH-20</b>	Hazardous / Non-Hazardous	(D-18-12) 21dda	31° 50§ 38”	111° 06§ 47.1”	55-561880
<b>MH-21</b>	Hazardous / Non-Hazardous	(D-18-12) 11bbc	31° 52§ 58.7”	111° 05§ 36.3”	55-561881
<b>MH-22</b>	Hazardous / Non-Hazardous	(D-18-12) 14bdd1	31° 51§ 50.8”	111° 05§ 17.5”	55-561872
<b>MH-23</b>	Hazardous / Non-Hazardous	(D-18-12) 14bdd2	31° 51§ 51.6”	111° 05§ 17.4”	55-561871
<b>MH-27</b>	Hazardous / Non-Hazardous	(D-18-12)21add	31° 51§ 02”	111° 06§ 54”	55-203702
<b>MH-28* <sup>4</sup></b>	Hazardous / Non-Hazardous	To be determined	To be determined	To be determined	To be determined
<b>MH-29* <sup>4</sup></b>	Hazardous / Non-Hazardous	To be determined	To be determined	To be determined	To be determined
<b>MH-11</b>	Non-Hazardous	(D-18-13)16ddd	31° 51§ 22.6”	111° 00§ 40.4”	55-803637
<b>MH-12</b>	Non-Hazardous	(D-18-13)16daa	31° 51§ 45.3”	111° 00§ 38.6”	55-803638
<b>MH-25A*</b>	Non-Hazardous	(D-18-13)9dda	31° 52§ 22”	111° 00§ 41”	55-201528
<b>MH-26A*</b>	Non-Hazardous	(D-18-13)9aaa	31° 53§ 04”	111° 00§ 41”	55-201527
<b>Point of Compliance (POC) Well – Narrative Standard</b>					

<b>Table 2.4.1 POINTS OF COMPLIANCE (POC) FOR SIERRITA MINE <sup>1</sup></b>					
<b>CW-8</b>	Non-Hazardous	Pending	Pending	Pending	Pending
<sup>1</sup> All POC wells are proposed and must be installed according to the permit compliance schedule. <sup>2</sup> Cadastral coordinates and latitude and longitude bearings are approximate. The “as-built” coordinates must be incorporated into the permit following installation of each well. <sup>3</sup> Arizona Department of Water Resources (ADWR) well registration numbers must be amended to the permit. Pursuant to A.A.C. R18-9-A211(c)(2), adding the ADWR well registration numbers shall be considered a minor permit amendment. <sup>4</sup> POC Wells to be installed per Compliance Schedule in Section 3.0. <sup>5</sup> Hazardous = Well used to monitor hazardous constituents. Non-Hazardous = Well used to monitor non-hazardous constituents. * East-Half POC Wells					

The monitoring parameters and requirements for each POC well are listed in Section 4.2, Tables 4.2.2, 4.2.3 and 4.2.4. 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(K)(1), A.A.C. R18-9-A206(A)]**

All monitoring required in this permit shall continue for the duration of the permit, regardless of the status of the facility. 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. The permittee shall consult the most recent version of the ADEQ Quality Assurance Project Plan (QAPP) and Environmental Protection Agency (EPA) Title 40 Code of Federal Regulations (CFR) PART 136 for guidance in this regard. 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.

**2.5.6 Discharge Monitoring**

None required by this permit.

**2.5.2 Facility / Operational Monitoring**

The operational monitoring requirements for the facilities referenced in Section 4.1, Table 4.1.1 are listed in Section 4.2, Table 4.2.1.

**2.5.3 Groundwater Monitoring and Sampling Protocols**

**2.5.3.1 Groundwater Sampling Protocol**

Static water levels shall be measured and recorded prior to sampling. Wells shall be purged of at least three borehole volumes (as calculated using the static water level) or until indicator parameters (pH, temperature, conductivity) are stable, whichever represents the greater volume. If evacuation results in the well going dry, the well shall be allowed to recover to 80% of the original borehole volume, or for seventy-two (72) hours, whichever is shorter, prior to sampling. If after twenty-four (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).

As an alternative method for sampling, the permittee may conduct the sampling 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 shall include dissolved oxygen, turbidity, pH, temperature, and conductivity.

### **2.5.3.2 POC Well Installation**

Ten (10) existing monitor wells designated as hazardous/non-hazardous POC wells are listed in Section 2.4, Table 2.4.1. Four (4) additional wells listed in Section 2.4, Table 2.4.1, referred to as MH-11, MH-12, MH-25A and MH-26A, are designated as non-hazardous POC wells. Wells MH-11, MH-12, MH-25A and MH-26A are located on the alluvial basin downgradient from and northeast of the tailings impoundment and will monitor a sulfate plume designated as a non-hazardous contaminant. The permittee shall install each well in accordance with all ADWR requirements. Each new POC well must be constructed to monitor groundwater quality in the uppermost aquifer in accordance with the compliance schedule.

### **2.5.3.3 Ambient Groundwater Monitoring for POC Wells**

Per the Compliance Schedule, eight (8) consecutive quarters of groundwater sampling must be completed in MH-27 to establish ambient groundwater quality conditions in that well. For new wells MH-28 and MH-29, ambient groundwater quality will be established by collecting twelve (12) consecutive monthly sample rounds in each well, per the Compliance Schedule. Each quarterly or monthly ambient groundwater sample shall be analyzed for the parameters listed in Section 4.2, Table 4.2.2. Ambient sampling is not required for monitor wells MH-11, MH-12, MH-25A, and MH-26A.

### **2.5.3.4 Alert Levels (ALs) for POC Wells**

ALs shall be calculated for all contaminants with an established numeric AWQS for each POC well except CW-8, MH-11, MH-12, MH25A, and MH-26A. The AL and AQL for each parameter for which the eight (8) quarters of ambient samples have been completed, are listed in Section 4.2, Tables 4.2.3, 4.2.4, and 4.2.5.

Where ambient sampling is required, within ninety (90) days of the receipt of the laboratory analyses for the final quarter or month of the ambient groundwater monitoring period for each POC well referenced in Section 2.4, Table 2.4.1 the permittee shall submit the ambient groundwater data in tabulated form to the WPS-MU for review. Copies of all laboratory analytical reports, field notes, and the Quality Assurance/Quality Control (QA/QC) procedures used in collection and analyses of the samples for all parameters listed in Section 4.2, Tables 4.2.3, 4.2.4, and 4.2.5 to be established for each POC well, shall be submitted to the WPS-MU. 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 by the WPS-MU. The ALs shall be established and calculated by the following formula, or another method submitted to WPS-MU in writing and approved for this permit by the WPS-MU:

$$AL\ M = + K\sigma$$

Where M = mean,  $\sigma$  = 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 in the permit:

1. The AL shall be calculated for a parameter using the analyses from a minimum of eight (8) consecutive quarterly sample events. For new wells not installed prior to or on the effective date of the permit, twelve

- (12) consecutive monthly sample rounds must be used to calculate ALs. The permittee shall not use more than twelve (12) sample rounds in the calculation of a parameter.
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 and the AQL at the AWQS.

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

For each of the monitored analytes for which a numeric AWQS has been adopted, 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 the monitoring point.

Using the same methodology, ADEQ reserves the right to set ALs or AQLs at a future time, where applicable, for those analytes that may have a numeric standard.

#### **2.5.3.6 Narrative Aquifer Water Quality Standards for Non-Hazardous POC Wells**

Narrative Aquifer Water Quality Standards shall be established for the non-hazardous contaminant sulfate in POC well CW-8, pursuant to the Compliance Schedule in Section 3.0, using the methodology described in ADEQ Substantive Policy Statement, titled *Using Narrative Aquifer Water Quality Standards to Develop Permit Conditions for Aquifer Protection Permits*. An interim AL of 650 mg/L for sulfate is set in the permit for POC Well CW-8 to protect downgradient users of the aquifer.

#### **2.5.3.7 Compliance Groundwater Monitoring for POC Wells**

Quarterly compliance groundwater monitoring in POC wells MH-27, MH-28 and MH-29 shall commence within the first calendar quarter after completion of the ambient groundwater sampling period. Quarterly compliance groundwater monitoring in all other POC wells shall commence within the first calendar quarter after the effective date of this permit. For quarterly compliance monitoring, the permittee shall analyze groundwater samples for the parameters listed in Section 4.2, Table 4.2.3, and 4.2.4. In addition to quarterly compliance groundwater monitoring, every two (2) years (biennial) the permittee shall analyze samples from the POC wells for an expanded list of parameters. For the biennial monitoring event, the parameters listed in Section 4.2, Table 4.2.5 shall be analyzed. The biennial sampling event shall replace the regularly scheduled quarterly sampling event. The permittee may submit a written request to the WPS-MU to modify, reduce or delete a monitoring parameter in the quarterly or biennial compliance groundwater monitoring tables (Section 4.2, Tables 4.2.3, 4.2.4, and 4.2.5) in accordance with the following criteria:

1. The parameter in question has not been detected for at least two (2) consecutive biennial or four (4) consecutive quarterly monitoring events in the well. The PQL reported by the laboratory shall be less than 80% of the established numeric AWQS, and shall not be greater than three (3) times the laboratory method detection limit for that parameter.
2. The permittee shall submit a written report indicating the parameter(s) proposed for modification, accompanied by supporting data, including laboratory analytical reports and quality assurance/quality control data, to the ADEQ WPS-MU for review.
3. Upon review, the WPS-MU will determine if the modification(s) requested is justified and approved. The respective changes, if approved, will require an amendment to the permit.

**2.5.3.8 POC Well Replacement**

In the event that one (1) or more of the designated POC wells should become unusable or inaccessible due to damage, a decrease in water levels, or any other event, a replacement POC well shall be constructed and installed within sixty (60) days upon approval by the WPS-MU.

**2.5.3.9 Passive Containment Demonstration**

Based on supporting documentation provided in the Application, the permittee has satisfactorily predicted that the Sierrita-Espananza 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 five (5) years from the effective date of this permit. The results of the post-audit shall be submitted to the WPS-MU 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 passive containment. 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. The passive containment modeling projections shall be based solely on natural or engineered topographical, geological, or hydrological control measures that can operate without continuous maintenance (A.R.S. § 49-243(G)(1)).

Every five (5) years thereafter, 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 the 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 WPS-MU for review.

Each post-audit report shall include a revised table of groundwater elevations 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 WPS-MU.

**2.5.4 Surface Water Monitoring and Sampling Protocols**

None required by 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. Analyses shall be performed by a laboratory licensed by the Arizona Department of Health Services, Office of Laboratory Licensure and Certification. 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> Ave.  
Phoenix, AZ 85007

Phone: (602) 364-0720

### **1.1.1 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 WPS-MU for approval prior to installation and the permit shall be amended to include any new monitoring points.

## **2.6 Contingency Plan Requirements**

### **2.6.1 General Contingency Plan Requirements**

At least one copy of the approved contingency and emergency response plan(s) submitted in response to the Compliance Schedule, Section 3.0, 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 that is exceeded or any violation of an AQL, discharge limit (DL), or other permit condition shall be reported to ADEQ following the reporting requirements in Section 2.7.3.

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 of an AQL, 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. The permittee is subject to enforcement action for the failure to comply with any contingency actions in this permit. 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 has 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.

### **2.6.2 Exceeding of Alert Levels**

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

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

In the event that freeboard performance levels in a surface impoundment are not maintained, the permittee shall:

- 1) Immediately cease or reduce discharging to the reservoir to prevent overtopping. Remove and properly dispose or recycle to other plant processes the excess wastewater in the reservoir until the water level is restored at or below the permitted freeboard limit.
- 2) Within 5 days of discovery, evaluate the cause of the incident and adjust operational conditions as necessary to avoid future occurrences.
- 3) Record in the facility log, the amount of wastewater 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). Records documenting each freeboard incident and actions taken to correct the problem shall be included in the Annual Report as required in Section 2.7.1 (Self Monitoring Report Forms).



- 4) 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.

**B. Performance Levels, Other Than Freeboard**

1. If an operational AL listed in Section 4, Table 4.2.1 has been observed or noted during required inspection and operational monitoring, the permittee shall immediately investigate to determine the cause of the condition. The investigation shall include the following:
  - A. Inspection, testing, and assessment of the current condition of all treatment or pollutant discharge control systems that may have contributed to the operational performance condition.
  - B. Review of recent process logs, reports, and other operational control information to identify any unusual occurrences.
2. The AL exceedance, results of the investigation, and any corrective action taken shall be reported to the Water Quality Compliance Section, Enforcement Unit (WQCS/EU), within thirty (30) days of the discovery of the condition. Upon review of the submitted report, the Department may amend the permit to require additional monitoring, increased frequency of monitoring, or other actions.
3. The permittee shall initiate actions identified in the approved contingency plan referenced in Section 3 and any specific contingency measures identified in Section 2.6 to resolve any problems identified by the investigation which may have led to an AL being exceeded. To implement any other corrective action the permittee shall obtain prior approval from ADEQ according to Section 2.6.6.

**2.6.2.2 Exceeding of Alert Levels Set for Discharge Monitoring**

Not applicable.

**2.6.2.3 Exceeding of Alert Levels in Groundwater Monitoring Wells**

**2.6.2.3.1 Alert Levels for Indicator Parameters**

Not applicable for this permit.

**2.6.2.3.2 Alert Levels for Pollutants with Numeric Aquifer Water Quality Standards**

1. If an AL for a pollutant set in Section 4, Tables 4.2.3, 4.2.4, or 4.2.5 has been exceeded, the permittee may conduct verification sampling within 5 days of becoming aware of an AL being exceeded. 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. If verification sampling confirms the AL being exceeded 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 investigation of the cause of the AL being exceeded, including inspection of all discharging units and all 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.

3. The permittee shall initiate actions identified in the approved contingency plan and specific contingency measures identified in Section 2.6 to resolve any problems identified by the investigation which may have led to an AL being exceeded. 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 Water Permits 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 Water Permits Section.
4. Within thirty (30) days after confirmation of an AL being exceeded, the permittee shall submit the laboratory results to the Water Quality Compliance Section, Data Unit along with a summary of the findings of the investigation, the cause of the AL being exceeded, 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 ALs being exceeded may be reduced to the regularly scheduled frequency, if the results of three (3) consecutive monthly sequential sampling events demonstrate that no parameters exceed the AL.

**2.6.2.3.3 Alert Levels for Pollutants with Narrative Aquifer Water Quality Standards**

1. The ADEQ has determined that a Use Protection Limit for sulfate of 400 mg/L shall be established in the permit at groundwater well ESP-4 (Esperanza Wellfield).
2. The ADEQ has set an Interim AL for sulfate of 650 mg/L, established in groundwater monitor well CW-8, to provide the indicated use protection in ESP-4.
3. The permittee may utilize the ADEQ Substantive Policy Statement *Using Narrative Aquifer Water Quality Standards to Develop Permit Conditions for Aquifer Protection Permits*, to propose an alternative AL for ADEQ approval.

**2.6.2.3.4 Alert Levels to Protect Downgradient Users from Pollutants Without Numeric Aquifer Water Quality Standards**

1. If the AL set for sulfate in POC Well CW-8 has been exceeded, the permittee may conduct verification sampling within 15 days of becoming aware of an AL being exceeded.
2. If verification sampling does not confirm that an exceedance has occurred, the permittee shall notify the WQCS/EU of the results, and assume that there has been no exceedance.
3. If verification sampling confirms that the AL has been exceeded, or no verification sample is taken, the permittee shall conduct one or more of the following contingency actions:
  - A. Install or provide a permanent replacement well or alternative source of water,
  - B. Install an interceptor well system to prevent further spread of the high-sulfate ground water
  - C. Install a water treatment system
  - D. Propose other methods to reduce sulfate concentrations in the high-sulfate ground water of the aquifer.
4. The permittee shall submit to the WPS/MU for approval, a corrective action plan, within 30 days of receipt of verification of the AL exceedance. This plan shall include a schedule for completion of proposed activities described in the plan.
5. The permittee shall also immediately notify all downgradient users of the aquifer who may be directly affected by the discharge.

#### **2.6.2.4 Exceedance of Action Leakage Rate for Process Solution Impoundments**

At a minimum, the permittee shall initiate the following actions within three (3) days of becoming aware of an exceedance of an action leakage rate for a facility listed in Section 2.2.4, Table 2.2.4. All information shall be recorded in a log book as described in Section 2.7.2. The permittee shall:

1. Drain and/or pump out all fluid collected in the leak collection and recovery system (LCRS) to reduce head on the liner system;
2. Quantify and record the amount of fluid pumped from the leak collection and recovery system on a weekly basis until the leakage rate is no longer exceeded;
3. Assess the potential for migration of liquids out of the containment system; and,
4. Assess the current condition of the liner system.
5. Take appropriate corrective action to mitigate the cause(s) of the exceedance.

#### **2.6.2.5 Rapid and Large Leakage Exceedance in the Process Solution Impoundments**

Additional response actions based on rapid and large leakage rate (RLL) for a facility listed in Section 2.2.4, Table 2.2.4 shall include the following:

1. Notify the WQCS/EU within twenty- four (24) hours of becoming aware of the exceedance,
2. Reduce the hydraulic head on the liner including emptying of the portion of the impoundment over the affected liner,
3. Conduct visual inspection to identify areas of leakage,
4. Repair all identified areas of leakage within ninety (90) days of discovery,
5. Initiate closure, temporary cessation, or partial closure of the impoundment if identified areas of leakage cannot be repaired within ninety (90) days of discovery,
6. After repairs have been made, monitor the leakage rate on a weekly basis while the impoundment is being filled, and for a period of three (3) months after filling.

Within thirty (30) days of a confirmed RLL exceedance, the permittee shall submit a written report to the WPS-MU. The written report shall include a description of the exceedance and its potential causes, the period of exceedance and the anticipated time period during which the exceedance is expected to continue, and a description of any actions taken or planned to be taken to eliminate or prevent recurrence of the exceedance and to mitigate the impacts of the exceedance. Upon approval of the WPS-MU, the permittee shall initiate the actions necessary to mitigate the impacts of the exceedance.

#### **2.6.3 Discharge Limitations (DL) Violations**

If a DL set in Sections 2.6.3.1, 2.6.3.2 or 2.6.3.3 has been violated, the permittee shall immediately investigate to determine the cause of the violation.

##### **2.6.3.1 Liner Failure, Containment Structure Failure, or Unexpected Loss of Fluid**

If there is an unexpected loss of fluid, failure of a containment structure, or leakage through the liner system of a permitted surface impoundment, such that fluids are released to the vadose zone, the permittee shall take the following actions:

1. Immediately cease all non-gravity inflows to the surface impoundment as necessary to prevent any further releases to the environment.
2. Within 24-hours of discovery, notify the ADEQ WQCS/EU.
3. Within five (5) days of discovery of a failure that resulted in a release 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 4.2.3. Within thirty (30) days of the incident, submit a copy

- of the analytical results to ADEQ WQCS/EU.
4. Within fifteen (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 made available for ADEQ review.
  5. Within thirty (30) days of discovery, remove any 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 any disposal arrangements. The facility log/recordkeeping file shall be maintained according to Section 2.7.2 (Operation Inspection / Log/Recordkeeping File).
  6. Within thirty (30) days of discovery of the incident, submit a report to ADEQ as specified in Section 2.7.3 (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 sixty (60) days of discovery, conduct an assessment of the impacts to the subsoil and/or groundwater resulting from the incident, including geophysical assessment of release to the sub-surface. If soil or groundwater is impacted such that there is a reasonable probability that pollutants will reach an aquifer, submit to ADEQ, for approval, a corrective action plan to address problems identified in the assessment, including identification of releases to the environment, 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 thirty (30) days of completion of corrective actions, submit to ADEQ, a written report as specified in Section 2.6.6 (Corrective Actions).

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

If overtopping of fluid from a permitted surface impoundment occurs, the permittee shall:

1. Immediately cease non-gravity inflows to the surface impoundment to prevent any further releases to the environment.
2. Within 24-hours of discovery, notify the ADEQ WQCS/EU.
3. Within five (5) 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 4.2.3. Within thirty (30) days of the incident, submit a copy of the analytical results to the ADEQ WQCS/EU.
4. Within five (5) days of discovery, remove and dispose of or recycle excess fluid in the impoundment until the water level is restored at or below the required freeboard. Record in the facility log, the amount of fluid removed, a description of the removal method, and any disposal arrangements. The facility log/recordkeeping file shall be maintained according to Section 2.7.2 (Operation Inspection / Log/Recordkeeping File).
5. Within thirty (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 thirty (30) days of discovery of overtopping, submit a report to ADEQ as specified in Section 2.7.3 (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 sixty (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 POC, submit to ADEQ for approval, a corrective action plan to address problems identified in the assessment, including identification of releases to the environment, 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 thirty (30) days of completion of corrective actions, submit to ADEQ, a written report as specified in Section 2.6.6 (Corrective Actions).

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

If any unauthorized materials flow to a permitted surface impoundment, the permittee shall:

1. Immediately cease all unauthorized inflows to the surface impoundment(s).
2. Within 24-hours of discovery, notify the ADEQ WQCS/EU.
3. Within five (5) days of the incident, identify the source of the material and determine the cause for the inflow. Characterize the unauthorized inflow and contents of the affected impoundment, and evaluate the volume and concentration of the inflow 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 unauthorized discharges.
4. Within thirty (30) days of an inflow of unauthorized materials, submit a report to ADEQ as specified in Section 2.7.3 (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, 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 (AQL) Violation in Groundwater Monitor Wells**

1. If an AQL set in Section 4.2, Tables 4.2.3, 4.2.4, or 4.2.5 has been exceeded, the permittee may conduct verification sampling within 5 days of becoming aware of an AQL being exceeded. 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. If verification sampling confirms that the AQL is violated for any 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 discharging units and all 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.

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 downgradient users who may be directly affected by the discharge.
5. The permittee shall continue monitoring at the increased frequency until the contaminant(s) is below

the AQL and AL for three consecutive months.

**2.6.5 Emergency Response and Contingency Requirements for Unauthorized Discharges [A.R.S. § 49-201(12) and pursuant to A.R.S. § 49-241]**

**2.6.5.1 Duty to Respond**

The permittee shall act immediately to correct any condition resulting from a discharge (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 (A.R.S. § 49-201(12)) of suspected hazardous substances (A.R.S. § 49-201(18)) 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 ADEQ Water Quality Field Service Unit (WQFSU) at (602) 771-4620 within 24-hours upon discovering the discharge of hazardous material which: a) has the potential to cause an AQL to be exceeded; 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 (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 ADEQ WQFSU at (602) 771-4620 within 24-hours upon discovering the discharge of non-hazardous material which: a) has the potential to cause an AQL to be exceeded at the applicable point of compliance; or b) 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 ADEQ WQCS/EU within thirty (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 that notice. Upon review of the submitted report, ADEQ may require additional monitoring or corrective actions.

A post-audit report regarding the passive containment demonstration is required within five years of the effective date of this permit, and every five years thereafter, in accordance with Section 2.5.3.9 of this permit.

**2.6.6 Corrective Actions**

Specific contingency measures identified in Section 2.6 and actions identified in the approved contingency plan referenced in Section 3.0 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 WPS-MU prior to implementing a corrective action to accomplish any of the following goals in response to exceeding 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 thirty (30) days of completion of any corrective action, the operator shall submit to the ADEQ WQCS/EU, 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 Forms (SMRF)**

1. The permittee shall complete the SMRFs provided by ADEQ, and submit them to the WQCS/DU.
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 quarter, the permittee shall enter "not required" on the SMRF and submit the report to ADEQ. The permittee shall use the format devised by ADEQ.
3. The tables contained in Section 4 of this permit list the parameters to be monitored and the frequency for reporting results for groundwater compliance monitoring. Analytical methods shall be recorded on the SMRFs.
4. In addition to the SMRF, the applicable information contained in Section 6.8 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, and a log book (paper copies, forms or electronic data) of the inspections and measurements required by this permit, shall be maintained at all times at the location where day-to-day decisions regarding the operation of the facility are made.

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;
6. Any other information required by this permit to be entered in the log book, and
7. 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 WQCS/EU in writing within five (5) days (except as provided in Section 2.6.5) of becoming aware of a violation of any permit condition, discharge limitation or of an AL being exceeded.
2. The permittee shall submit a written report to the WQCS/EU within thirty (30) days of becoming aware of the violation of any permit condition or discharge limitation. 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 its 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 Operational, Other or Miscellaneous Reporting**

The permittee shall, upon completion of the biennial sampling described in Table 4.2.4, submit a monitoring summary report to the Water Permits Section. This report shall be due at the same time as the SMRF form for the biennial sampling event. 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, Action Levels, or operational limits 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 Discharge Impact 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.
6. A list of any new sumps, impoundments, or vehicle washes constructed within the passive containment, unless exempt or covered by a general APP.

**2.7.5 Reporting Location**

All SMRFs shall be submitted to:

Arizona Department of Environmental Quality  
Water Quality Compliance Section, Data Unit  
Mail Code: 5415B-1  
1110 W. Washington Street  
Phoenix, AZ 85007  
Phone (602) 771-4681

All documents required by this permit to be submitted to the Water Quality Compliance Section shall be directed to:

Arizona Department of Environmental Quality  
Water Quality Compliance Section, Enforcement Unit  
Mail Code: 5415B-1  
1110 W. Washington Street  
Phoenix, AZ 85007  
Phone (602) 771-4614

All documents required by this permit to be submitted to the Water Permits Section, Mining Unit shall be directed to:

Arizona Department of Environmental Quality  
Water Permits Section, Mining Unit



Mail Code: 5415B-3  
1110 W. Washington Street  
Phoenix, AZ 85007  
Phone (602) 771-4428

**2.7.6 Reporting Deadline**

The following table lists the quarterly report (SMRF) due dates:

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

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

The WPS-MU and WQCS/DU shall be notified within ten (10) 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 Water Quality Compliance Section before ceasing operation of the facility for a period of sixty (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's approval, the permittee shall implement the approved plan. If necessary, ADEQ shall amend permit conditions to incorporate conditions to address temporary cessation. Every three years during the period of temporary cessation, the permittee shall provide written notice to the Water Quality Compliance Section of the operational status of the facility. 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 Water Quality Compliance Section of the permittee's intent to cease operation without resuming activity for which the facility was designed or operated.

**2.9.1 Closure Plan**

Within ninety (90) days following notification of closure, the permittee shall submit for approval to the WPS-MU, a Closure Plan with sufficient detail to satisfy the requirements of A.R.S. § 49-252 and A.A.C. R18-9-A209(B)(1)(a).

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.

**2.9.2 Closure Completion**

Upon completion of closure activities, the permittee shall give written notice to the WPS-MU indicating that the approved Closure Plan has been implemented fully. 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 (1) year thereafter under a diligent schedule of closure actions;
2. Further action is necessary to keep the facility in compliance with aquifer water quality standards at the applicable point of compliance;
3. Continued action is required to verify that the closure design has eliminated discharge to the extent intended;
4. Remedial or mitigative 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 shall be established based on a review of facility closure actions and will be subject to review and approval by the WPS-MU.

In the event clean closure cannot be achieved pursuant to A.R.S. § 49-252, the permittee shall submit for approval to the WPS-MU 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(29) 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**

Reserved.

**2.10.2 Post-Closure Completion**

Reserved.

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

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 WPS-MU. A copy of the cover letter must also be submitted to the WQCS/DU.

ITEM DESCRIPTION	TIME TO COMPLETE	REMARKS
<b>DISCHARGE IMPACT AREA</b>		
Delineation of Discharge Impact Area	Twelve (12) months from effective date of permit	Define the discharge impact area using the sulfate plume characterization study.
<b>POINT OF COMPLIANCE WELLS</b>		
POC Well Installation: Wells MH-28 and MH-29	Thirty (30) days after effective date of APP No. P-101679	Wells must be designed in accordance with all ADWR requirements. A work plan including the location of the well and the well design must be submitted to ADEQ thirty days after the effective date of the APP. Wells will be designed to be screened within the uppermost aquifer. The well screen should extend a maximum of fifty (50) feet above and a maximum of one hundred thirty (130) feet below the top of the current non-pumping water level. If a longer well screen is used, the permittee must include an explanation in the well design plan or the well log for the longer screen interval.
POC Well Installation: Wells MH-28 and MH-29	Fifteen (15) days after receiving approval from ADEQ	Within fifteen days of receiving approval from the ADEQ, PDSI shall submit completed notice of intent forms to Arizona Department of Water Resources (ADWR) detailing well construction information.
POC Well Installation: Wells MH-28 and MH-29	Ninety (90) days after receiving ADWR approval	Wells shall be drilled and installed as approved by ADEQ and ADWR within ninety days after receiving approval from ADWR.
POC Well Installation: Wells MH-28 and MH-29	Forty-five (45) days after completion of construction of wells	Geologic and well construction logs must be submitted to ADEQ within forty-five (45) days of well installation. The logs must include the ADWR well registration number, and the “as built” cadastral and latitude and longitude coordinates for thewells.
Ambient Water Quality Monitoring: Wells MH-28 and MH-29	Eighteen (18) months after effective date of APP No. P-101679	Each well must be sampled for ambient water quality for twelve (12) consecutive months. The first sample event must be completed within sixty (60) days of well installation. Each well must be sampled for all of the parameters listed for the well in Table 4.2.2.
Alert Levels (AL) and Aquifer Quality Limits (AQL) for POC wells MH-28 and MH-29	Twenty-one (21) months after effective date of APP No. P-101679	Submit within three (3) months following completion of the ambient sampling period, copies of all laboratory analytical reports, field notes, the QA/QC data used in collection and analysis of the samples, and a report including the statistical calculations of the ALs and AQLs to ADEQ WPS-MU. Incorporation of these data will constitute a minor amendment to the permit.

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ITEM DESCRIPTION	TIME TO COMPLETE	REMARKS
<p>POC Well Compliance Monitoring Wells MH-14, MH-15W, MH-16W, MH-18, MH-19, MH-20, MH-21, MH-22, MH-23</p> <p>Compliance Monitoring for POC Wells MH-28 and MH-29</p>	<p>Beginning with the first calendar quarter after the effective date of APP No. P-101679. Submittal of quarterly Self Monitoring Report Forms (SMRF) shall follow the due date schedule in Section 2.7.6</p> <p>Beginning with the first calendar quarter following completion of the ambient sampling period or no later than twenty-one (21) months after the effective date of APP P-101679.</p>	<p>Sample for parameters listed in Table 4.2.3 for quarterly sampling events. Sample for parameters listed in Table 4.2.4 for biennial events in place of Table 4.2.3 parameters. Following completion of each compliance monitoring event, submit copies of SMRFs to the ADEQ, WQCS-DU according to the schedule in Section 2.7.6.</p>
<p>Ambient Water Quality Monitoring for POC Well MH-27</p>	<p>Twenty-four (24) months after the effective date of APP No. P-101679.</p>	<p>POC well MH-27 shall be sampled for eight (8) consecutive quarters beginning with the first calendar quarter after the effective date of the permit. The permittee shall submit an annual progress report to ADEQ, WPS-MU at twelve (12) months and twenty-four (24) months after the effective date of the permit, containing the analytical results from these samples.</p>
<p>Alert Level (AL) and Aquifer Quality Limits (AQL) for POC well MH-27</p>	<p>Twenty-seven (27) months after the effective date of APP P-101679.</p>	<p>Submit within three (3) months following completion of the ambient sampling period, copies of all laboratory analytical reports, field notes, the QA/QC data used in the collection and analysis of the samples, and a report including the statistical calculations of the ALs and AQLs for this well to ADEQ, WPS-MU. Incorporation of these data to the permit will constitute a minor amendment to the permit.</p>
<p>Compliance Monitoring for Non-hazardous POC Wells MH-11, MH-12, MH-25 and MH-26</p>	<p>Beginning with the first calendar quarter following the effective date of the permit, submit quarterly SMRFs to ADEQ following the schedule in Section 2.7.6</p>	<p>Submit quarterly Self Monitoring Report Forms (SMRFs) to ADEQ, WQCS-DU.</p>
<p><b>POINT OF COMPLIANCE WELL – NARRATIVE STANDARD</b></p>		
<p>Narrative Aquifer Water Quality Standards for Non-hazardous POC well CW-8</p>	<p>Twelve(12) months after the effective date of APP No. P-101679</p>	<p>Submit a report to ADEQ, WPS-MU containing a characterization of the regional aquifer and the extent of the sulfate plume beneath the Sierrita-Green Valley bajada. The report shall include calculations for establishing an Alert Level for sulfate at a POC well, based on a Use Protection Level of 400mg/L, in accordance with ADEQ's Narrative Aquifer Water Quality Standard Policy. An interim Alert Level for sulfate in POC Well CW-8 of 650 mg/L is established in this permit. The methodology used shall follow the criteria described in ADEQ's Substantive Policy Statement <i>Using Narrative Aquifer Water Quality Standards to Develop Permit Conditions for Aquifer Protection Permits</i>. The characterization investigation</p>

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<b>ITEM DESCRIPTION</b>	<b>TIME TO COMPLETE</b>	<b>REMARKS</b>
		may include installation of additional monitor wells, deepening of existing wells, depth specific groundwater quality sampling, hydraulic testing to determine hydrologic parameters, groundwater flow and transport modeling, investigation of the source of sulfate in well CW-7, or other investigative procedures. The report shall include the results of the groundwater flow and transport modeling. The report shall include an application for a permit amendment.
Performance Evaluation of Interceptor Wellfield	Twelve(12) months after the effective date of APP No. P-101679	The hydrologic report required for the narrative AWQS shall also include an evaluation of the performance of the interceptor wellfield to provide hydrologic capture to prevent exceedance of an AWQS at any applicable point of compliance.
Compliance Monitoring for Non-hazardous POC Well CW-8	Beginning with the first calendar quarter following the effective date of the permit, submit quarterly SMRFs to ADEQ following the schedule in Section 2.7.6.	Submit quarterly Self Monitoring Report Forms (SMRFs) to ADEQ, WQCS-DU.
<b>PASSIVE CONTAINMENT DEMONSTRATION</b>		
Sierrita-Esperanza open pit mine	Sixty (60) months from the effective date of APP No. P-101679, and every sixty (60) months thereafter until mine closure.	Permittee shall submit a post-audit report to the WPS-MU updating the passive containment demonstration, including any revisions resulting from hydrologic or operational changes observed during the reevaluation. The first post-audit is due five (5) years from the effective date of the permit with subsequent post-audits due every five (5) years thereafter.
<b>CONTINGENCY AND EMERGENCY RESPONSE PLAN</b>		
Contingency and Emergency Response Plan	Within 90 days of the effective date of the permit	Permittee shall submit for ADEQ approval a Contingency Plan that satisfies the requirements of Arizona Administrative Code R18-9-A204, including emergency response provisions.

**AQUIFER PROTECTION PERMIT**

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ITEM DESCRIPTION	TIME TO COMPLETE	REMARKS
<b>BADCT/ENGINEERING</b>		
SX-1 Drain Pond (D-33)	Thirty (30) days from effective date of permit	Submit the Action Leakage Rate (ALR) and the rate for the Rapid and Large Leakage (RLL) to ADEQ Aquifer Protection Program for approval, with an application for a permit amendment. The calculations shall be done in accordance with ADEQ memo MU03:0057, dated 3/31/2003 or other method approved by ADEQ.
Raffinate Pond No. 2 (D-10) Raffinate Pond No. 3 (D-04) Drain Pond No. 2 (D-15)  SX-3 Drain Pond (D-31)	Six (6) months from effective date of permit	Upon ADEQ approval, install dedicated pump with adequate design capacity to remove the fluid collected in the sump at each of the Leakage Collection and Recovery System (LCRS) sumps.
Bailey Lake (D-03)	Six (6) months from effective date of permit	Submit to ADEQ Aquifer Protection Program, for evaluation, 2 copies of the study conducted for neutralization potential and/or attenuation capacity in support of BADCT demonstration.
Sierrita Active Oxide Leach Area (D-17)	Twelve (12) months from effective date of permit	If evaluation indicates the need for additional facility upgrade, submit a revised BADCT approach identifying the preferred upgrade(s) to the ADEQ Aquifer Protection Program for review.
Sierrita Active Sulfide Leach Area (D-18)	Eighteen (18) months from effective date of permit	If required: Submit 2 copies of proposed design, construction and operational details of the preferred upgrade(s) to the ADEQ Aquifer Protection Program for approval, along with an application for a permit amendment.
	Thirty-six (36) months from effective date of permit	If required: Complete construction of the ADEQ approved design upgrade(s).
Sierrita Active Oxide Leach Area (D-17)	Twelve (12) months from effective date of permit	Submit to ADEQ Aquifer Protection Program, for evaluation, 2 copies of stability analysis (static and pseudostatic) based on facility's final configuration (ultimate height and foot-print).
Sierrita Active Sulfide Leach Area (D-18)	Eighteen (18) months from effective date of permit	If evaluation indicates the need for corrective measures to sustain acceptable safety factors, submit a revised BADCT approach, identifying the preferred corrective action(s) or upgrade (s) to the ADEQ Aquifer Protection Program for review and comments.
	Twenty-four (24) months from effective date of permit	If required: Submit 2 copies of proposed design, construction and operational details of the preferred corrective action(s) or upgrade(s) to the ADEQ Aquifer Protection Program for approval, along with an application for a permit amendment.
	Thirty-six (36) months from effective date of permit	If required: Complete construction of the ADEQ approved design for the corrective action(s) or upgrade(s).

**AQUIFER PROTECTION PERMIT**

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ITEM DESCRIPTION	TIME TO COMPLETE	REMARKS
West Waste Rock Piles (D-19)	Twelve (12) months from effective date of permit	Submit to ADEQ Aquifer Protection Program, for evaluation, 2 copies of stability analysis (static and pseudostatic) based on facility's final configuration (ultimate height and foot-print).
M Waste Rock Pile (D-47)	Eighteen(18) months from effective date of permit	If evaluation indicates the need for corrective measures to sustain acceptable safety factors, submit a revised BADCT approach, identifying the preferred corrective action(s) or upgrade(s) to the ADEQ Aquifer Protection Program for review and comments.
"V" Waste Rock Pile (D-56)	Twenty-four (24) months from effective date of permit	If required: Submit 2 copies of proposed design, construction and operational details of the preferred corrective action(s) or upgrade(s) to the ADEQ Aquifer Protection Program for approval, along with an application for a permit amendment..
	Thirty-six (36) months from effective date of permit	If required: Complete construction of the ADEQ approved design for the corrective action(s) or upgrade(s).
Sierrita Tailing Impoundment Basin (D-01 A-K)	Twelve (12) months from effective date of permit	Submit BADCT alternatives, identifying the preferred upgrade(s), to the ADEQ Aquifer Protection Program for review and comments.
	Twenty-four (24) months from effective date of permit	Submit 2 copies of the proposed design, construction and operational details of the preferred upgrades to the ADEQ Aquifer Protection Program for approval, along with an application for a permit amendment..
	Forty-two (42) months from effective date of permit	Complete construction of the ADEQ approved design upgrades
Vehicle Wash (D-30)	Twelve (12) months from effective date of permit	Submit to the ADEQ Aquifer Protection Program a facility upgrade or replacement for approval, along with an application for a permit amendment..
	Eighteen (18) months from effective date of permit	Complete implementation of the ADEQ approved design plan
Sierrita Tailing Impoundment (D-01)	Twelve (12) months from effective date of permit	Submit to the ADEQ Aquifer Protection Program, for evaluation, 2 copies of stability analysis (static and pseudostatic) based on facility's final configuration (ultimate height and foot-print).
	Eighteen (18) months from effective date of permit	If evaluation indicates the need for corrective measures to sustain acceptable safety factors, submit a revised BADCT approach, identifying the preferred corrective action(s) or upgrade(s) to the ADEQ Aquifer Protection Program for review and comments.
	Thirty (30) months from effective date of permit	If required: Submit 2 copies of proposed design, construction and operational details of the preferred corrective action(s) or upgrade(s) to the ADEQ Aquifer Protection Program for approval, along with an application for a permit amendment..
	Forty-eight (48) months from effective date of permit	If required: Complete construction of the ADEQ approved design for the corrective action(s) or upgrade(s).

**AQUIFER PROTECTION PERMIT**

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<b>ITEM DESCRIPTION</b>	<b>TIME TO COMPLETE</b>	<b>REMARKS</b>
B Pond (D-07)	Twelve (12) months from effective date of permit	Submit to ADEQ the test results of soil samples for total metals and SPLP, including the closure plan, for review and approval, along with an application for a permit amendment..
	Twenty-four (24) months from effective date of permit	Implement the ADEQ approved closure plan.
Copper Sulfate Plant Tanks Secondary Containment Structures (D-65)	Six (6) months from effective date of permit	Submit to the ADEQ Aquifer Protection Program, for evaluation, 2 copies of facility design drawings or as built drawings, including an appropriate freeboard and provision to overflow into an existing tertiary containment structure.
	Twelve (12) months from effective date of permit	Complete implementation of the ADEQ approved design plan.



**4.0 TABLES AND FIGURES**

**1.0 FACILITY AND POC TABLES**

TABLE 4.1.1 Permitted Facilities and BADCT

**2.0 COMPLIANCE AND OPERATIONAL MONITORING**

TABLE 4.2.1 Required Inspections and Operational Monitoring

TABLE 4.2.2 Table of Parameters for Ambient Groundwater Monitoring for Point of Compliance (POC) Wells MH-27, MH-28, and MH-29

TABLE 4.2.3 Quarterly Compliance Groundwater Monitoring Requirements for Non-Hazardous POC Wells

TABLE 4.2.4 Quarterly Compliance Groundwater Monitoring Requirements for Hazardous POC Wells

TABLE 4.2.5 Biennial Compliance Groundwater Monitoring Requirements for POC Wells

**4.3 SITE MAP** Attachment 1 Point of Compliance and Use Protection Wells

**TABLE 4.1.1  
PERMITTED FACILITIES AND BADCT**

Facility Name (PDSI Facility No.)	Latitude/Longitude	Facility BADCT
<b>AMARGOSA WASH DRAINAGE AREA</b>		
<b>Non-stormwater Impoundments:</b>		
Duval Canal Velocity Pond (D-64) New Facility	31° 52§ 10" N 111° 06§ 05" W	<b>Individual BADCT:</b> Facility is an unlined flow-through structure over-excavated and backfilled with on-site borrow material that was moisture conditioned and compacted to 95 percent maximum dry density. The facility is an energy dissipation and sediment pond that receives stormwater run-off from the crushing and conveying area. Accumulated fluids drain into Duval Canal.
Amargosa Pond (D-05)	31° 51§ 55" N 111° 06§ 00" W	<b>Individual BADCT:</b> Facility is an existing, single-lined impoundment with an 80-mil HDPE liner underlain by a 12-inch thick layer of compacted on-site native material. The HDPE liner is secured in an engineered anchor trench. The competent, andesite bedrock underlying the facility has relatively low hydraulic conductivity ranging from 10 <sup>-4</sup> cm/sec to 10 <sup>-6</sup> cm/sec. The impoundment has a fluid storage capacity of 49 acre-feet with a depth of 25 feet and is sufficient to contain stormwater run-on from a 100-year, 24-hour storm event. The impoundment provides containment for stormwater run-off and during upset conditions from Headwall No. 1, Bailey Lake, Raffinate Pond No. 2, and Drain Pond No. 2. Upstream, Interceptor No. 1 – a primary cutoff trench equipped with a sump and pump-back system captures any subsurface flow and pumps it back to Raffinate Pond No. 2. Downstream, Interceptor No. 2, a secondary cutoff trench equipped with a sump and pump-back system, captures any seepage from Amargosa Pond and subsurface flow not captured by the primary cutoff trench. The facility is designed to overflow through a 6-inch thick concrete-lined Amargosa spillway into Duval Canal. Accumulated fluid shall be pumped out into the leach circuit as soon as practical, but no later than thirty (30) days. The facility shall be operated with a minimum of 2 feet of freeboard.
SX-1 Tank Farm Pond (D-34)	31° 51§ 56" N 111° 06§ 02" W	<b>Individual BADCT:</b> Facility is an existing, single-lined impoundment with an 80-mil geomembrane overlying a 3-inch thick gunnite layer. The geomembrane is secured in an engineered anchor trench. The competent bedrock underlying the facility has relatively low hydraulic conductivity ranging from 10 <sup>-5</sup> cm/sec to 10 <sup>-7</sup> cm/sec. The impoundment has a storage capacity of 0.12 acre-feet with a depth of 5 feet. The impoundment provides containment for stormwater run-off and surface flows during upset conditions from the upgradient SX-1 Tank Farm Secondary Containment. Accumulated fluid is pumped back into the SX-1 circuit. The facility is designed to overflow into Amargosa Pond.
<b>Process Solution Impoundments:</b>		
Headwall No. 1 (D-02)	31° 51§ 49" N 111° 06§ 34" W	<b>Individual BADCT:</b> Facility is an existing unlined impoundment created behind an earthen dam across Amargosa Wash which is underlain by the existing land surface comprised of Quaternary alluvium and Demetrie volcanics. The impoundment has a fluid storage capacity of 3 acre-feet with a maximum depth of 22 feet. The impoundment provides containment for leachate (PLS) from the oxide leach area. Accumulated PLS is directed through an HDPE lined discharge channel and gravity fed to Bailey Lake. The facility is designed to overflow into Bailey Lake.
Bailey Lake (D-03)	31° 51§ 52" N 111° 06§ 17" W	<b>Individual BADCT:</b> Facility is an existing unlined impoundment constructed behind an earthen dam immediately below the Headwall No. 1 in Amargosa Wash. The subgrade, consisting of on-site native

**TABLE 4.1.1  
PERMITTED FACILITIES AND BADCT**

Facility Name (PDSI Facility No.)	Latitude/Longitude	Facility BADCT
		material, is compacted to 95 percent maximum dry density and is underlain by Quaternary alluvium and Demetrie volcanics. The impoundment has a fluid storage capacity of 135 acre-feet with a maximum depth of 42.1 feet. The impoundment provides containment for overflow and any subsurface flow from the upgradient Headwall No. 1. Accumulated fluid is pumped to SX Plant Nos. 1 and 2. Facility upgrade includes an interceptor trench, excavated into bedrock. The trench, equipped with a sump and pump-back system, is located immediately downgradient to capture any seepage from Bailey Lake. The facility is designed to overflow through a concrete-lined spillway into Amargosa Pond. See Compliance Schedule.
SX-1 Drain Pond (D-33)	31° 51' 55" N 111° 06' 05" W	<b>Prescriptive BADCT:</b> Facility is upgraded from a single-lined to a double-lined impoundment using 60-mil HDPE liners incorporating an LCRS. The bottom liner is underlain by a minimum of 6-inch thick layer of compacted 3/8-inch minus sand and gravel layer over a 1-inch minus gravel sub-grade. The competent andesite bedrock underlying the facility has relatively low hydraulic conductivity ranging from 10 <sup>-4</sup> cm/sec to 10 <sup>-7</sup> cm/sec. The HDPE liners are secured in an engineered anchor trench. The impoundment has a fluid storage capacity of 0.2 acre-feet with an approximate depth of 7 feet. The impoundment provides containment for any washdown and run-off from SX-1 Plant. Upstream, stormwater is diverted via roadway, away from facility. The facility is designed to overflow through an 8-inch HDPE pipe, installed 12 inches below the embankment crest, to SX-2 Drain Pond. Accumulated fluid shall be pumped out into the SX-1 circuit as soon as practical, but no later than 30 days. The Action Leakage Rate (ALR) and the Rapid and Large Leakage Rate (RLL) shall be determined by the permittee in accordance with the Compliance Schedule and the permit shall be amended to reflect these values. See Compliance Schedule.
Raffinate Pond No. 2 (D-10)	31° 51' 51" N 111° 06' 09" W	<b>Individual BADCT:</b> Facility is an existing double-lined impoundment using 60-mil HDPE liners incorporating an LCRS. The bottom liner is underlain by a geotextile cushion underlain by a 6-inch thick layer of compacted native material. The facility overlies shallow bedrock that has a low permeability ranging from 10 <sup>-4</sup> cm/sec to 10 <sup>-6</sup> cm/sec. The liners are secured in an engineered anchor trench around the impoundment perimeter. The impoundment has a fluid storage capacity of 6 acre-feet with a maximum depth of 16 feet. Surface water run-off is diverted away from the facility. The impoundment provides temporary containment for copper depleted leachate solution from SX Plant Nos. 1 and 2. Accumulated fluid is pumped to the leach dumps. The facility is designed to overflow through a concrete-lined spillway into Amargosa Pond. See Compliance Schedule.
Drain Pond No. 2 (D-15)	31° 51' 53" N 111° 06' 04" W	<b>Individual BADCT:</b> Facility is an existing double-lined impoundment using 60-mil HDPE liners incorporating an LCRS. The bottom liner is underlain by a geotextile cushion over 6-inch layer of compacted fine-grained material. The facility overlies shallow bedrock which has a low permeability ranging from 10 <sup>-5</sup> cm/sec to 10 <sup>-7</sup> cm/sec. The liners are secured in an engineered anchor trench around the impoundment perimeter. The impoundment has a fluid storage capacity of 1 acre-foot with a maximum depth of 10 feet. The impoundment provides temporary containment for organics used at SX Plant Nos. 1 and 2 and during upset conditions from Tank Farm 2. Accumulated fluid is pumped to Raffinate Pond No.2, SX Strip Solution Tanks,

**TABLE 4.1.1  
PERMITTED FACILITIES AND BADCT**

Facility Name (PDSI Facility No.)	Latitude/Longitude	Facility BADCT
		or Headwall No.1. Downstream, Interceptor No. 1 trench is excavated into bedrock to capture any subsurface flow. The trench is equipped with a sump and pump to discharge captured fluid, via an HDPE pipeline, into Raffinate Pond No. 2. The facility is designed to overflow through a concrete-lined spillway into Amargosa Pond. The Action Leakage Rate (ALR) and the Rapid and Large Leakage Rate (RLL) shall be determined by the permittee in accordance with the Compliance Schedule and the permit shall be amended to reflect these values. See Compliance Schedule.
Moly Decant Tanks and Pad Area (D-39A) New Facility	31° 51' 54" N 111° 06' 11" W	<b>Individual BADCT:</b> Facility consists of four partially below-ground steel-reinforced concrete walls with an adjacent steel-reinforced concrete drying pad. The adjacent drying pad is approximately 60 feet by 110 feet. The facility is underlain by crystalline (andesite) bedrock with relatively low permeability of 10 <sup>-4</sup> cm/sec to 10 <sup>-7</sup> cm/sec. Each Moly Decant Tank is 50 feet by 26 feet and 3-4 feet deep. The impoundments provide containment of overflow from the molybdenum processing thickeners. Any excess fluid is pumped to Bailey Lake. The concrete pad is used to further dry the molybdenum concentrate. Once dry, concentrate is moved to the molybdenum roaster. Downgradient, two interceptor trenches, equipped with pump-back systems, capture any potential discharge and pump it back into the SX circuit.
<b>Dump Leaching Area:</b>		
Sierrita Active Oxide Leach Area (D-17)	31° 51' 19" N 111° 07' 59" W	<b>Individual BADCT:</b> Facility is an existing oxide leach dump, constructed using the end dumping method over moderate-to-steeply sloping topography which minimizes the potential for discharge. The natural channels, within the leach dump footprint, are underlain by bedrock with relatively low permeability of 10 <sup>-5</sup> to 10 <sup>-9</sup> cm/sec. The facility covers a surface area of approximately 446 acres. The leachate is collected at the headwalls (Headwall No. 1 and/or Headwall No. 3) located immediately downgradient of the facility. Containment of overflow and run-on from a 100-year, 24-hour storm event is provided by Amargosa Pond and SW-3 Pond. The facility shall not exceed the aerial footprint shown in the APP application. The ultimate crest elevation of the facility shall not exceed 4350 feet amsl. See Compliance Schedule.
<b>Solution Conveyance Channels:</b>		
Duval Canal (D-29)	31° 51' 32" N 111° 04' 39" W	<b>Individual BADCT:</b> Facility is an existing canal (conveyance channel), initially lined with an 80-mil HDPE geomembrane extending from Sierrita Mill to Demetrie Wash Crossing. Recent upgrade includes installation of an 80-mil HDPE liner along the remaining segment from Demetrie Wash Crossing to Sierrita Tailing Impoundment. The liner is anchored in an engineered trench. The canal is approximately 4.25 miles long, 10 feet wide, and 6 feet deep and has side slopes at 1.3H:1V. The canal has a design capacity of 3,100 cubic feet per second and an average gradient of 3.4 percent. The facility receives surface runoff from the Mill Site, overflow from Amargosa Pond, B Pond, and seepage collected and pumped from B and C Sumps. Containment of surface flow and run-off from a 100-year, 24-hour storm event is provided by the Sierrita Tailing Impoundment.
Amargosa Spillway (D-48)	31° 51' 55" N 111° 05' 46" W	<b>Individual BADCT:</b> Facility is an existing single-lined spillway (conveyance channel) with an 80-mil HDPE geomembrane overlying a 6-inch bedding layer of compacted native material. The liner is anchored in an

**TABLE 4.1.1  
PERMITTED FACILITIES AND BADCT**

Facility Name (PDSI Facility No.)	Latitude/Longitude	Facility BADCT
		engineered trench. The conveyance channel approximately 1,950 feet long, 15 feet wide at the base, 29 feet wide at the crest, 3 to 5 feet deep, with an average slope of 1 percent, has a design capacity of 1,762 cubic feet per second. A 26-feet x 18-feet x 2-feet deep stilling basin is designed at the confluence of the spillway and the Amargosa Pond concrete overflow. The spillway receives overflow from Amargosa Pond during upset conditions or stormwater run-off from the upgradient areas. Containment of surface flow and run-off from a 100-year, 24-hour storm event is provided by the Sierrita Tailing Impoundment.
<b>DEMETRIE WASH AREA</b>		
<b>Non-stormwater Impoundments:</b>		
07 Pond (D-43)	31° 52' 58" N 111° 06' 29" W	<b>Individual BADCT:</b> Facility is an existing, single-lined impoundment with an 80-mil HDPE liner underlain by alluvium and shallow, igneous intrusive bedrock with relatively low permeability ranging from 10 <sup>-4</sup> cm/sec to 10 <sup>-6</sup> cm/sec. The HDPE liner is secured in an engineered anchor trench. The impoundment has a storage capacity of 24.9 acre-feet with a depth of 25 feet. The impoundment provides containment for potentially impacted runoff from the Ocotillo Waste Rock Pile and stormwater from native upgradient hills to the east. Accumulated fluid is pumped via HDPE pipeline below the Ocotillo Waste Rock Pile and discharged into the Raw Water Reservoir. Upstream, a 750 foot long interceptor trench, lined with an 80-mil HDPE geomembrane and equipped with a sump and pump system captures any stormwater from the upgradient watershed and discharges at the east end of 07 Pond. The facility is designed to contain stormwater run-off from a 100-year, 24-hour storm event. Accumulated fluid shall be pumped out as soon as practical, but no later than thirty (30) days. Facility shall maintain a minimum of 2 feet of freeboard.
New D Pond (D-45)	31° 52' 31" N 111° 05' 51" W	<b>Individual BADCT:</b> Facility is an existing, single-lined impoundment with an 80-mil HDPE geomembrane underlain by 12-inch thick compacted layer of native material. The HDPE liner is secured in an engineered anchor trench. The facility overlies shallow andesite and granodiorite with relatively low permeability of 10 <sup>-6</sup> cm/sec. The pond has a storage capacity of 14 acre-feet with a depth of 8 feet. The impoundment provides containment for run-off from the closed CLEAR Plant and Copper Sulfate areas. Accumulated fluid collected in the pond is gravity fed via 10-inch diameter HDPE pipeline into the Duval Canal. Upstream, a 300-foot long diversion channel, lined with a 60-mil HDPE geomembrane underlain by a 12-inch thick layer of compacted native material, diverts any stormwater to a reinforced shotcrete-lined sediment basin. Also, located upgradient, a cut-off trench keyed into bedrock, captures any subsurface flow. Downgradient, a 190-foot long cut-off trench keyed into bedrock, minimizes any subsurface flow. The trenches include a 6-inch diameter corrugated, perforated HDPE pipe laid at a minimum slope of 2 percent toward a fiberglass sump. The sump is equipped with a dedicated submersible pump. The pond is designed as a surge pond and is normally dry. The bottom of the pond slopes toward a perforated HDPE drainpipe, which protrudes 2 feet above the bottom of the pond in the southwest corner. The side slopes have a grade of 3H:1V. Although normally dry, the facility is designed to contain surface flows and run-off from a 100-year, 24-hour storm event. The facility shall be operated with a minimum of 2 feet of freeboard.

**TABLE 4.1.1  
PERMITTED FACILITIES AND BADCT**

Facility Name (PDSI Facility No.)	Latitude/Longitude	Facility BADCT
Copper Sulfate Pipeline Ponds 1 & 2 (D-59) New Facilities	31° 52§ 02" N 111° 05§ 56" W	<b>Prescriptive BADCT:</b> Facilities are single-lined impoundments with a 60-mil HDPE liner underlain by a 12-inch thick layer of 3/8-inch minus native material compacted to 95 percent maximum dry density. The HDPE liners are secured in an engineered anchor trench. The facilities are approximately 73 feet long, 67 feet wide, 7 feet deep, with sides sloping at 3H:1V. Each impoundment has a fluid storage capacity of 15,000 gallons. The impoundments provide secondary containment during an upset condition for the Copper Sulfate Plant area. Accumulated fluid shall be pumped out into the SX/Copper Sulfate circuit as soon as practical, but no later than thirty (30) days. The facilities shall be operated with a minimum of 2 feet of freeboard.
Copper Sulfate Plant Tanks Secondary Containment Structures (D-65) New Facility	31° 52§ 36" N 111° 05§ 56" W	<b>Individual BADCT:</b> Facility is a new reinforced concrete containment structure underlain by a minimum of three inches of compacted aggregate material overlying an existing concrete slab. The secondary containment structure is approximately 118 feet long, 32 feet wide with a 10-inch tall curb around the entire perimeter. The reinforced concrete curb is eight inches wide. Solutions captured are diverted to a central fiberglass reinforced plastic (FRP) trench running the entire length of the facility sloping to a FRP embedded 4 ft. X 4 ft. sump for return to the process water circuit. The containment has a fluid storage capacity of 14,000 gallons (0.057 acre-feet) with a depth of 8 inches. The facility provides secondary containment for potentially impacted stormwater from the old plant area and upset conditions from seven above ground crystallizing vessels containing process solution. Upgradient, an interceptor trench captures any surface water run-on and diverts it into New D Pond. The facility is designed to overflow through a weir via a proposed gravity-fed pipeline underlain by a concrete apron into an existing reinforced concrete tertiary containment structure. Fluid accumulated in the facility shall be pumped out into Raffinate Pond #2 as soon as practical, but no later than thirty (30) days. See Compliance Schedule.
Tailing Pipeline Containment Structures (D-62 A-F) New Facilities	31° 52§ 07" N to 31° 52§ 12" N  111° 05§ 30" W to 111° 05§ 37" W	<b>Individual BADCT:</b> Facilities consist of six secondary containment structures over-excavated to a depth of 8 inches, moisture conditioned, and backfilled and compacted to 95 percent maximum dry density within plus or minus 3 percent of optimum moisture content. Containment structures A and B have a fluid storage capacity of 1.462 million gallons. Containment structures C-F have a fluid storage capacity of 1.815 million gallons. The structures provide containment in the event that the reclaim pipeline or tailing slurry pipeline should have a breach. Accumulated fluid shall be pumped out as soon as practical, but no later than thirty (30) days.
<b>ESPERANZA WASH DRAINAGE AREA</b>		
<b>Non-stormwater Impoundments:</b>		
SX-3 Stormwater Pond (D-11)	31° 50§ 49" N 111° 07§ 08" W	<b>Individual BADCT:</b> Facility is an existing, single-lined impoundment with an 80-mil HDPE liner underlain by a compacted alluvium material overlying shallow andesite bedrock with relatively low permeability ranging from 10 <sup>-5</sup> cm/sec to 10 <sup>-7</sup> cm/sec. The HDPE liner is secured in an engineered anchor trench. The impoundment has a fluid storage capacity of 52 acre-feet, with a depth of 17 feet. The impoundment provides containment of stormwater run-off from upgradient, native terrain, during upset conditions at Headwall No.3, Raffinate Pond No.3, SX-3 Drain Pond, and surface run-off from the Headwall No. 2 area. Any solutions impounded in the

**TABLE 4.1.1  
PERMITTED FACILITIES AND BADCT**

<b>Facility Name (PDSI Facility No.)</b>	<b>Latitude/Longitude</b>	<b>Facility BADCT</b>
		<p>pond are pumped out by a floating barge pump back to Raffinate Pond No. 3. An additional pump may be used to transport solutions to Amargosa Pond if needed. Upstream, Interceptor No.3 , an HDPE-lined interceptor trench keyed into bedrock, captures any subsurface flow which may have bypassed the primary interceptor trench upgradient of Headwall No. 3 and pumps it back to Raffinate Pond No.3. The trench contains a subsurface drain consisting of gravel size material wrapped in geotextile extending the length of the trench diverting any subsurface flow and directing it to the sump which pumps it back to Raffinate Pond No.3. The facility is designed to contain stormwater run-off from a 100-year, 24-hour storm event. Accumulated fluid shall be pumped into the leach circuit as soon as practical, but no later than thirty (30) days. The facility shall be operated with a minimum of 2 feet of freeboard.</p>
<p>Cat Pond 1 (D-42A)</p>	<p>31° 50§ 33" N 111° 07§ 53" W</p>	<p><b>Individual BADCT:</b> Facility is an existing, single-lined impoundment with an 80-mil HDPE liner underlain by a 12-inch thick layer of 3/8-inch minus native material compacted to 95 percent maximum dry density. The HDPE liner is secured in an engineered anchor trench. The facility overlies more competent bedrock with relatively low permeability of 10<sup>-5</sup> cm/sec. The impoundment has a fluid storage capacity of 25.2 acre-feet, with a depth of 27 feet. The sides of the pond have a slope of 3H:1V. The impoundment provides containment for stormwater run-off from the upgradient native terrain, the Sierrita Waste Rock Pile, and during upset conditions from Headwall No. 5. Upgradient and to the west, a single-lined channel with an 80-mil HDPE liner underlain by a 12-inch thick layer of bedding material discharges stormwater from the upgradient watershed into Cat Pond 1. The channel is 8 feet wide at the base, approximately 11.5 feet wide at the crest with 3H:1V side slopes. The channel is approximately 1,400 feet long with an average grade at 1 percent. This facility is designed to contain flows from a 100-year, 24-hour storm event. In the event of overflow, discharge would flow into a single-lined spillway with an 80-mil HDPE liner underlain by a 12-inch thick layer of native material. The spillway consists of a 40-foot long riprap apron for energy dissipation. The spillway is 10 feet wide at the base with 3H:1V side slopes. Accumulated fluid shall be pumped back into the process or used for dust control on roads on-site as soon as practical, but no later than thirty (30) days. The facility shall be operated with a minimum of 2 feet of freeboard.</p>
<p>Cat Pond 2 (D-42B)</p>	<p>31° 50§ 34" N 111° 08§ 18" W</p>	<p><b>Individual BADCT:</b> Facility is an existing, single-lined impoundment with an 80-mil HDPE liner underlain by a 12-inch thick layer of 3/8-inch minus native material compacted to 95 percent maximum dry density. The HDPE liner is secured in an engineered anchor trench. The facility overlies more competent bedrock with relatively low permeability of 10<sup>-5</sup> cm/sec. The impoundment has a fluid storage capacity of 60.1 acre-feet, with a depth of 40 feet. The sides of the pond have a slope of 3H:1V. The impoundment provides containment for stormwater run-off from the upgradient native terrain and the Sierrita Waste Rock Pile. Upgradient and to the west, a single-lined channel with an 80-mil HDPE geomembrane underlain by a 12-inch thick layer of</p>

**TABLE 4.1.1  
PERMITTED FACILITIES AND BADCT**

Facility Name (PDSI Facility No.)	Latitude/Longitude	Facility BADCT
		<p>compacted native material, discharges stormwater from the upgradient watershed into Cat Pond 2. The channel is 20 feet wide at the base, approximately 34 feet wide at the crest with 3H:1V side slopes. The channel is approximately 1,800 feet long with an average grade of 1 percent. The facility is designed to contain a 100-year, 24-hour storm event. In the event of overflow, discharge would flow into a single-lined spillway with an 80-mil HDPE geomembrane underlain by a 12-inch thick layer of compacted bedding material and a 50-feet long riprap apron for energy dissipation. The spillway is 20 feet wide at the base with 3H:1V side slopes. Accumulated fluid shall be pumped back into the process or used for dust control on roads on-site as soon as practical, but no later than thirty (30) days. The facility shall be operated with a minimum of 2 feet of freeboard.</p>
<b>Process solution Impoundments:</b>		
Raffinate Pond No. 3 (D-04)	31° 50§ 53" N 111° 07§ 09" W	<p><b>Individual BADCT:</b> Facility is an existing double-lined impoundment with 60-mil HDPE liners incorporating an LCRS. The bottom liner is underlain by a geotextile cushion underlain by 6 inches of 3/4-inch minus native material compacted to 95% of maximum dry density. The facility is underlain by andesite with relatively low permeability ranging from 10<sup>-5</sup> cm/sec to 10<sup>-7</sup> cm/sec. The liners are secured in an engineered anchor trench around the impoundment perimeter. The impoundment has a fluid storage capacity of 16 acre-feet with a maximum depth of 22 feet. The pond has side slopes of 2.5H:1V. The impoundment provides containment for stormwater run-off and during upset conditions at SX-3 Stormwater Pond, Headwall #3, Headwall #5, and subsurface flows pumped from Interceptor No. 3. The facility is designed to overflow through lined spillway into SX-3 Stormwater Pond. The Action Leakage Rate (ALR) and the Rapid and Large Leakage Rate (RLL) shall be determined by the permittee in accordance with the Compliance Schedule and the permit shall be amended to reflect these values. See Compliance Schedule.</p>
SX-3 Drain Pond (D-31)	31° 50§ 54" N 111° 07§ 16" W	<p><b>Individual BADCT:</b> Facility is a double-lined impoundment using 60-mil HDPE liners incorporating an LCRS. The bottom liner is underlain by geotextile cushion underlain by a 6-inch thick bedding layer of ¾-inch minus material compacted to 95% of maximum density. The impoundment is underlain by shallow bedrock with relatively low permeability ranging from 10<sup>-5</sup> to 10<sup>-7</sup> cm/sec. The HDPE liner is secured in an engineered anchor trench. The impoundment has a fluid storage capacity of 2.6 acre-feet and sides slope with a grade of 2.5H:1V. The impoundment receives leaching process solution (PLS, raffinate, organics) from SX-3 Tank Farm Secondary Containment activities and impacted stormwater. The facility is designed to overflow through a lined spillway into SX-3 Stormwater Pond. Accumulated fluid shall be pumped back into the leach circuit as soon as practical, but no later than thirty (30) days. The facility shall be operated with a minimum of 2 feet of freeboard. The Action Leakage Rate (ALR) and the Rapid and Large Leakage Rate (RLL) shall be determined by the permittee in accordance with the Compliance Schedule and the permit shall be amended to reflect these values. See Compliance Schedule.</p>
Headwall No. 2 (D-46)	31° 51§ 08" N 111° 06§ 55" W	<p><b>Individual BADCT:</b> Facility is an existing, partially lined impoundment created behind an earthen dam. The headwall is lined with an 80-mil HDPE on the upstream face of the dam and is keyed into bedrock. The facility</p>



**TABLE 4.1.1  
PERMITTED FACILITIES AND BADCT**

Facility Name (PDSI Facility No.)	Latitude/Longitude	Facility BADCT
		is underlain by Demetrie Volcanics. The impoundment provides containment of leachate (PLS) from the oxide and sulfide leach areas. The facility is designed to discharge accumulated fluid via 10-inch diameter HDPE pipeline into Raffinate Pond No. 3. The facility is designed to overflow through Headwall No.2 Channel into SX-3 Stormwater Pond.
Headwall No. 3 (D-09)	31° 50§ 57" N 111° 07§ 16" W	<b>Individual BADCT:</b> Facility is an existing, partially lined impoundment created behind an earthen dam. The upstream face of the dam is lined with two face-to face 80-mil HDPE liners, keyed into bedrock, underlain by a 12-inch thick layer of compacted native material. The excavation for the impoundment is lined with bentonite-amended soil having a permeability of less than 10 <sup>-6</sup> cm/sec. The facility is underlain by andesite bedrock with relatively low permeability of 10 <sup>-5</sup> cm/sec to 10 <sup>-7</sup> cm/sec. The HDPE geomembrane is secured in an engineered anchor trench around the perimeter. The impoundment has a fluid storage capacity of 15 acre-feet, with a maximum depth of 21 feet. The impoundment provides containment for stormwater from relatively undisturbed terrain above the dam site and leachate (PLS) from the Sierrita Oxide and Sulfide Active Leach Areas. Accumulated fluid is pumped through two 24-inch HDPE pipelines installed near the bottom of the impoundment to a concrete vault and then to Raffinate Pond No. 3. Upstream, an 80-mil HDPE double lined interceptor trench, equipped with a sump and pump system captures subsurface flows and directs the collected fluid to the Headwall No. 3 Reservoir. The facility is designed to accommodate flow from a 25-year, 24-hour storm event. The facility is designed to overflow through a concrete-lined spillway into Stormwater No. 3 Pond.
Headwall No. 5 (D-12)	31° 50§ 42" N 111° 07§ 57" W	<b>Individual BADCT:</b> Facility is an existing partially lined impoundment created behind an earthen dam. The upstream face of the dam is lined with an 80-mil HDPE geomembrane underlain by 12-inches of compacted course sand and gravel bedding material. The liner is secured into an anchor trench that runs along the entire length of the dam. The facility is underlain by bedrock with relatively low permeability of 10 <sup>-5</sup> cm/sec. The impoundment has a fluid storage capacity of 11.44 acre-feet with a maximum depth of 20 feet. The impoundment receives potentially impacted stormwater commingled with PLS from the leach area. Accumulated fluid is pumped to Headwall No.3 by a self-activated floating barge pump with a maximum pumping capacity of 50 gpm. To the East, a diversion channel diverts any runoff around the reservoir to the natural drainage channel downstream of the headwall. The trapezoidal channel has a 12-foot wide base and 1H:1V side slopes. Downgradient, a cutoff trench intercepts any subsurface flow or seepage through the dam. The facility shall be operated with a minimum of 2 feet of freeboard.
<b>Dump Leaching Area:</b>		
Sierrita Active Leach Area (D-18)	31° 52§ 02" N 111° 06§ 50" W	<b>Individual BADCT:</b> Facility is an existing sulfide leach dump, constructed using the end dumping method over moderate-to-steeply sloping topography which minimizes the potential for discharge. The natural channels within the leach dump footprint are underlain by relatively low hydraulic conductivity bedrock. The facility covers a surface area of approximately 446 acres. The leachate is collected at the headwalls (Headwall No. 1 and/or Headwall No. 3) located immediately downgradient of the facility. Containment of overflow and

**TABLE 4.1.1  
PERMITTED FACILITIES AND BADCT**

Facility Name (PDSI Facility No.)	Latitude/Longitude	Facility BADCT
		run-on from a 100-year, 24-hour storm event is provided by Amargosa Pond and SW-3 Pond. The facility shall not exceed the aerial footprint shown in the APP application. The ultimate crest elevation of the facility shall not exceed 4,400 feet amsl. See Compliance Schedule.
<b>Solution Conveyance Channel:</b>		
Headwall No. 2 Channel (D-08)	31° 50§ 59" N 111° 06§ 56" W	<b>Individual BADCT:</b> Facility is an existing single-lined conveyance channel with a 60-mil HDPE geomembrane underlain by a 6-inch layer of compacted native bedding material. The facility is underlain by andesite with relatively low permeability ranging from 10 <sup>-4</sup> cm/sec to 10 <sup>-6</sup> cm/sec. The HDPE liner is anchored in an engineered trench. The conveyance channel is approximately 2,500 feet long, 10 feet wide at the base, 2.5 feet deep with 2H:1V slopes, having an average gradient of 1.2 percent. The channel has a design capacity of 420.6 cubic feet per second. The channel provides conveyance for stormwater from native upgradient terrain and during upset conditions from Headwall No. 2 and an upgradient booster station. Accumulated fluid is discharged at the east end of SX-3 Stormwater Pond.
<b>MILL SITE AREA</b>		
<b>Non-stormwater Impoundments:</b>		
Rhenium Plant Sump (D-63) New Facility	31° 52§ 43" N 111° 06§ 05" W	<b>Prescriptive BADCT:</b> Facility is a single-lined secondary containment with a 90-mil PVC liner underlain by 6-inch thick steel reinforced concrete poured as part of the adjacent pad. A 100-mil HDPE rub sheet cushion is laid down at the bottom of the impoundment beneath the 90-mil liner. The impoundment 4 feet x 4 feet x 3.5 feet deep provides secondary containment during upset condition from the concrete pad which is used for temporary storage of packaged and sealed sodium perhenate. Accumulated fluid in the impoundment during upset condition is recovered into the Rhenium processing circuit. The impoundment shall be pumped out as soon as practical, but no later than thirty (30) days.
Raw Water Reservoir (D-21)	31° 52§ 29" N 111° 06§ 35" W	<b>Individual BADCT:</b> Facility is an existing, single-lined impoundment with a 3-foot thick compacted bentonite-amended soil liner with a hydraulic conductivity of approximately 2 x 10 <sup>-8</sup> cm/sec. The impoundment has a fluid storage capacity of 25 acre-feet, with a depth of 50 feet. The impoundment provides containment for plant make-up water pumped from the interceptor wellfield east of the tailing impoundment, reclaim water from the tailings, fresh water from Canoa wellfield and Esperanza wellfield and periodically stormwater from 07 Pond. The stormwater run-off is diverted away from the impoundment. The reservoir shall be pumped out as soon as practical, but no later than sixty (60) days. The facility shall be operated with a minimum of 2 feet of freeboard.
<b>Process Solution Impoundment:</b>		
Decant Ponds and Pad Area (D-20)	31° 52§ 22" W 111° 06§ 03" W	<b>Individual BADCT:</b> Facility consists of reinforced concrete lined basins (6-inch thick concrete, with polyethylene tape-sealed joints and PVC liner on the side walls) covered by gunnite. The pad covers 400 feet by 276 feet in area. The facility provides containment of overflow from the copper-moly thickeners and used for settling and recovery of solids. Reclaimed fluids are pumped to the reclaim circuit and the Tailing Thickeners.

**TABLE 4.1.1  
PERMITTED FACILITIES AND BADCT**

<b>Facility Name (PDSI Facility No.)</b>	<b>Latitude/Longitude</b>	<b>Facility BADCT</b>
Tailing Thickeners (D-40)	31° 52§ 25" N 111° 06§ 11" W	<b>Individual BADCT:</b> Facility consists of four circular walls, each with a diameter of 508 feet, and a maximum depth of 23 feet. The walls are constructed with concrete, the floor with 3 feet of compacted soil-bentonite admix with an average hydraulic conductivity of $2.2 \times 10^{-8}$ cm/sec and average moisture content of 8.9%. The thickener area is underlain by Tertiary intrusives. The Thickeners allow for the recovery and recycling of makeup water prior to transfer of the tailing material to the Tailing Impoundment..
<b>Solution Conveyance Channels:</b>		
Drainage Channel West Plant Area (D-22)	31° 52§ 20" N 111° 05§ 59" W	<b>Individual BADCT:</b> Facility is an existing single-lined conveyance channel with 60-mil HDPE geomembrane underlain by compacted native material overlying Tertiary intrusives. The liner is secured in an engineered anchor trench. The channel is 5,370 feet long, 15-30 feet wide and 4-6 feet deep. The channel provides conveyance for stormwater run-off and accommodates fluids during upset conditions from the West Plant area. The facility is designed to flow into Duval Canal.
Thickeners Area Drainage Channel (D-41)	31° 52§ 16" N 111° 06§ 01" W	<b>Individual BADCT:</b> Facility is an existing single-lined conveyance channel with 60-mil HDPE geomembrane liner underlain by compacted native material overlying Tertiary intrusives. The liner is secured in an engineered anchor trench. The channel provides containment for stormwater runoff and during upset conditions of process flows in the Sierrita Mill tailing thickener area. It is 15 feet in width, with an average depth of 4 feet. The facility is designed to flow into Duval Canal.
<b>TAILING IMPOUNDMENTS</b>		
Sierrita Tailing Impoundment (D-01)	31° 50§ 59" N 111° 02§ 57" W	<b>Individual BADCT:</b> Facility is an existing tailing impoundment, where tailing in the slurry form is deposited using conventional upstream method of tailing deposition. The slimes, a finer fraction of the tailing material, provide a relatively low permeability coating of the floor surface to minimize infiltration. The tailing impoundment covers a surface area of approximately 3,600 acres, with a 2,500 feet long divider dam separating the pond into north and south sections. Diversion channels to the west and upgradient are designed to divert surface run-on from a 100-year, 24-hour storm event. The run-off from the embankment is captured by the catchment basins. Water accumulates toward the west side of the impoundment in the reclaim pond where it is recovered and pumped to the Raw Water Reservoir for use in the milling process. Piezometers and inclinometers are installed along the impoundment dam for monitoring phreatic surface and to ensure dam stability. The facility shall be operated with a minimum of 4 feet of freeboard. The maximum crest elevation of the tailing dam shall not exceed 4,350 feet amsl. The facility shall not exceed the aerial footprint shown in the application. See Compliance Schedule.
Sierrita Tailing Impoundment Sediment Basins (D-01 A-K) New Facility	31° 49§ 42" N to 31° 51§ 51" N  111° 01§ 28" W to 111° 01§ 39" W	<b>Individual BADCT:</b> Facility consists of eleven unlined sediment ponds of varying storage capacities, underlain by alluvial deposits consisting of sand and gravel with caliche layers near the ground surface. Caliche layers provide a zone of permeability relatively lower than the underlying alluvium. The sediment ponds provide containment for surface water run-off from the face of tailing dam along with the tailings that have been discharged off the tailing impoundment and deposited into these ponds. Accumulated fluid is allowed to evaporate. In the event, infiltration of impacted water from sediment ponds to occur, it would be

**TABLE 4.1.1  
PERMITTED FACILITIES AND BADCT**

Facility Name (PDSI Facility No.)	Latitude/Longitude	Facility BADCT
		captured by a series of interceptor wells located along the east side of the tailing impoundment. Water is pumped from the wells to the Raw Water Reservoir for use in the milling process. See Compliance Schedule.
Blue Algae Pond (D-58) New Facility	31° 52§ 11" N 111° 05§ 05" W	<b>Individual BADCT:</b> Facility consists of a single-lined impoundment with a 36-mil ultra violet (UV) protected polypropylene geomembrane liner and three 500-gallon tanks. This facility is underlain by a 6-inch layer of natural material compacted to 95% maximum dry density. The geomembrane is secured in an engineered anchor trench. The facility is located on top of the Esperanza Tailing Impoundment with relatively low permeability. The impoundment has a storage capacity of approximately 1 acre-foot with a depth of 6 feet. The impoundment provides containment of algae cultures used as a biological soil crust reducing fugitive dust from the tailing impoundment. Accumulated cultures are pumped out into the active tailing impoundment. The facility shall be operated with a minimum of two feet of freeboard.
<b>WASTE ROCK PILES</b>		
West Waste Rock Piles (D-19)	31° 51§ 12" N 111° 08§ 57" W	<b>Individual BADCT:</b> Facilities are waste rock piles constructed using the end dumping method over moderate-to-steeply sloping topography which minimizes the potential for discharge. Upstream, the Tinaja Pond captures any run-on and eliminates flow through the pile. Additionally, run-off that is contained in Tinaja Wash is captured by Headwall No.5, Cat Ponds 1 and 2. Further run-on to the pile is reduced by the West Diversion Channel, Upper Diversion Channel, and Lower Collections Channel. Run-off from the waste piles gravity flows into Cat Ponds 1 and 2. The facility shall not exceed the maximum crest elevation of 4,375 feet amsl. The facility shall not exceed the aerial footprint shown in Drawing No. 3 of the Supplement to the APP Application BADCT Demonstration Addendum issued March 2005. Stability analysis is required in the Compliance Schedule.
Ocotillo Waste Rock Pile (D-36)	31° 52§ 50" N 111° 06§ 35" W	<b>Individual BADCT:</b> Facility is a waste rock pile constructed using the end dumping method over moderate-to-steeply sloping topography which minimizes the potential for discharge. The facility covers a total surface area of approximately 200-250 acres and contains approximately 130 million tons of overburden. Upgradient, run-off is diverted to the Mill Site drainage. Run-off from the northern portion of the rock pile will flow onto 07 Pond via HDPE-lined collection channel located at the toe of the waste rock pile. The overburden will be backfilled into the Ocotillo Pit as mining progresses. The facility shall not exceed the maximum crest elevation of 4,500 feet amsl. The facility shall not exceed the aerial footprint shown in Drawing No.3 of the Supplement to the APP Application BADCT Demonstration Addendum issued March 2005.
M Waste Rock Pile (D-47)	31° 52§ 52" N 111° 09§ 19" W	<b>Individual BADCT:</b> Facility is a waste rock pile constructed using the end dumping method over moderate-to-steeply sloping topography which minimizes the potential for discharge. The run-off from the facility enters the Sierrita-Esperanza Pit - a passive containment. The facility shall not exceed the maximum crest elevation of 4,500 feet amsl. The facility shall not exceed the aerial footprint shown in Drawing No.3 of the Supplement to the APP Application BADCT Demonstration Addendum issued March 2005. Stability analysis is required in the Compliance Schedule.

**TABLE 4.1.1  
PERMITTED FACILITIES AND BADCT**

Facility Name (PDSI Facility No.)	Latitude/Longitude	Facility BADCT
“V” Waste Rock Pile (D-56) New Facility	31° 53§ 12” N 111° 07§ 06” W	<p><b>Individual BADCT:</b> Facility is waste rock pile underlain by Quaternary alluvium and Tertiary intrusives. Runoff from the facility follows the natural drainage. Downgradient, monitor well MH-21 provides warning of any potential discharge to the groundwater. The facility shall not exceed the maximum crest elevation of 3,930 feet. The facility shall not exceed the aerial footprint shown in Drawing Three of the Supplement to the APP Application BADCT Demonstration Addendum issued March 2005. Stability analysis is required in the Compliance Schedule.</p>
<b>OPEN PITS</b>		
Sierrita-Esperanza Pit (D-55)	31° 52§ 17” N 111° 08§ 01” W	<p><b>Individual BADCT:</b> Facility is an open pit approximately 6,000 by 12,000 feet in plan area, and is currently mined for copper ore. The top elevation of the pit is approximately 4,100 feet amsl and the bottom is approximately 2,550 feet amsl. The pit is underlain by Tertiary intrusive rocks with a permeability ranging from <math>1 \times 10^{-6}</math> cm/sec to <math>7 \times 10^{-4}</math> cm/sec and quartz monzonite with a permeability of <math>5 \times 10^{-6}</math> cm/sec. The Sierrita and Esperanza pits were mined into one large pit causing a passive containment. The pit creates a passive containment with a capture zone defined by the 3800 foot potentiometric contour. The impoundment has a fluid storage capacity of 500 million gallons of solution. The passive containment provides containment for water conservation and receives surface stormwater and overflow from SX-3 Stormwater Pond and Amargosa Pond. Accumulated fluid is pumped to SX Plant and the reclaim water system.</p>
Ocotillo Pit (D-60) New Facility	31° 53§ 00” N 111° 06§ 50” W	<p><b>Individual BADCT:</b> Facility is a small, open pit approximately 1,824 feet in diameter. The facility provides containment for stormwater run-off discharged directly into the bottom of the Ocotillo Pit. The facility is inaccessible due to the encroachment of overburden dumped near the edge of the pit, covering the access ramp. The current pit lake elevation is 3,580 feet amsl. PDSI plans to backfill this pit with waste rock, which will minimize the potential for discharge.</p>
Moly Satellite Pit (D-61) New Facility	31° 53§ 02” N 111° 08§ 18” W	<p><b>Individual BADCT:</b> Facility consists of a series of push-backs located immediately north of the Sierrita-Esperanza Pit. These push-backs are the beginning of a pit being mined for molybdenum ore. The facility is underlain by Ruby Star quartz monzonite porphyry and Harris Ranch quartz monzonite. Accumulated fluid is pumped out and conveyed to the Sierrita-Esperanza Pit solution storage area. PDSI plans to backfill this pit with waste rock, which will minimize the potential for discharge.</p>
<b>VEHICLE WASHES AND MISCELLANEOUS FACILITIES</b>		
Truck Wash (D-16)	31° 51§ 38” N 111° 08§ 26” W	<p><b>Individual BADCT:</b> Facility is located near the maintenance shop on the south side of the Sierrita Pit. Trucks are washed off by high-pressure hoses with the water discharging through a metal grate to a concrete-lined sump for settling of solids. The water is then run through an oil water separator and discharged to the Sierrita Pit.</p>
Vehicle Wash (D-30)	31° 52§ 22” N 111° 06§ 19” W	<p><b>Individual BADCT:</b> Facility consists of a concrete pad sloping toward a center drain and associated piping. The facility is located in the main plant area west of the Tailing Thickeners. High-pressure water is used to clean dirt from vehicle exteriors; no surfactants are used. Drainage goes directly to the West Plant Area</p>

**TABLE 4.1.1  
PERMITTED FACILITIES AND BADCT**

Facility Name (PDSI Facility No.)	Latitude/Longitude	Facility BADCT
		Drainage Channel. An upgrade is required under the Compliance Schedule.
Copper Concentrate Storage (D-35)	31° 52§ 30" N 111° 06§ 13" W	<b>Individual BADCT:</b> Facility is an engineered 10 inch thick reinforced concrete slab, partially covered with a 1.5 foot thick reinforced concrete curb around the perimeter. The concrete slab overlies a minimum 6-inch compacted gravel layer. The concrete slab is sloped to drain to a concrete-lined sump within the confines of the facility. Any fluid that accumulates in the sump is pumped into the flotation circuit.
<b>Facilities to be Closed Under Compliance Schedule and/or to cease operation without intent to resume activities</b>		
A Pond (D-06)	31° 51§ 55" N 111° 05§ 48" W	Facility has been decommissioned and no longer exists. The test results of soil samples have been submitted to ADEQ for review and comments.
B Pond (D-07)	31° 51§ 56" N 111° 05§ 36" W	Facility has ceased operation without intent to resume activity for which it was designed. The test results of soil samples have been submitted to ADEQ. The facility will be closed under Compliance Schedule.
Old D Pond (D-13)	31° 52§ 38" N 111° 05§ 49" W	Facility has ceased operation without intent to resume activity for which it was designed. All of the sample results for total metals and SPLP submitted to ADEQ are within the SRL requirements and AWQS. This site is scheduled for reclamation. Final closure for the facility will be completed during mine closure.
Rhenium Ponds (D-23)	31° 51§ 59" N 111° 04§ 25" W	Facility ceased operation in 1998. The test results of soil samples have been submitted to ADEQ for review and comment.
Launders Facility (D-39)	31° 51§ 54" N 111° 06§ 11" W	The facility has ceased operation without intent to resume activity for which it was designed. Final closure for the facility will be completed during mine closure.
<b>Facilities Regulated under other Permits</b>		
Wastewater system (40-101) 10,000 gpd	N/A	General Permit 1.09 (A.A.C. R-18-9-B301.I)
Mine Waste Tires	N/A	General Permit 1.06 (A.A.C. R18-9-B301.F)
Mine Area Septic 20,000 gal.	N/A	General Permit 1.09 (A.A.C. R18-9-B301.I)
Primary Crusher Septic 1,500 gal.	N/A	General Permit 1.09 (A.A.C. R18-9-B301.I)
Shovel/Drill Maintenance Shop Septic 5,000 gal.	N/A	General Permit 1.09 (A.A.C. R18-9-B301.I)
Clear Plant Septic 10,000 gal.	N/A	General Permit 1.09 (A.A.C. R18-9-B301.I)
Tailings Thickener Septic 2,000 gal.	N/A	General Permit 1.09 (A.A.C. R18-9-B301.I)
Esperanza Mill Area Septic 10,000 gal.	N/A	General Permit 1.09 (A.A.C. R18-9-B301.I)
SX Maintenance septic 1,200 gal.	N/A	General Permit 1.09 (A.A.C. R18-9-B301.I)

**TABLE 4.1.1  
PERMITTED FACILITIES AND BADCT**

<b>Facility Name (PDSI Facility No.)</b>	<b>Latitude/Longitude</b>	<b>Facility BADCT</b>
Tailing Impoundment Office Septic 1,200 gal.	N/A	General Permit 1.09 (A.A.C. R18-9-B301.I)

Notes:

- A. The primary discharge control technologies (DCTs) for each discharging facility are presented; however, additional discharge controls are discussed in the APP application and subsequent submittals and correspondence referenced in Section **xx** of this APP.
- B. Prescriptive BADCT design involves a prescribed engineering approach that utilizes pre-approved discharge control technologies or engineering equivalents to meet the requirements of A.R.S 49-243(B)(1).

Individual BADCT design involves general principals of engineering design, and is based upon alternative discharge control measures considered, the technical and economic advantages and disadvantages of each alternative, and justification for the selection of the best alternative to meet the requirements of A.R.S. 49-243(B)(1).

- C. Definitions/Abbreviations:

BADCT – Best Available Demonstrated Control Technology  
 HDPE – High Density Polyethylene  
 PVC – Poly Vinyl Chloride  
 LCRS – Leakage Collection and Recovery System  
 ALR – Action Leakage Rate  
 RLL – Rapid and Large Leakage  
 PLS – Pregnant Leachate Solution  
 amsl – above mean sea level  
 N/A – Not Applicable

<b>TABLE 4.2.1 Required Inspections and Operational Monitoring</b>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
<b>AMARGOSA WASH DRAINAGE AREA - Non-stormwater Impoundments; Lined</b>	
<p><b>Non-stormwater Impoundments - Ponds, Sumps, and Associated Conveyance Systems:</b></p> <p>Amargosa Pond (D-05)</p> <p>SX-1 Tank Farm Pond D-34)</p>	<p><b>Monthly:</b> Visually inspect and maintain applicable freeboard in impoundments: Amargosa Pond – 2 feet.</p> <p><b>Quarterly and following precipitation events measuring at least 1-inch in a 24-hour period:</b> (Precipitation depth to be measured based on readings obtained from the mine weather station used for such measurements) Visually inspect and take appropriate action if any evidence of:</p> <ul style="list-style-type: none"> <li>-perforated, cut, tear or damaged liner and impairment of anchor trench integrity;</li> <li>-impairment of embankment integrity as applicable;</li> <li>-excessive erosion in conveyances and diversions;</li> <li>-excess accumulation of debris in conveyances and diversions; and</li> <li>-impairment of access.</li> </ul> <p>At pump locations, inspect pumps, valves and structures for pump operation and structural integrity.</p> <p><b>Annually:</b> Remove excess sediments/sludge from the impoundments, conveyances and diversions as needed to maintain at least 80 percent of designed capacity.</p> <p><b><u>Specific Requirement</u></b> Remove accumulated fluid - the process solution or impacted stormwater due to process upsets and/or storm event, from the impoundment as soon as practical, but no later than 30 days after cessation of the upset or storm event.</p>



<b>TABLE 4.2.1 Required Inspections and Operational Monitoring</b>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
<b>AMARGOSA WASH DRAINAGE AREA – Process Solution Impoundments; Double-lined</b>	
<p><b>Process Solution Impoundments - Ponds, Sumps, and Associated Conveyance Systems:</b></p> <p>Raffinate Pond No. 2 (D-10)</p> <p>Drain Pond No. 2 (D-15)</p> <p>SX-1 Drain Pond (D-33)</p>	<p><b>Daily:</b> Visually inspect and take appropriate action if any evidence of : -blocked overflow pipes/spillway structures.</p> <p><b>Weekly:</b> Measure flow rate in the LCRS; confirm that it is less than specified Action Leakage Rate (ALR) (See BADCT TABLE 4.1.1 and Section 2.6.2.4) and less than specified rate for Rapid and Large Leakage (RLL) ( See BADCT TABLE 4.1.1 and Section 2.6.2.5); and take appropriate action if exceedence is observed in the ALR or RLL.</p> <p><b>Quarterly:</b> Visually inspect and take appropriate action if any evidence of: -perforated, cut, tear or damaged liner and impairment of anchor trench integrity; -impairment of embankment integrity as applicable; -excessive erosion in conveyances and diversions; -excess accumulation of debris in conveyances and diversions; and -impairment of access. At pump locations, inspect pumps, valves and structures for pump operation and structural integrity.</p> <p><b>Annually:</b> Remove excess sediments/sludge from the impoundments, conveyances and diversions as needed to maintain at least 80 percent of designed capacity.</p>



<b>TABLE 4.2.1 Required Inspections and Operational Monitoring</b>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
Duval Canal - Lined (D-29)  Amargosa Spillway - Lined (D-48)  Duval Canal Velocity Pond (D-64) - Unlined	<p><b>Quarterly and following precipitation events measuring at least 1-inch in a 24-hour period:</b> (Precipitation depth to be measured based on readings obtained from the mine weather station used for such measurements)</p> <p>Visually inspect and take appropriate action if any evidence of:</p> <ul style="list-style-type: none"> <li>-perforated, cut, tear or damaged liner and impairment of anchor trench integrity (lined conveyances);</li> <li>-impairment of embankment integrity as applicable;</li> <li>-excessive erosion in conveyances and diversions;</li> <li>-excess accumulation of debris in conveyances and diversions; and</li> <li>-impairment of access.</li> </ul> <p><b>Annually:</b> Remove excess sediments/sludge from the conveyances and diversions as needed to maintain at least 80 percent of designed capacity.</p>
<b>DEMETRIE WASH DRAINAGE AREA – Non-Stormwater Impoundments</b>	
07 Pond - Lined (D-43)  New D Pond - Lined (D-45)  Copper Sulfate Ponds 1&2 - Lined (D-59)  Copper Sulfate Plant Tanks Secondary Containment Structures (D-65)  Tailing Pipeline Containment Structures - Unlined (D-62 A-F)	<p><b>Monthly:</b> Visually inspect and maintain applicable freeboard in impoundments: 07-Pond – 2 feet, New D Pond – 2 feet, Copper Sulfate Ponds 1&amp;2 – 2 feet.</p> <p><b>Quarterly and following precipitation events measuring at least 1-inch in a 24-hour period:</b> (Precipitation depth to be measured based on readings obtained from the mine weather station used for such measurements)</p> <p>Visually inspect and take appropriate action if any evidence of:</p> <ul style="list-style-type: none"> <li>-perforated, cut, tear or damaged liner and impairment of anchor trench integrity (lined ponds);</li> <li>-surface cracks at concrete-lined structures and impoundments;</li> <li>-impairment of embankment integrity as applicable;</li> <li>-excessive erosion in conveyances and diversions;</li> <li>-excess accumulation of debris in conveyances and diversions; and</li> <li>-impairment of access.</li> </ul> <p>At pump locations, inspect pumps, valves and structures for pump operation and structural integrity.</p> <p><b>Annually:</b> Remove excess sediments/sludge from the impoundments, conveyances and diversions as needed to maintain at</p>

<b>TABLE 4.2.1 Required Inspections and Operational Monitoring</b>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
	<p>least 80 percent of designed capacity.</p> <p><b><u>Specific Requirement</u></b> Remove accumulated fluid - the process solution or impacted stormwater due to process upsets and/or storm event, from the impoundment as soon as practical, but no later than 30 days after cessation of the upset or storm event.</p>
<b>ESPERANZA WASH DRAINAGE AREA - Non-stormwater Impoundments; Lined</b>	
<p><b>Non-stormwater Impoundments - Ponds, Sumps, and Associated Conveyance Systems:</b></p> <p>SX-3 Stormwater Pond (D-11)</p> <p>Cat Pond 1 (D-42A)</p> <p>Cat Pond 2 (D-42B)</p>	<p><b>Monthly:</b> Visually inspect and maintain applicable freeboard in impoundments: SX-3 Stormwater Pond – 2 feet, Cat Pond 1 – 2 feet, Cat Pond 2 – 2 feet.</p> <p><b>Quarterly and following precipitation events measuring at least 1-inch in a 24-hour period:</b> (Precipitation depth to be measured based on readings obtained from the mine weather station used for such measurements) Visually inspect and take appropriate action if any evidence of:</p> <ul style="list-style-type: none"> <li>-perforated, cut, tear or damaged liner and impairment of anchor trench integrity;</li> <li>-impairment of embankment integrity as applicable;</li> <li>-excessive erosion in conveyances and diversions;</li> <li>-excess accumulation of debris in conveyances and diversions; and</li> <li>-impairment of access.</li> </ul> <p>At pump locations, inspect pumps, valves and structures for pump operation and structural integrity.</p> <p><b>Annually:</b> Remove excess sediments/sludge from the impoundments, conveyances and diversions as needed to maintain at least 80 percent of designed capacity.</p> <p><b><u>Specific Requirement</u></b> Remove accumulated fluid - the process solution or impacted stormwater due to process upsets and/or storm event, from the impoundment as soon as practical, but no later than 30 days after cessation of the upset or storm event.</p>
<b>ESPERANZA WASH DRAINAGE AREA – Process Solution Impoundments</b>	

<b>TABLE 4.2.1 Required Inspections and Operational Monitoring</b>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
<p><b>Process Solution Impoundments - Ponds, Sumps, and Associated Conveyance Systems:</b></p> <p>Raffinate Pond No. 3 - Double Lined (D-04)</p> <p>Headwall No.2 - Partially Lined (D-46)</p> <p>Headwall No. 3 - Single Lined (D-09)</p> <p>Headwall No. 5 – Partially Lined (D-12)</p> <p>SX-3 Drain Pond (D-31)</p>	<p><b>Daily:</b> Visually inspect and take appropriate action if any evidence of : -blocked overflow pipes/spillway structures. Visually inspect and maintain applicable freeboard of 2 feet in Headwall No. 5, 2 feet in SX-3 Drain Pond.</p> <p><b>Weekly – Raffinate Pond No. 3 &amp; SX-3 Drain Pond:</b> Measure flow rate in the LCRS; confirm that it is less than specified Action Leakage Rate (ALR) (See BADCT TABLE 4.1.1, Section 2.6.2.4, and Table 2.2.4) and less than specified rate for Rapid and Large Leakage (RLL) ( See BADCT TABLE 4.1.1, Section 2.6.2.5); and take appropriate action if exceedence is observed in the ALR or RLL.</p> <p><b>Quarterly:</b> Visually inspect and take appropriate action if any evidence of: -perforated, cut, tear or damaged liner and impairment of anchor trench integrity; -impairment of embankment integrity as applicable; -excessive erosion in conveyances and diversions; -excess accumulation of debris in conveyances and diversions; and -impairment of access. At pump locations, inspect pumps, valves and structures for pump operation and structural integrity.</p> <p><b>Annually:</b> Remove excess sediments/sludge from the impoundments, conveyances and diversions as needed to maintain at least 80 percent of designed capacity.</p>
<b>ESPERANZA WASH DRAINAGE AREA – Dump Leaching</b>	
<p>Sierrita Active Leach Area (D-18)</p>	<p><b>Monthly:</b> Visually inspect and take appropriate action if any evidence of: -dump or stockpile deformations, including surface cracks, slides, sloughs, or differential settlement affecting slope stability.</p>
<b>ESPERANZA WASH DRAINAGE AREA – Solution Conveyance Channel</b>	

<b>TABLE 4.2.1 Required Inspections and Operational Monitoring</b>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
<p>Headwall No. 2 Channel - Lined (D-08)</p>	<p><b>Quarterly and following precipitation events measuring at least 1-inch in a 24-hour period:</b>                      (Precipitation depth to be measured based on readings obtained from the mine weather station used for such measurements)                      Visually inspect and take appropriate action if any evidence of:                      -perforated, cut, tear or damaged liner and impairment of anchor trench integrity;                      -impairment of embankment integrity as applicable;                      -excessive erosion in conveyances and diversions;                      -excess accumulation of debris in conveyances and diversions; and                      -impairment of access.                      At pump locations, inspect pumps, valves and structures for pump operation and structural integrity.</p> <p><b>Annually:</b>                      Remove excess sediments/sludge from the impoundments, conveyances and diversions as needed to maintain at least 80 percent of designed capacity.</p>
<p><b>MILL SITE - Non-stormwater Impoundments and Concentrate Storage; Lined</b></p>	

<b>TABLE 4.2.1 Required Inspections and Operational Monitoring</b>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
<p>Rhenium Plant Sump – PVC Liner (D-63)</p> <p>Raw Water Reservoir – Bentonite Liner (D-21)</p> <p>Copper Concentrate Storage (D-35)</p>	<p><b>Monthly:</b> Visually inspect and maintain applicable freeboard of 2 feet in the Raw Water Reservoir.</p> <p><b>Quarterly and following precipitation events measuring at least 1-inch in a 24-hour period:</b> (Precipitation depth to be measured based on readings obtained from the mine weather station used for such measurements)</p> <p>Visually inspect and take appropriate action if any evidence of:</p> <ul style="list-style-type: none"> <li>-perforated, cut, tear or damaged liner and impairment of anchor trench integrity (Rhenium Plant Sump)</li> <li>-desiccation, gaps or gouges in bentonite amended soil liner (Raw Water Reservoir)</li> <li>-surface cracks at concrete-lined impoundment (Copper Concentrate Storage)</li> <li>-impairment of embankment integrity as applicable;</li> <li>-excessive erosion in conveyances and diversions;</li> <li>-excess accumulation of debris in conveyances and diversions; and</li> <li>-impairment of access.</li> </ul> <p>At pump locations, inspect pumps, valves and structures for pump operation and structural integrity.</p> <p><b>Annually:</b> Remove excess sediments/sludge from the impoundments, conveyances and diversions as needed to maintain at least 80 percent of designed capacity (except for Copper Concentrate Storage).</p>
<b>MILL SITE – Process Solution Impoundments; Lined</b>	
<p>Tailing Thickeners (D-40)</p> <p>Decant Ponds and Pad Areas (D-20)</p>	<p><b><u>Tailings Thickeners</u></b></p> <p><b>Quarterly:</b> Visually inspect thickeners and take appropriate action if any evidence of:</p> <ul style="list-style-type: none"> <li>-seepage through surface cracks of concrete-lined walls.</li> </ul> <p><b>After Cleanout:</b> Visually inspect thickeners and take appropriate action if any evidence of:</p> <ul style="list-style-type: none"> <li>-desiccation, gaps or gouges in bentonite-amended soil liner during the clean out cycle;</li> </ul> <p><b><u>Decant Ponds &amp; Pad Areas:</u></b></p> <p><b>Quarterly:</b> Visually inspect &amp; take appropriate action if there is any evidence of:</p> <ul style="list-style-type: none"> <li>-seepage or cracks that affect the structural integrity of the concrete tanks or pad area.</li> </ul>
<b>MILL SITE – Solution Conveyance Channels</b>	

<b>TABLE 4.2.1 Required Inspections and Operational Monitoring</b>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
<p>Drainage Channel West Plant Area - Lined (D-22)</p> <p>Thickeners Area Drainage Channel - Lined (D-41)</p>	<p><b>Quarterly and following precipitation events measuring at least 1-inch in a 24-hour period:</b> (Precipitation depth to be measured based on readings obtained from the mine weather station used for such measurements)</p> <p>Visually inspect and take appropriate action if any evidence of:</p> <ul style="list-style-type: none"> <li>-perforated, cut, tear or damaged liner and impairment of anchor trench integrity;</li> <li>-impairment of embankment integrity as applicable;</li> <li>-excessive erosion in conveyances and diversions;</li> <li>-excess accumulation of debris in conveyances and diversions; and</li> <li>-impairment of access.</li> </ul> <p><b>Annually:</b> Remove excess sediments/sludge from the impoundments, conveyances and diversions as needed to maintain at least 80 percent of designed capacity.</p>
<b>TAILINGS IMPOUNDMENTS</b>	
<p>Sierrita Tailing Impoundment (D-01)</p> <p>Sierrita Tailing Impoundment</p>	<p><b><u>Sierrita Tailings Impoundment</u></b></p> <p><b>Daily:</b> Visually inspect and maintain applicable beach distance (see BADCT – Table 4.1.1), and the following applicable freeboard: Sierrita Tailings Impoundment – 4 feet.</p> <p>Visually inspect and take appropriate action if any evidence of:</p> <ul style="list-style-type: none"> <li>-tailing dam deformation, including surface cracks, slides, sloughs, seeps, erosion features or differential settlement affecting dam stability.</li> </ul> <p><b>Quarterly:</b> Monitor piezometers and inclinometers along the tailing dam to maintain phreatic surface within safe operating limits and to ensure dam safety.</p> <p><b><u>Sierrita Tailing Impoundment Interceptor Wells</u></b></p> <p><b>Monthly:</b> At pump locations: -Inspect pumps, valves, and structures for pump operation, and structural integrity.</p> <p><b><u>Sierrita Tailing Impoundment Sediment Basins and Blue Algae Pond</u></b></p>



<b>TABLE 4.2.1 Required Inspections and Operational Monitoring</b>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
<p>Sediment Basins (D-01A-K)</p> <p>Blue Algae Pond (D-58)</p>	<p><b>Weekly:</b> Visually inspect and maintain 2 feet of freeboard in the Blue Algae Pond.</p> <p><b>Monthly:</b> Visually inspect and take appropriate action if any evidence of: -impairment of embankment integrity; -impairment of access. At pump locations, inspect pumps and structures for pump operation and structural integrity.</p> <p><b>Annually:</b> Remove excess sediments/sludge from the Sediment Basins and Blue Algae Pond as needed to maintain at least 80 percent of designed capacity -</p>
<b>WASTE ROCK PILES</b>	
<p>West Waste Rock Piles (D-19)</p> <p>Ocotillo Waste Rock Pile (D-36)</p> <p>M Waste Rock Pile (D-47)</p> <p>“V” Waste Rock Pile(D-56)</p>	<p><b>Monthly:</b> Visually inspect and take appropriate action if any evidence of: -dump or stockpile deformation, including surface cracks, slides, sloughs, or differential settlement affecting slope stability.</p>
<b>OPEN PITS</b>	
<p>Sierrita-Esperanza Pit (D-55)</p>	<p><b>Quarterly and following precipitation events measuring at least 1-inch in a 24-hour period:</b> Visually inspect and maintain the fluid level in the pit below the maximum operating elevation of 3,700 feet amsl.</p> <p><b>Quarterly:</b></p>

<b>TABLE 4.2.1 Required Inspections and Operational Monitoring</b>	
<b>Facility Name (#)</b>	<b>Operational Requirements</b>
	<p>At pump locations, inspect pumps and pump structures for pump operation and structural integrity.</p> <p>Visually inspect and take appropriate action if any evidence of:</p> <ul style="list-style-type: none"> <li>-impairment of embankment integrity as applicable;</li> <li>-impairment of access.</li> </ul>
<b>TRUCK WASH AND MISCELLANEOUS FACILITIES</b>	
<p>Truck Wash (D-16)</p> <p>Vehicle Wash (D-30)</p>	<p><b>Monthly:</b></p> <p>Maintain oil-water separators, grease traps, and sediment basins in operational condition, as applicable.</p> <p>Inspect concrete structures – slab and sumps for structural integrity, as applicable.</p>

Depth to Water Level (feet)	Potassium <sup>1</sup>	Nickel <sup>1</sup>
Water Level Elevation (feet amsl)	Sodium <sup>1</sup>	Selenium <sup>1</sup>
Temperature – field (°F)	Iron <sup>1</sup>	Thallium <sup>1</sup>
pH – Field & Lab (S.U.)	Aluminum <sup>1</sup>	Zinc <sup>1</sup>
Field Specific Conductance (µmhos/cm)	Antimony <sup>1</sup>	Total Cyanide
Total Dissolved Solids – Lab	Arsenic <sup>1</sup>	Gross Alpha Particle Activity (pCi/L) <sup>2</sup>
Total Alkalinity	Barium <sup>1</sup>	Radium 226 (pCi/L)
Bicarbonate	Beryllium <sup>1</sup>	Radium 228 (pCi/L)
Carbonate	Cadmium <sup>1</sup>	Total Uranium
Hydroxide	Chromium <sup>1</sup>	Carbon Disulfide
Sulfate	Cobalt <sup>1</sup>	Benzene
Chloride	Copper <sup>1</sup>	Toluene
Fluoride	Lead <sup>1</sup>	Ethylbenzene
Nitrate + Nitrite	Manganese <sup>1</sup>	Total Xylenes
Calcium	Mercury <sup>1</sup>	
Magnesium <sup>1</sup>	Molybdenum <sup>1</sup>	

- 1 Metals must be analyzed as dissolved metals.
- 2 If the gross alpha particle activity is greater than fifteen (15) pCi/L, then test for adjusted gross alpha particle activity. The adjusted gross alpha particle activity is the gross alpha particle activity, including radium 226, minus radon and total uranium (the sum of uranium 238, uranium 235 and uranium 234 isotopes).

<b>Table 4.2.3 Quarterly Compliance Groundwater Monitoring Requirements for Non-Hazardous POC Wells</b>										
PARAMETER	MH-11		MH-12		MH-25A		MH-26A		CW-8	
	AQL	AL	AQL	AL	AQL	AL	AQL	AL	AQL	AL
Depth to Water (in feet)	None	None	None	None	None	None	None	None	None	None
Water Level Elevation (in feet amsl)	None	None	None	None	None	None	None	None	None	None
Field pH (S.U.)	None	None	None	None	None	None	None	None	None	None
Field Specific Conductance (µmhos/cm)	None	None	None	None	None	None	None	None	None	None
Temperature – field (°F)	None	None	None	None	None	None	None	None	None	None
Sulfate	None	None	None	None	None	None	None	None	None	650 mg/L
Total Dissolved Solids	None	None	None	None	None	None	None	None	None	None
Nitrate + Nitrite	10	8	10	8	10	8	10	8	None	None
Fluoride	4	3.2	4	3.2	4	3.2	4	3.2	None	None
Barium	2	1.6	2	1.6	2	1.6	2	1.6	None	None

NR = Analysis is not required  
 None = Monitoring required, but no AQL or AL established in the permit.  
 AQL = Aquifer Quality Limit  
 AL = Alert Level

All concentrations are in milligrams per liter (mg/L) unless otherwise specified.

Use Table 4.2.5 parameter list for biennial sampling events.

<b>Table 4.2.4 Quarterly Compliance Groundwater Monitoring Requirements for Hazardous POC Wells</b>								
PARAMETER	MH-14		MH-15W		MH-16W		MH-18	
	AQL	AL	AQL	AL	AQL	AL	AQL	AL
Depth to Water (in feet)	None	None	None	None	None	None	None	None
Water Level Elevation (in feet amsl)	None	None	None	None	None	None	None	None
Field pH (S.U.)	None	Res.	None	Res.	None	Res.	None	Res.
Field Specific Conductance (µmhos/cm)	None	None	None	None	None	None	None	None
Temperature – field (° F)	None	None	None	None	None	None	None	None
Cadmium	0.005	0.004	0.005	0.004	0.005	0.004	0.005	0.004
Cobalt	NR	NR	NR	NR	NR	NR	None	None
Copper	None	None	None	None	None	None	None	None
Molybdenum	NR	NR	NR	NR	NR	NR	None	None
Fluoride	4.0	3.2	4.0	3.2	4.0	3.2	4.0	3.2
Nitrate + Nitrite	10	8	10	8	10	8	10	8
Sulfate	None	None	None	None	None	None	None	None
Total Dissolved Solids	None	None	None	None	None	None	None	None
Beryllium	0.004	0.0032	0.004	0.0032	0.004	0.0032	0.004	0.0032
Nickel	0.10	0.08	0.10	0.08	0.10	0.08	0.10	0.08
Selenium	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.04
Magnesium	None	None	None	None	None	None	None	None
Antimony	0.006	0.0048	0.006	0.0048	0.006	0.0048	0.006	0.0048
Arsenic	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.04
Chromium	0.10	0.08	0.10	0.08	0.10	0.08	0.10	0.08
Lead	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.04
Thallium	0.002	0.0016	0.002	0.0016	0.002	0.0016	0.002	0.0016

Res. = Reserved: At the conclusion of eight (8) rounds of quarterly groundwater sampling from well MH-27 and twelve (12) rounds of monthly groundwater sampling from wells MH-28 and MH-29; the permittee is required to submit an Ambient Groundwater Monitoring Report and permit amendment request to ADEQ WPS-MU to propose AQLs and ALs based on the ambient data. AQLs and ALs will be calculated based on the criteria in 2.5.3.4 and 2.5.3.5. Either a numeric value or “None” will be amended to the permit for each AQL and AL listed as “Reserved.”

NR = Analysis is not required  
 None = Monitoring required, but no AQL or AL established in the permit.  
 AQL = Aquifer Quality Limit  
 AL = Alert Level

All concentrations are in milligrams per liter (mg/L) unless otherwise specified.

Metals will be analyzed as dissolved metals

Use Table 4.2.5 parameter list for biennial sampling events.

<b>Table 4.2.4 Quarterly Compliance Groundwater Monitoring Requirements for Hazardous POC Wells</b>								
PARAMETER	MH-19		MH-20		MH-21		MH-22	
	AQL	AL	AQL	AL	AQL	AL	AQL	AL
Depth to Water (in feet)	None	None	None	None	None	None	None	None
Water Level Elevation (in feet amsl)	None	None	None	None	None	None	None	None
Field pH (S.U.)	None	None	None	None	None	None	None	None
Field Specific Conductance (µmhos/cm)	None	None	None	None	None	None	None	None
Temperature – field (°F)	None	None	None	None	None	None	None	None
Cadmium	0.005	0.004	0.005	0.004	0.005	0.004	0.010	None
Cobalt	None	None	None	None	None	None	None	None
Copper	None	None	None	None	None	None	None	None
Molybdenum	None	None	None	None	None	None	None	None
Fluoride	4.0	3.2	4.0	3.2	4.0	1.95	4.0	3.18
Nitrate + Nitrite	10.0	8.3	10.0	8.0	10.0	8.0	10.0	8.0
Sulfate	None	None	None	None	None	None	None	None
Total Dissolved Solids	None	None	None	None	None	None	None	None
Beryllium	0.004	0.0032	0.004	0.0032	0.004	0.0032	0.004	0.0032
Nickel	0.10	0.08	0.10	0.08	0.10	0.08	0.10	0.08
Selenium	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.04
Magnesium	None	None	None	None	None	None	None	None
Antimony	0.006	0.0048	0.006	0.0048	0.006	0.0048	0.006	0.0048
Arsenic	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.04
Chromium	0.10	0.08	0.10	0.08	0.10	0.08	0.10	0.08
Lead	0.05	0.04	0.05	0.04	0.05	0.04	0.05	0.04
Thallium	0.002	0.0016	0.002	0.0016	0.002	0.0016	0.002	0.0016

Res. = Reserved: At the conclusion of eight (8) rounds of quarterly groundwater sampling from well MH-27 and twelve (12) rounds of monthly groundwater sampling from wells MH-28 and MH-29; the permittee is required to submit an Ambient Groundwater Monitoring Report and permit amendment request to ADEQ WPS-MU to propose AQLs and ALs based on the ambient data. AQLs and ALs will be calculated based on the criteria in 2.5.3.4 and 2.5.3.5. Either a numeric value or “None” will be amended to the permit for each AQL and AL listed as “Reserved.”

NR = Analysis is not required  
 None = Monitoring required, but no AQL or AL established in the permit.  
 AQL = Aquifer Quality Limit  
 AL = Alert Level

All concentrations are in milligrams per liter (mg/L) unless otherwise specified.

Metals will be analyzed as dissolved metals

Use Table 4.2.5 parameter list for biennial sampling events.

**Table 4.2.4  
Quarterly Compliance Groundwater Monitoring Requirements for  
Hazardous POC Wells**

PARAMETER	MH-23		MH-27		MH-28		MH-29	
	AQL	AL	AQL	AL	AQL	AL	AQL	AL
Depth to Water (in feet)	None	None	None	None	None	None	None	None
Water Level Elevation (in feet amsl)	None	None	None	None	None	None	None	None
Field pH (S.U.)	None	Res.	None	Res.	None	None	None	None
Field Specific Conductance (µmhos/cm)	None	None	None	None	None	None	None	None
Temperature – field (°F)	None	None	None	None	None	None	None	None
Cadmium	0.005	0.004	Res.	Res.	Res.	Res.	Res.	Res.
Cobalt	None	None	None	None	None	None	None	None
Copper	None	None	None	None	None	None	None	None
Molybdenum	None	None	None	Res.	None	Res.	None	Res.
Fluoride	4.0	3.2	Res.	Res.	Res.	Res.	Res.	Res.
Nitrate + Nitrite	10.0	8.0	Res.	Res.	Res.	Res.	Res.	Res.
Sulfate	None	None	None	None	None	None	None	None
Total Dissolved Solids	None	None	None	None	None	None	None	None
Beryllium	0.004	0.0032	Res.	Res.	Res.	Res.	Res.	Res.
Nickel	0.10	0.08	Res.	Res.	Res.	Res.	Res.	Res.
Selenium	0.05	0.04	Res.	Res.	Res.	Res.	Res.	Res.
Magnesium	None	None	None	None	None	None	None	None
Antimony	0.006	0.0048	Res.	Res.	Res.	Res.	Res.	Res.
Arsenic	0.05	0.04	Res.	Res.	Res.	Res.	Res.	Res.
Chromium	0.10	0.08	Res.	Res.	Res.	Res.	Res.	Res.
Lead	0.05	0.04	Res.	Res.	Res.	Res.	Res.	Res.
Thallium	0.002	0.0016	Res.	Res.	Res.	Res.	Res.	Res.

Res. = Reserved: At the conclusion of eight (8) rounds of quarterly groundwater sampling from well MH-27 and twelve (12) rounds of monthly groundwater sampling from wells MH-28 and MH-29; the permittee is required to submit an Ambient Groundwater Monitoring Report and permit amendment request to ADEQ WPS-MU to propose AQLs and ALs based on the ambient data. AQLs and ALs will be calculated based on the criteria in 2.5.3.4 and 2.5.3.5. Either a numeric value or “None” will be amended to the permit for each AQL and AL listed as “Reserved.”

NR = Analysis is not required

None = Monitoring required, but no AQL or AL established in the permit.

AQL = Aquifer Quality Limit

AL = Alert Level

All concentrations are in milligrams per liter (mg/L) unless otherwise specified.

Metals will be analyzed as dissolved metals

Use Table 4.2.5 parameter list for biennial sampling events.

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<b>Table 4.2.5 Biennial Compliance Groundwater Monitoring Requirements for POC Wells</b>								
PARAMETER	MH-14		MH-15W		MH-16W		MH-18	
	AQL	AL	AQL	AL	AQL	AL	AQL	AL
Depth to Water (in feet)	None	None	None	None	None	None	None	None
Water Level Elevation (in feet amsl)	None	None	None	None	None	None	None	None
Field pH (S.U.)	None	None	None	None	None	None	None	None
Field Specific Conductance (µmhos/cm)	None	None	None	None	None	None	None	None
Temperature – Field (° F)	None	None	None	None	None	None	None	None
Total Dissolved Solids	None	None	None	None	None	None	None	None
Total Alkalinity	None	None	None	None	None	None	None	None
Carbonate	None	None	None	None	None	None	None	None
Bicarbonate	None	None	None	None	None	None	None	None
Hydroxide	None	None	None	None	None	None	None	None
Chloride	None	None	None	None	None	None	None	None
Sulfate	None	None	None	None	None	None	None	None
Sodium	None	None	None	None	None	None	None	None
Potassium	None	None	None	None	None	None	None	None
Calcium	None	None	None	None	None	None	None	None
Magnesium	None	None	None	None	None	None	None	None
Nitrate + Nitrite	10	8	10	8	10	8	10	8
Fluoride	4.0	3.2	4.0	3.2	4.0	3.2	4.0	3.2
Aluminum	NR	NR	NR	NR	NR	NR	None	None
Antimony	0.006	0.0048	0.006	0.0048	0.006	0.0048	0.006	0.0048
Arsenic	0.050	0.040	0.050	0.040	0.050	0.040	0.050	0.040
Beryllium	0.004	0.0032	0.004	0.0032	0.004	0.0032	0.004	0.0032
Barium	2.0	1.6	2.0	1.6	2.0	1.6	2.0	1.6
Cadmium	0.005	0.004	0.005	0.004	0.005	0.004	0.005	0.004
Chromium	0.10	0.08	0.10	0.08	0.10	0.08	0.10	0.08



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Iron	None	None	None	None	None	None	None	None
<b>Table 4.2.5 Biennial Compliance Groundwater Monitoring Requirements for POC Wells</b>								
PARAMETER	MH-14		MH-15W		MH-16W		MH-18	
	AQL	AL	AQL	AL	AQL	AL	AQL	AL
Lead	0.050	0.040	0.050	0.040	0.050	0.040	0.050	0.040
Mercury	0.002	0.0016	0.002	0.0016	0.002	0.0016	0.002	0.0016
Nickel	0.10	0.08	0.10	0.08	0.10	0.08	0.10	0.08
Selenium	0.050	0.040	0.050	0.040	0.050	0.040	0.050	0.040
Thallium	0.002	0.0016	0.002	0.0016	0.02	0.0016	0.02	0.0016
Copper	None	None	None	None	None	None	None	None
Cobalt	NR	NR	NR	NR	NR	NR	None	None
Manganese	None	None	None	None	None	None	None	None
Molybdenum	NR	NR	NR	NR	NR	NR	None	None
Zinc	None	None	None	None	None	None	None	None
Gross Alpha Particle Activity (pCi/L)	15	12	15	12	15	12	15	12
Radium 226+Radium 228 (pCi/L)	5	4	5	4	5	4	5	4
Total Uranium	None	None	None	None	None	None	None	None
Benzene	0.005	0.004	0.005	0.004	0.005	0.004	0.005	0.004
Toluene	1.0	0.800	1.0	0.800	1.0	0.800	1.0	0.800
Ethylbenzene	0.70	0.560	0.70	0.560	0.70	0.560	0.70	0.560
Total Xylenes	10	8	10	8	10	8	10	8
Total Cyanide	0.2	0.16	0.2	0.16	0.2	0.16	0.2	0.16
Carbon Disulfide	None	None	None	None	None	None	None	None

Res. = Reserved - At the conclusion of eight (8) rounds of quarterly groundwater sampling from well MH-27 and twelve (12) rounds of monthly groundwater sampling from wells MH-28 and MH-29; the permittee is required to submit an Ambient Groundwater Monitoring Report and permit amendment request to ADEQ to propose ALs and AQLs based on ambient data. AQLs and ALs will be calculated based on the criteria in 2.5.3.4 and 2.5.3.5. Either a numeric value or "None" will be amended to the permit for each AQL or AL listed as "Reserved."

NR = Analysis not required

None = Analysis required but no AQL or AL established in permit

AQL = Aquifer Quality Limit

AL = Alert Level

All concentrations in parts per million (ppm) unless otherwise specified

Metals will be analyzed as dissolved metals

If the gross alpha particle activity is greater than fifteen (15) pCi/L, then test for adjusted gross alpha particle activity.

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The adjusted gross alpha particle activity is the gross alpha particle activity including radium 226, minus radon and total uranium (the sum of the uranium 238, 235 and 234 isotopes).

Use Table 4.2.3 and 4.2.4 parameters for quarterly sampling events between biennial events.

<b>Table 4.2.5</b>								
<b>Biennial Compliance Groundwater Monitoring Requirements for POC Wells</b>								
PARAMETER	MH-19		MH-20		MH-21		MH-22	
	AQL	AL	AQL	AL	AQL	AL	AQL	AL
Depth to Water (in feet)	None	None	None	None	None	None	None	None
Water Level Elevation (in feet amsl)	None	None	None	None	None	None	None	None
Field pH (S.U.)	None	None	None	None	None	None	None	None
Field Specific Conductance (µmhos/cm)	None	None	None	None	None	None	None	None
Temperature – Field (° F)	None	None	None	None	None	None	None	None
Total Dissolved Solids	None	None	None	None	None	None	None	None
Total Alkalinity	None	None	None	None	None	None	None	None
Carbonate	None	None	None	None	None	None	None	None
Bicarbonate	None	None	None	None	None	None	None	None
Hydroxide	None	None	None	None	None	None	None	None
Chloride	None	None	None	None	None	None	None	None
Sulfate	None	None	None	None	None	None	None	None
Sodium	None	None	None	None	None	None	None	None
Potassium	None	None	None	None	None	None	None	None
Calcium	None	None	None	None	None	None	None	None
Magnesium	None	None	None	None	None	None	None	None
Nitrate + Nitrite	10	8.3	10	8	10	8	10	8
Fluoride	4.0	3.2	4.0	3.2	4.0	1.95	4.0	3.18
Aluminum	None	None	None	None	None	None	None	None
Antimony	0.006	0.0048	0.006	0.0048	0.006	0.0048	0.006	0.0048
Arsenic	0.050	0.040	0.050	0.040	0.050	0.040	0.050	0.040
Beryllium	0.004	0.0032	0.004	0.0032	0.004	0.0032	0.004	0.0032
Barium	2.0	1.6	2.0	1.6	2.0	1.6	2.0	1.6
Cadmium	0.005	0.004	0.005	0.004	0.005	0.004	0.010	None
Chromium	0.10	0.08	0.10	0.08	0.10	0.08	0.10	0.08

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Iron	None	None	None	None	None	None	None	None
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<b>Table 4.2.5 Biennial Compliance Groundwater Monitoring Requirements for POC Wells</b>								
PARAMETER	MH-19		MH-20		MH-21		MH-22	
	AQL	AL	AQL	AL	AQL	AL	AQL	AL
Lead	0.050	0.040	0.050	0.040	0.050	0.040	0.050	0.040
Mercury	0.002	0.0016	0.002	0.0016	0.002	0.0016	0.002	0.0016
Nickel	0.10	0.08	0.10	0.08	0.10	0.08	0.10	0.08
Selenium	0.050	0.040	0.050	0.040	0.050	0.040	0.050	0.040
Thallium	0.002	0.0016	0.002	0.0016	0.002	0.0016	0.002	0.0016
Copper	None	None	None	None	None	None	None	None
Cobalt	None	None	None	None	None	None	None	None
Manganese	None	None	None	None	None	None	None	None
Molybdenum	None	None	None	None	None	None	None	None
Zinc	None	None	None	None	None	None	None	None
Gross Alpha Particle Activity (pCi/L)	15	12	15	12	15	12	15	12
Radium 226+Radium 228 (pCi/L)	5	4	5	4	5	4	5	4
Total Uranium	None	None	None	None	None	None	None	None
Benzene	0.005	0.004	0.005	0.004	0.005	0.004	0.005	0.004
Toluene	1.0	0.800	1.0	0.800	1.0	0.800	1.0	0.800
Ethylbenzene	0.700	0.560	0.700	0.560	0.700	0.560	0.700	0.560
Total Xylenes	10	8	10	8	10	8	10	8
Total Cyanide	0.20	0.16	0.20	0.16	0.20	0.16	0.20	0.16
Carbon Disulfide	None	None	None	None	None	None	None	None

Res. = Reserved - At the conclusion of eight (8) rounds of quarterly groundwater sampling from well MH-27 and twelve (12) rounds of monthly groundwater sampling from wells MH-28 and MH-29; the permittee is required to submit an Ambient Groundwater Monitoring Report and permit amendment request to ADEQ to propose ALs and AQLs based on ambient data. AQLs and ALs will be calculated based on the criteria in 2.5.3.4 and 2.5.3.5. Either a numeric value or "None" will be amended to the permit for each AQL or AL listed as "Reserved."

NR = Analysis not required  
None = Analysis required but no AQL or AL established in permit  
AQL = Aquifer Quality Limit  
AL = Alert Level  
All concentrations in parts per million (ppm) unless otherwise specified  
Metals will be analyzed as dissolved metals



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Chromium	0.10	0.08	Res.	Res.	Res.	Res.	Res.	Res.
Iron	None	None	None	None	None	None	None	None
<b>Table 4.2.5</b>								
<b>Biennial Compliance Groundwater Monitoring Requirements for POC Wells</b>								
PARAMETER	MH-23		MH-27		MH-28		MH-29	
	AQL	AL	AQL	AL	AQL	AL	AQL	AL
Lead	0.050	0.040	Res.	Res.	Res.	Res.	Res.	Res.
Mercury	0.002	0.0016	Res.	Res.	Res.	Res.	Res.	Res.
Nickel	0.10	0.08	Res.	Res.	Res.	Res.	Res.	Res.
Selenium	0.050	0.040	Res.	Res.	Res.	Res.	Res.	Res.
Thallium	0.002	0.0016	Res.	Res.	Res.	Res.	Res.	Res.
Copper	None	None	None	None	None	None	None	None
Cobalt	None	None	None	None	None	None	None	None
Manganese	None	None	None	None	None	None	None	None
Molybdenum	None	None	None	None	None	None	None	None
Zinc	None	None	None	None	None	None	None	None
Gross Alpha Particle Activity (pCi/L)	15	12	Res.	Res.	Res.	Res.	Res.	Res.
Radium 226+Radium 228 (pCi/L)	5	4	Res.	Res.	Res.	Res.	Res.	Res.
Total Uranium	None	None	None	None	None	None	None	None
Benzene	0.005	0.004	Res.	Res.	Res.	Res.	Res.	Res.
Toluene	1.000	0.800	Res.	Res.	Res.	Res.	Res.	Res.
Ethylbenzene	0.700	0.560	Res.	Res.	Res.	Res.	Res.	Res.
Total Xylenes	10	8	Res.	Res.	Res.	Res.	Res.	Res.
Total Cyanide	0.20	0.16	Res.	Res.	Res.	Res.	Res.	Res.
Carbon Disulfide	None	None	None	None	None	None	None	None
<p>Res. = Reserved - At the conclusion of eight (8) rounds of quarterly groundwater sampling from well MH-27 and twelve (12) rounds of monthly groundwater sampling from wells MH-28 and MH-29; the permittee is required to submit an Ambient Groundwater Monitoring Report and permit amendment request to ADEQ to propose ALs and AQLs based on ambient data. AQLs and ALs will be calculated based on the criteria in 2.5.3.4 and 2.5.3.5. Either a numeric value or "None" will be amended to the permit for each AQL or AL listed as "Reserved."</p> <p>NR = Analysis not required</p> <p>None = Analysis required but no AQL or AL established in permit</p> <p>AQL = Aquifer Quality Limit</p> <p>AL = Alert Level</p> <p>All concentrations in parts per million (ppm) unless otherwise specified</p> <p>Metals will be analyzed as dissolved metals</p>								

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If the gross alpha particle activity is greater than fifteen (15) pCi/L, then test for adjusted gross alpha particle activity. The adjusted gross alpha particle activity is the gross alpha particle activity including radium 226, minus radon and total uranium (the sum of the uranium 238, 235 and 234 isotopes). Use Table 4.2.3 and 4.2.4 parameters for quarterly sampling events between biennial events.

**1.0 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 Sierrita Operation, Cyprus Sierrita Corporation, Pima County, Arizona, dated September 7, 1994.
2. Cyprus Sierrita Corporation, Supplement to Application for Aquifer Protection Permit, September 1996.
3. Cyprus Sierrita Corporation, BADCT Work Plan for APP Application, January 1997.
4. Cyprus Sierrita Corporation, Supplement to Application for Aquifer Protection Permit BADCT Demonstration, August 1997.
5. Cyprus Sierrita Corporation, Supplement to Application for Aquifer Protection Permit, August 1999.
6. Supplement to the Aquifer Protection Permit Application BADCT Demonstration Addendum, Sierrita Mine, Green Valley, Arizona dated March 2005.
7. Aquifer Protection Permit Program Project File, Inventory Number 101679.
8. Public Notice, dated \_\_\_\_\_.
9. Public Hearing, dated \_\_\_\_\_.
10. Responsiveness Summary, dated \_\_\_\_\_.
11. ADEQ *Technical Guidance Document 1*, dated June 1993.
12. ADEQ *Arizona Mining BADCT Guidance Manual*, September 1998.
- 13.
- 14.
- 15.

## **6.0 GENERAL CONDITIONS AND RESPONSIBILITIES**

### **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 upon the amount of daily influent or discharge of pollutants in gallons per day as established by A.R.S. § 49-242(D).

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

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 Severability [A.R.S. § 49-243(K)(8)]**

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.

### **6.5 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 aquifer water quality standard at the applicable point of compliance for the facility. Where, at the time of issuance of the permit, an aquifer already exceeds an aquifer water quality standard 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.

### **6.6 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(D), shall be in effect prior to any discharge authorized by this permit and shall remain in effect for the duration of the permit.

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

The permittee shall notify the Director within five (5) days after the occurrence of any one of the following:

1. The filing of bankruptcy by the permittee.
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.

### **6.8 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.



**6.9 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.

**6.10 Inspection and Entry [A.R.S. §§ 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 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.

**6.11 Duty to Amend [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.

**6.12 Permit Action: Amendment, Transfer, Suspension & 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, renewed, or revoked for cause, under the rules of the Department. The filing of a request by the permittee for a permit action does not stay or suspend the effectiveness of any existing permit condition. The Director shall issue a public notice of all proposed permit actions pursuant to A.A.C. R18-9-A211, R18-9-A212 and R18-9-A213.

**6.12.1 Permit Reopen**

The Director may reopen this permit and amend it pursuant to A.A.C. R18-9-A211.

**6.12.2 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 will be approved until the applicant complies with all transfer requirements as specified in A.A.C. R18-9-A212(B) and (C).

The permittee shall notify the Water Permits Section in writing within fifteen (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.