

Aquifer Protection Permit 100525
 PLACE ID 6376, LTF 63882
 SIGNIFICANT AMENDMENT
ASARCO Ray Operations

The Arizona Department of Environmental Quality (ADEQ) proposes to issue an Aquifer Protection Permit (APP) amendment for the subject facility that covers the life of the facility, including operational, closure, and post closure periods unless suspended or revoked pursuant to Arizona Administrative Code (A.A.C.) R18-9-A213. This document gives pertinent information concerning the issuance of the permit amendment. The requirements contained in this permit will allow the permittee to comply with the two key requirements of the Aquifer Protection Program: 1) meet Aquifer Water Quality Standards at the Point of Compliance (POC); and 2) demonstrate Best Available Demonstrated Control Technology (BADCT). The purpose of BADCT is to employ engineering controls, processes, operating methods or other alternatives, including site-specific characteristics (i.e., the local subsurface geology); to reduce discharge of pollutants to the greatest degree achievable before they reach the aquifer; or to prevent pollutants from reaching the aquifer.

I. FACILITY INFORMATION

Name and Location

Name of Permittee:	ASARCO LLC
Mailing Address:	ASARCO LLC – Ray Operations Box 640 Kearny, AZ 85137
Facility Name and Location:	ASARCO Ray Operations 27809 N. Mineral Creek Road Kearny, Arizona 85137 Pinal County

Regulatory Status

The Notice of Disposal for this site was received on January 18, 1985. The initial aquifer protection permit (APP) application was received on March 25, 1994.

Type of license	License identifier	Effective date
Notice of Disposal	APP 100525 LTF 49225	January 18, 1985
Other Amendment	APP 100525 LTF 49721	May 28, 2009
Significant Amendment	APP 100525 LTF 58677	April 14, 2014
Other Amendment	APP 100525 LTF 60873	June 4, 2015

The site also operates pursuant to an AZPDES (AZ0000035) that was last modified on August 10, 2016. The Ray Concentrator and Elder Gulch Tailings Impoundment have already been issued an APP, Number P-102278.

This site was for a time the subject of a Consent Decree between ASARCO, the State of Arizona and the United States Department of Justice, entered into on January 23, 1998. This Consent Decree required improvements to the water quality of Mineral Creek. The main provisions to be used to achieve this were the construction of a diversion tunnel, and the attainment of, and full compliance with an APP. The Consent Decree has been terminated.

Facility Description

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

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

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

Operational facilities, such as ditches and catchments, are integral parts of the RDAs and serve to manage process fluids within the RDAs. These facilities are transient in nature and move in conjunction with the lateral or vertical expansion of the RDA, as well as changing

patterns of raffinate application. Moreover, during their existence, these facilities typically have variable liquid levels based on evaporation rates, impoundment elevation, rock placement, and raffinate application rates. The facilities may contain stormwater, process contact water, PLS, raffinate, or any combination thereof. ASARCO refers to these facilities as Dynamic Solution Management Facilities (DSMFs). These facilities exist only on permitted RDAs and are considered part of the RDAs for permitting purposes, rather than being separately permitted.

The permitted facilities include 8 RDAs (incorporating the associated DSMFs); 29 primary and secondary process solution impoundments; 7 non-stormwater impoundments, 2 truck-wash impoundments, 1 tailing impoundment, and 1 non-municipal solid waste landfill.

Amendment Description

ADEQ has reviewed and approved the following:

- The expansion of the Rock Deposition Area (RDA) footprint for the eight (8) RDAs (1 Series RDA through 9 Series RDA). The 6 Series RDA subsumed into the 8 Series RRDA.
- Add facility No. 11 Tank to the permit. The tank is an existing facility that is not in use. ASARCO proposes to use the tank as a Process Solution holding tank.
- Merge APP No. P-511619 with APP No. P-100525. APP No. P-511619 was a closure permit for detention ponds DP1 through DP-22. Post closure monitoring in APP No. P-511619 was required to be conducted using point of compliance (POC) wells R-18, R-19 and R-22 under APP No. P100525. The detention ponds will be covered by the 7-Series RDA expansion.
- On July 15, 2016, ADEQ issued an Authority to Operate a Non-Municipal Solid Waste Landfill at Mining Operations to ASARCO, Ray Operations with a facility identification number B3.2, and is eligible for coverage under the terms and conditions of the General Permit established at R18-13-802. Operational requirements for the landfill established in the ATO have been removed from the APP.

Other changes include:

- Updating the permit language to conform to the most current permit format.
- Added Sections 2.1.21.1, 2.2.21.1 and 2.9.1.1 for the facility description, BADCT and closure of the Detention Ponds DP-1 through DP-22 from P-511619 to this permit.
- Updating the Tables in Section 4.2.
- Moved the facilities list and BADCT descriptions to Section 2.2 in the permit.

II. BEST AVAILABLE DEMONSTRATED CONTROL TECHNOLOGY

The Ray Operations are divided into three sub-areas: A, B, and C. Sub-area B consists of the area underlain by the capture zone, characterized as the “passive containment” created by the Ray open pit. Sub-area A is the mine area located hydrologically upgradient of the passive containment, and Sub-area C is the mine area located hydrologically downgradient of the passive containment. BADCT has been determined in accordance with the ADEQ Arizona Mining BADCT Guidance Manual.

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

Current discharge control technology (DCT) and site factors;
 Aquifer loading;

Technically feasible alternative DCTs; and, Cost vs. discharge reduction.

BADCT is supplemented by a required inspection and maintenance program, and groundwater monitoring at the applicable points of compliance.

III. COMPLIANCE WITH AQUIFER WATER QUALITY STANDARDS

Monitoring and Reporting Requirements

Groundwater monitoring is required at the POC wells. The permittee will monitor groundwater quarterly for the constituents listed in Table 4.2.4 of the permit. The permittee will monitor for alpha particle activity, radium 226 + radium 228 and total uranium at POC wells #R-18, R-19, R-22 once in every two years per Table 4.2.5 of the permit.

Groundwater movement generally is from areas of higher topographic elevation, associated with the crests of the drainage divides, to lower areas near Mineral Creek. Some alluvium of higher hydraulic conductivity occurs in the center of the drainage. The depth to groundwater within the basin varies from more than 100 feet, to tens of feet along Mineral Creek. The groundwater gradient within the basin flows from areas of higher topography to lower topography (toward the center of the basin), and downstream. The POC wells have been installed in the vicinity of the furthest downgradient facilities in Mineral Creek, immediately past the Mineral Creek Retention Basin, and in the vicinity of Goat Ranch Lined Impoundment. The Retention Basin is designed to temporarily store stormwater from the 100-year, 24- hour storm event, and as the final temporary storage for fluids from unforeseen emergency spills, from Area C facilities. The 77 acre-foot Retention Basin has a 2500 gpm pumping system designed to remove flows for the 47 acre-foot design 100- year, 24-hour storm event within 5 days.

Point(s) of Compliance (P.O.C)

POC Locations	ADWR Registration Number	Latitude (North)	Longitude (West)
R-18	55-534853	33° 07' 34"	110° 58' 35"

R-19	55-534852	33° 07' 34"	110° 58' 35"
R-22	55-543974	33° 07' 33"	110° 58' 36"
R-2	55-525710	33° 07' 17.3"	110° 58' 14.9"
R-2a	55-533677	33° 07' 09.8"	110° 57' 53.7"
R-3	55-525711	33° 07' 07.5"	110° 57' 32.3"
R-4	55-525712	33° 07' 03.9"	110° 57' 07.0"
R-4a	55-534346	33° 07' 40.8"	110° 56' 56.3"

Discharge Monitoring

Discharge Monitoring is not required.

IV. SURFACE WATER CONSIDERATIONS

The project area is contained within the Mineral Creek hydrologic basin. Facilities are designed to contain the 100-year, 24- hour storm event, and still maintain appropriate freeboard. Mineral Creek upstream of mine operations in Sub Area A is diverted into the Mineral Creek Diversion Tunnel, and at the end of the tunnel enters a lined channel that ends downgradient of most mine operations in Sub Area C. Stormwater falling in Sub-area A, upstream of the Diversion Structure, will be diverted by the Mineral Creek Diversion Tunnel. Stormwater falling in Sub-area A, downstream of the Diversion Structure, will report to the Ray Mine Open Pit, along with stormwater runoff from Sub-area B. Stormwater collected in the Ray Mine Open Pit will be recycled for use at the mine. Stormwater commingled with PLS in the Ray Mine Open Pit will be processed in the SX-EW Plant prior to recycling. Stormwater falling outside the impoundments, but within Sub-area C, is routed into the Retention Basin. The facility does not have MSGP coverage and all stormwater related to the facility is managed under the AZ0000035 Individual AZPDES permit.

V. COMPLIANCE SCHEDULE

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 Water Permit Section. A copy of the cover letter must also be submitted to the Water Quality Compliance Section.

No.	Description	Due by:	Permit Amendment Required?
1	Closure Plan for the facilities being closed under June 26, 2012 Amendment Application. Facilities include: 1. Imp. Behind Stacker Dam (C22.1) 2. 3 Unlined Middle Slimes Ponds (C3.2b) 3. Crusher Cooling Water Imp (C15.13) These facilities had been integrated into	At final mine closure.	Yes

	larger operating facilities, actual closure will not occur until the larger facilities are closed. Upon completion of closure activities, provide a closure report for each facility indicating the closure activities and results of sampling. Refer to Section 2.9 (Closure).		
2	As built plans for the 4F Impoundment. Include certification that the facility was constructed in accordance with plans approved by ADEQ and QA/QC documentation completed for liner and subgrade preparation. The final construction report shall be certified by the on-site construction manager and shall be sealed by a registered professional engineer.	Submit within 90 days of completion of construction.	No
3	As built plans for the Suzie D Impoundment. Include certification that the facility was constructed in accordance with plans approved by ADEQ and QA/QC documentation completed for liner and subgrade preparation. The final construction report shall be certified by the on-site construction manager and shall be sealed by a registered professional engineer.	Submit within 90 days of completion of construction.	No
4	As built plans for the Mill Pond. Include certification that the facility was constructed in accordance with plans approved by ADEQ and QA/QC documentation completed for liner and subgrade preparation. The final construction report shall be certified by the on-site construction manager and shall be sealed by a registered professional engineer.	Submit within 90 days of completion of construction.	No
5	As built plans for the 7E Raffinate Storage Pond. Include certification that the facility was constructed in accordance with plans approved by ADEQ and QA/QC documentation completed for liner and subgrade preparation. The final construction report shall be certified by the	Submit within 90 days of completion of construction.	No

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

VI. OTHER REQUIREMENTS FOR ISSUING THIS PERMIT

Technical Capability

ASARCO LLC has demonstrated the technical competence necessary to carry out the terms and conditions of the permit in accordance with A.R.S. § 49-243(N) and A.A.C. R18-9-A202(B). Consultants and contractors hired to design and/or build facility upgrades have also demonstrated the appropriate technical competence.

ADEQ requires that appropriate documents be sealed by an Arizona registered geologist or professional engineer. This requirement is a part of an on-going demonstration of technical capability. The permittee is expected to maintain technical capability throughout the life of the facility.

Financial Capability

The permittee shall maintain financial capability throughout the life of the facility. The closure and post-closure costs are estimated to be \$21,651,571 and \$4,869,569 respectively. The financial assurance mechanism was demonstrated through A.A.C. R-18-9-A203(C)(1), a financial test for self-assurance and a letter from ASARCO's Chief Financial Officer.

Zoning Requirements

Under A.R.S. § 11-812 metallic mineral mining is exempt from local land use regulations.

VII. ADMINISTRATIVE INFORMATION

Public Notice (A.A.C. R18-9-108(A))

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a draft permit or other significant action with respect to a permit or application. The aquifer protection program rules require that permits be public noticed in a newspaper of general circulation within the area affected by the facility or activity and provide a minimum of 30 calendar days for interested parties to respond in writing to ADEQ. The basic intent of this requirement is to ensure that all interested parties have an opportunity to comment on significant actions of the permitting agency with respect to a permit application or permit.

Public Comment Period (A.A.C. R18-9-109(A))

The Department shall accept written comments from the public before a significant permit amendment is made. The written public comment period begins on the publication date of the public notice and extends for 30 calendar days. After the closing of the public comment period, ADEQ is required to respond to all significant comments at the time a final permit decision is reached or at the same time a final permit is actually issued.

Public Hearing (A.A.C R18-9-109(B))

A public hearing may be requested in writing by any interested party. The request should state the nature of the issues proposed to be raised during the hearing. A public hearing will be held if the Director determines there is a significant amount of interest expressed during the 30-day public comment period, or if significant new issues arise that were not considered during the permitting process.

VIII. ADDITIONAL INFORMATION

Additional information relating to this permit may be obtained from:

Arizona Department of Environmental Quality
Water Quality Division – APP Unit
Attn: Monica Phillips
1110 W. Washington Street, Mail Code 5415B-3
Phoenix, Arizona 85007
Phone: (602) 771-2253

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