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From: Barbara Cenalmor
Date: 1/22/10

Technical Support Document
ASARCO LLC - Ray Mine
Permit # V20633.R02

1. BACKGROUND

1.1 Applicant

This is a permit revision for an existing mining operation, operated by ASARCO LLC , a Delaware limited liability company. The SIC Code is 1021 for Metal Mining, Copper Ores. The facility is located at State Highway 177, 8 miles north of Kearny, Arizona, upon a parcel also identified by Pinal County Assessor's Parcel # 106-38-0001.

This technical support document summarizes this facility's history and any changes made to the permit through this renewal. Additional information may be found in the Technical Support Documents for previous permits for the facility.

This analysis reflects consideration of (at least) the following:

1. Application for minor revision V20633.R02, signed on 12/18/09 by Steven Holmes, General Manager.

2. CAM Plan Submittal, dated 12/18/09.

1.2 Attainment Classification

This facility is located in an area designated as nonattainment for PM10. At 59 FR 36116 (7/15/94), the EPA approved a plan for the "Hayden Township" TSP/PM10 non-attainment area. However, the plan lacks any recognition of this facility, or any limitation or obligation that applies to this source.

1.3 Permitting History

The following is a list of permits applied for and/or issued since 1990 with respect to the ASARCO Ray Mine.

Permit #	Permit Type	Issue Date	Equipment
6925, 6926	Installation (operating?)	1/10/90 (Oper. permit issued)	In-pit sulfide crusher, overland conveyor, two stackers, reclaim system, omni-cone crusher
7267	Installation (operating?)	7/16/90 (Oper. permit issued)	Water sprays on limestone plant
20148	Operating	4/14/93	Facility
10047	Installation	9/27/93	Gas tanks
20456	Installation (Operating?)	9/27/93 (Oper. permit issued)	Lime handling/slaking; lab fume scrubbers
20148.R01	Revision	7/9/99	Secondary Sulfide Ore Crusher
20148.R02	Revision	11/19/99	Perf. Test for Secondary Sulfide Ore Crusher
20456	Operating	9/27/93	Lime & Lab
A20510.000	Major Source	Withdrawn	Facility
V20600.000	Title V	6/5/03	Facility

Permit #	Permit Type	Issue Date	Equipment
V20600.R01	Minor Mod.	12/13/04	Heavy duty equipment painting
V20600.R02	Minor Mod.	7/13/05	Burning of pallets for training of the fire brigade.
V20600.R03	Minor Mod.	11/17/06	Landfill cell for asbestos materials.
V20600.R04	Significant Rev.	9/28/07	Replacement of In-Pit Crusher/Secondary Crusher.
V20633.000	Renewal	7/01/08	n/a
V20633.R01	Significant Revision	5/4/09	Revise requirement of 2 scrubbers for CR4 and require a baghouse instead.

1.4 Compliance History

Inspections are being regularly conducted at the ASARCO-Ray mine to ensure compliance with its applicable permit conditions.

ASARCO is currently in compliance with the permit conditions cited in permit V20633.000. The following table summarizes the recent inspections that ave been conducted on the source:

Inspection Date	FAR Number	Type of Inspection	Results
2/22/06		Compliance	In compliance
4/24/07	F-2007-129	Compliance	In compliance
4/2/08		Compliance	In compliance
3/19/09		Compliance	In compliance

1.4.1. RACT Compliance

The Title V permit V20600.000 for the Asarco-Ray Complex facility was issued on 6/5/2003. The technical support document (TSD) for such permit indicated that the existing controls at the facility constituted RACT.

As part of the RACT determination, PCAQCD agreed to install a PM10 monitor in Riverside to confirm whether RACT had been characterized properly. The TSD also indicated that "should the monitoring data disclose a pattern of exceedances that could be attributed to the Ray Mine, that would provide justification for either re-opening this permit, or invoking other relevant process, to revisit the foregoing characterization of RACT."

The data obtained from the Riverside monitor from 2003 to 2007 shows no exceedances of the 150 $\mu g/m^3$ PM10 24-hour standard.

2. PROCESS DESCRIPTION

There have been no changes to this process description since the last permitting transaction, Permit Renewal V20633.000

2.1 General Process[1]

This facility includes an open pit mine, crushing, grinding and flotation operations, leaching, solvent extraction and electrowinning operations. The bulk of the particulate matter emissions from this site originate from ore-mining operations. The site includes hot water heaters, solvent and diluent storage tanks, solvent extraction tanks, mixers/settlers, occasional open burns and landfill operations. These equipment and operations/activities are also sources of emissions of particulate matter and other pollutants.

2.1.1 Pit Operations

The mine extracts sulfide, oxide and silicate ores. Initially, diesel or electric-driven drills perforate the mineralized rock benches with 60-foot deep drill holes. Compressed air blows rock cuttings from the blast holes. Operators collect samples from cuttings to allow assay of the copper content and ore character. Blasting agents fracture and loosen the ore. Electric shovels load the material into diesel- or diesel-electric powered haul trucks. The haul trucks transfer sulfide ore to one of the several crushers, transfer leachable ores to separate sulfide or silicate leach dump areas, and transfer overburden material to waste dumps.

2.1.2 Maintenance Operations

The permitted operations at this facility include several diesel and gasoline tanks, 9 hot water washers powered by diesel and heavy equipment spray painting. All these operations are sources of Volatile Organic Compounds.

2.1.3 Ray Concentrator

There are currently 3 ore crushers at the Ray site: the in-pit crusher (CR-3a), the secondary in-pit crusher (CR-3b) and the near-pit Omni-cone crusher (CR-1). One (1) additional near-pit crusher (CR-4) has been permitted to replace the current in-pit and secondary crushers.

The current in-pit (CR-3a) crusher system is located approximately 500 feet below the pit lip. Trucks dump the sulfide ore into the in-pit's dump pocket, which in turn empties the ore onto an apron feeder that supplies the crusher. The in-pit crusher reduces the ore to an 8-inch-minus dimension. The secondary crusher only operates when harder ore materials are being mined from the pit. When both crushers are operating, they operate in series; the primary crusher feeds to the secondary crusher and the secondary crusher output is delivered to the concentrator via the overland conveyor. When the secondary crusher is not working, the output from the primary crusher is routed directly to the "overland" conveyor. Water sprays at each transfer point control emissions. The overland conveyor carries the ore about 0.8 mile to a transfer tower where a diverter gate alternatively directs a gravity drop of the ore onto a transfer belt conveyor leading to the railroad loading stockpile, or onto a transfer conveyor leading to the Ray concentrator coarse ore stockpile. Water sprays control drop point emissions.

[1]This section includes a summary of the current and projected operations at the facility, including activities just recently permitted through revisions.

The new near-pit crushing plant (CR-4), will be located approximately 800 feet from the existing transfer tower. Once its construction is finished it will completely replace the current in-pit and secondary crushers. The crushed ore from the new near-pit crusher will discharge directly into the discharge chute underneath the crusher, on to the discharge belt conveyor from where it will be transferred to a new overland conveyor. This conveyor will be approximately 800 feet long, in comparison with the existing one which is 4,200 feet long.

A coarse ore reclaim system is located beneath the Ray concentrator coarse stockpile and consists of three reclaim apron feeders and a mill conveyor. Water sprays control emissions at each apron feeder transfer point. The mill feed empties into a semiautogenous (SAG) mill. The SAG mill reduces the ore size to the consistency of coarse gravel using a wet-grind process. The SAG mill discharges the slurry through a screen used to remove the oversized material.

Fine materials passing through the SAG mill output screen enter 2 parallel wet ball mills which further reduce the ore to the consistency of fine sand. Reagents, fed into the ball mills, adhere to the copper-bearing metallic particles. The reagents include lime which is stored in dry storage silos. A baghouse controls the emissions generated by trucks delivering lime into the silos.

The ball mills feed a series of flotation cells where the reagent/metallic mineral mixture floats to the surface and is recovered by skimmer systems. The skimmed material is de-watered to produce a damp, copper-rich concentrate. This concentrate is transferred by conveyor to a loading pad where equipment load the material into rail cars or trucks for shipment off site. Drains remove the waste material or “tailings” from the bottom of the flotation cells. The tailings are pumped to a thickener and then to the Elder Gulch tailings impoundment.

A metallurgical laboratory used to analyze blast rock cuttings and other samples generates particulate matter and sulfuric acid emissions.

2.1.4 Train Load-Out

A railroad tunnel runs under the coarse ore stockpile. Drop chutes allow material to gravity feed into rail cars positioned in the tunnel. Water sprays control emissions during rail car loading.

The near-pit Omni-cone crusher (CR-1) receives previously crushed ore from the overland conveyor and it is used to crush the ore to an 8"-minimum dimension. This crusher is located in the train load out area. A wet scrubber system is used to control fugitive particulate matter emissions.

2.1.5 Ray Leaching Operations

Silicate ore that is mined out of the pit is carried to the heap-leaching areas and sprayed with dilute sulfuric acid to keep it wet. Contact with the acid slowly leaches the copper from the material and the liquid drains out. The underlying bedrock and drainages funnel the leachate into dams, which drain or are pumped to the solvent extraction-electrowinning plant.

2.1.6 Solvent Extraction-Electrowinning (SX-EW) Operations

The copper-laden leachate or “pregnant leach solution” (PLS) is conveyed to the SX plant where an organic solvent/kerosene solution strips the copper from the leach solution.

Sulfuric acid is used to strip the copper from the solvent/kerosene phase. The copper-rich solution is pumped to the electrowinning plant, where an electric current plates elemental copper onto copper cathode sheets. VOC emissions are generated from the use and storage of the solvent/kerosene solution. Also emissions of sulfuric acid are generated from the electrowinning tanks.

Natural gas heaters are used to provide process heat for both the solvent extraction and the electrowinning process. Combustion emissions are generated.

2.1.7 Administration/Miscellaneous

Other miscellaneous operations at this site generate fugitive particulate matter emissions, including windblown dust from leach heaps, dumps, stockpiles and tailings, a 50 acre solid waste landfill and a 14-acre regulated asbestos materials (RACM) landfill.

2.2 Process Changes

2.2.1 Equipment Addition

This minor permit revision authorizes the installation of a 2.9m MMBtu/hr natural gas fired boiler for heating operations associated with the Solvent Extraction-Electrowinning (SX-EW) operations. This will increase the number of SX-EW boilers (hot water heaters) to 5. The addition of this boiler represents a potential emissions increase of 1.2 tons of NOx and 1.04 tons of CO.

2.3 Administrative Changes

Some incorrect section or rule references have been addressed during this revision. Also, as indicated in the latest testing data for the crusher CR4, the CAM plan has been revised (per ASARCO's 12/18/09 submittal) to indicate the specific water flows and pressure drops that the controls should be operated at.

3. EMISSIONS

The existing facility already constitutes a "major emitting facility" within the meaning of CAA §165(a), and constitutes a "major source" within the meaning of CAA §302(j) or CAA §112.

The addition of this boiler represents a potential emissions increase of 1.2 tons of NOx and 1.04 tons of CO.

4. REGULATORY REQUIREMENTS AND MONITORING

4.1 Monitoring/Compliance Verification

The same requirements that apply to the existing boilers (water heaters) apply to the proposed one. Therefore only natural gas must be used as primary fuel, and propane as secondary fuel. Records of the annual amount of fuel used in the boilers/haters must be kept.

5. AMBIENT IMPACT ASSESSMENT

Any changes proposed by this permit revision do not include significant increases in emissions of PM10, therefore, no additional impact assessments have been conducted.

6. LIST OF ABBREVIATIONS

ADS . . . . . Agglomerative Dust Suppression
AP-42 . . . . . "Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources", 5th Edition
ASTM . . . . . American Society for Testing and Materials
CAA . . . . . Clean Air Act
CAM . . . . . Compliance Assurance Monitoring
CFR . . . . . Code of Federal Regulations
CO . . . . . Carbon Monoxide
H2S04 . . . . . Sulfuric Acid
hr . . . . . Hour
lb . . . . . Pound
MACT . . . . . Maximum Achievable Control Technology
MMBTU . . . . . Million British Thermal Units
Mod. . . . . Modification
MSDS . . . . . Material Safety Data Sheet
NOX . . . . . Nitrogen Oxides
NSPS . . . . . New Source Performance Standard
NSR . . . . . New Source Review
PCAQCD . . . . . Pinal County Air Quality Control District
PGCAQCD . . . . . Pinal-Gila Counties Air Quality Control District
PM10 . . . . . Particulate Matter nominally less than 10 Micrometers
PSD . . . . . Prevention of Significant Deterioration
SIC . . . . . Standard Industrial Code
SOX . . . . . Sulfur Dioxide
tpy . . . . . tons per year
TSD . . . . . Technical Support Document
VOC . . . . . Volatile Organic Compound
yr . . . . . year