Air Quality Permit

Issued to: ASARCO Incorporated
P.O. Box 1230
East Helena, MT 59635

Permit #2557-11
Application Complete: 7/5/00
Preliminary Determination Issued: 8/11/00
Department Decision Issued: 9/1/00
Final Permit Issued: 9/17/00
AFS # 049-0001

An air quality permit, with conditions, is granted to ASARCO Incorporated (ASARCO), pursuant to Section 75-2-204 and 211 of the Montana Code Annotated (MCA), as amended, and the Administrative Rules of Montana (ARM) 17.8.701, *et seq.*, as amended, for the following:

SECTION I: Permitted Facilities

A. Plant Location:

The ASARCO East Helena plant is a primary lead smelter originally constructed in 1888. The smelter is located in the NW¼ of Section 36, Township 10 North, Range 3 West, Lewis and Clark County, within the City of East Helena, approximately 3 miles east of Helena.

B. Existing Source Description and Permitted Equipment

The facility is a “custom” smelter and receives lead concentrates, as the raw materials, from various sources and processes the concentrates into lead bullion. The lead bullion still contains significant amounts of other metals, such as gold and silver, and is shipped off site for further refining. The facility also recycles material, such as off specification photographic paper and printed circuit boards, to recover the precious metals.

The following equipment, located at the ASARCO East Helena plant, is currently covered by this permit:

1. A Concentrate Storage and Handling Building (CSHB), which has the capability of handling 65,000 tons of material and is equipped with two overhead cranes, plus baghouse ventilation systems to handle any dust created by internal activity.

   The general associated equipment for the CSHB is described as follows:

   a. A pre-cast 650' L x 102' W x 65' H concrete building
   b. One railcar door
   c. Seven truck doors
   d. Four front-end loader doors
   e. Eleven personnel doors
   f. Two overhead cranes

g. Sixteen concrete storage bins
h. Twelve belt feeders
i. Two 107,500-CFM baghouses
j. One 26,000-CFM baghouse
k. One 30,000-CFM makeup air heating system
l. One 187-foot stack (modified from 130 feet - April 6, 1989)
m. A number of front-end loaders, trucks, graders, and scrapers. (CSHB previously covered under permit #2557).

2. A stack and associated equipment to vent gases from blast furnace baghouses.

3. A Sinter plant ventilation weak gas handling baghouse.

4. A Sinter Plant Ventilation System (SPVS). This ventilation system consists of the following equipment:

   a. A Mikro-Pulsaire® reverse pulse baghouse (55,000 acfm) with an air-to-cloth ratio of 4.0 to 1 with 16-oz. polypropylene bags or equivalent
   b. An Auburn International Tribflow® broken bag detector
   c. Hoods
   d. Necessary ductwork

   The baghouse discharges through the existing concentrate storage and handling building stack (187 feet).

5. Single contact sulfuric acid plant for the control of SO_2.

6. An acid dust handling and conveying system including, but not limited to, the following equipment:

   a. An agglomerator building ventilated by use of approximately 15,000 acfm of ventilation capacity from the concentrate storage and handling building (CSHB). The agglomerator building includes the following:

      i. A 70-ton surge bin controlled with a Mikro-Pul® 2000 acfm pulse-jet baghouse
      ii. A DustMaster conditioning system capable of storing, mixing, feeding, moisturizing, and transporting the acid dust
      iii. A belt conveyor to discharge the moistened dust to the No. 16 bin in the CSHB

   b. A delumper and enclosed surge bin (approximately 2 tons).

   c. A drag conveyor system to transport material from the sinter plant baghouse and the hot cottrell to the delumper.

d. A dense-phase pneumatic conveyor to transport the delumped material from the surge bin to the Agglomerator building

e. A pneumatic line to move the sinter plant cyclone dust to the Agglomerator building

7. A 1995 Dross reverberatory furnace and associated ventilation system. This includes the following equipment:

a. A 1995 Dross reverberatory furnace (ASARCO design), which is fired with two 9-million-BTU/hr natural gas burners.

b. The #4 lead kettle and cover.

c. A gas handling system. The system is a high velocity system, which consists of a plenum and local intake hoods. Local intake is on the Dross reverberatory furnace, the lead kettle, the Matte/Speiss tap, the Matte/Speiss launder, the charge hole, and the Matte/Speiss granulating pit. Under typical operational conditions, the total ventilation exiting the plenum normally ranges between 125,833 acfm and 69,684 acfm. The plenum exhausts to the brick flue that is connected to the blast furnace baghouses.

With the construction of the Dross baghouse, emissions from the plenum will be sent to the Dross baghouse instead of the blast furnace baghouse.

8. The dross plant ventilation system, including:

a. A pulse-jet baghouse (Dross Baghouse) with nominal flow of 225,000 acfm
b. A stack (200 feet minimum height) to vent emissions from Dross plant baghouse and from sinter storage baghouse

9. Charge car enclosures for each blast furnace.

10. The construction of a blast furnace baghouse dust handling system, including:

a. A dense-phase pneumatic dust conveying system as the primary method for conveying blast furnace baghouse dust to either a storage silo prior to charging to the blast furnaces or a rail loadout hopper prior to off-site shipment.

b. An enclosure over the blast furnace baghouse dust unloading and reclaiming area.

c. A pulse-jet baghouse (nominal flow rate 45,500 acfm) to control particulate emissions from various local and general ventilation points within the blast furnace baghouse dust unloading and reclaiming area enclosure. (Note: this is the same baghouse referred to in Section I.B.15.d.).

d. A 12-ton capacity rail loadout hopper with pulse-jet baghouse control (nominal flow rate 3500 acfm).

e. A 250-ton capacity blast furnace baghouse dust storage silo with pulse-jet baghouse control (nominal flow rate 2500 acfm).

f. A 50-ton capacity Portland cement silo with pulse-jet baghouse control (nominal flow 1400 acfm).

g. A 6-ton capacity blast furnace agglomerator charge hopper with pulse-jet baghouse control (nominal flow 1400 acfm).

h. Two agglomerators for mixing blast furnace baghouse dust, Portland cement and water prior to the mixture being charged to the blast furnaces.

11. The lead pots and lead granulation system, including the following:

a. The use of 5-ton lead pots with ventilation during filling and covers to be used during periods of transfer
b. The use of a lead granulation system, located in the dross plant building, to handle lead from the lead pots

12. The High Efficiency Reverse Osmosis (HERO) Water Treatment System, including the following:

a. Spray Dryer and Solids Disposal System, including the following:

i. A spray dryer and a natural gas-fired air heater (maximum firing rate of 11,000 ft^3 per hour),

ii. A spray dryer baghouse (Mikro-Pul® pulse jet, 6594 ft^2 of cloth area, 11,139 dry standard ft^3 per minute), induced draft fan and associated ductwork, and

iii. A bin-vent storage silo, bin-vent baghouse, rotary air locks, load out spout ventilation fan (induced draft) and associated piping and duct work.

b. Two Celgard® membrane degassifiers (10” diameter by 28” height), an air blower, ductwork and associated plumbing.

c. Other associated water treatment units.

13. Kodak Paper Handling System (Note: this equipment was installed in accordance with the *de minimis* rule), including the following:

a. De-baler
b. Infeed conveyor

c. Compactor and associated support structures

14. Printed Circuit Board Router Dust Injection System (Note: this equipment was installed in accordance with the *de minimis* rule), including the following:

    a. Super sack unloader bin with adjustable knife cutter and slide gate
    b. Blower assembly with motor, inlet/outlet silencers, outlet, check plate, relief valve, inlet filter, etc.
    c. Loss-of-weight batch feeder with vented shear protector and rotary airlock
    d. Dense phase pneumatic piping system and blast furnace tuypere injection ports

15. Printed Circuit Board Rotary Melting System, including the following:

    a. 1996 Coreco® rotary melting furnace (model 1848 Rotary Sweat Melt, 48" diameter by 24-foot length, three natural gas burners, total maximum rated design capacity of 6 MMBtu/hour heat input) equipped with air seals on the feed and discharge ends of the furnace.

    b. Water bath (to seal and collect the discharge from the Rotary furnace) with conveyor, associated duct work and damper.

    c. John Zink® thermal oxidation unit (model JZ #A05159, rated at 9900 scf/hour and 9 MMBtu/hour heat input), combustion blower, associated duct work and damper.

    d. Blast furnace baghouse's cleanout (ID #18V) associated baghouse (1996 Mikro-pul® pulse jet, model 1260J-10-30-TRH, 14,843 ft^2 cloth area), induced draft fan, associated duct work and blast furnace baghouse stack (point source ID #16P). (Note: The 1996 Mikro-pul® pulse jet baghouse, model 1260J-10-30-TRH, is the same one referred to in Section I.B.10.c.).

    e. A concrete bunker for raw material storage, Tetrahedrite hopper feeder, belt conveyor and rotary furnace feed hopper.

C. Equipment Permanently Shut Down:

1. The following sources of emissions have been permanently shut down.

    a. The zinc plant building (20V)
    b. The zinc plant building baghouse (21V)
    c. The zinc furnace baghouse stack (18P)

2. The following equipment shall not be used after completion of construction of the Acid Dust Handling System.

    a. The Acid Dust Bin Baghouse Stack (17P)
    b. The zigzag blender and other points of emissions in the acid dust handling

building (17V), except for the equipment associated with the 130-ton acid dust bin, which will be controlled by the acid dust bin baghouse

c. The acid dust incline conveyor and drop point into open-top gondola railcars (17Va)

3. The 47 feeder charging bins (8Vk) shall be permanently shut down once the two agglomerators for mixing, blast furnace baghouse, and blast furnace dust charging systems are operational.

D. Current Permit Action

The current permit action is an alteration of permit #2557-10. ASARCO proposes to install a Rotary Melting Furnace and thermal oxidation unit. The rotary furnace will enable ASARCO to recover the precious metals contained in printed circuit board material (CBM). The rotary melter project consists of three main steps:

1. The partial combustion and depolymerization of shredded CBM under starved air conditions in an indirect fired rotary kiln
2. Discharge of the partially melted CBM from the rotary kiln into a sealed water bath, and after quenching, transfer of the CBM residue to the blast furnace
3. Incineration of the volatile organic compounds (VOCs), evolved by the depolymerization process in the kiln, in a thermal oxidation unit

There are two air discharge points for the rotary melter project: the exhaust from natural gas combusted to heat the kiln, and the blast furnace baghouse stack. The emissions from heating the kiln are vented, uncontrolled, to atmosphere. The emissions from the incinerator, after being cooled by the addition of air, are routed to the blast furnace baghouse's cleanout baghouse and then exhausted through the blast furnace baghouse stack. The details are outlined in the Permit Analysis section. Permit **#2557-11** will replace permit #2557-10.

SECTION II: Conditions and Limitations

A. Definitions

The following definitions apply throughout this permit:

1. "Calendar Day" means a 24-hour period starting at 12:00 midnight and ending at 12:00 midnight 24 hours later, with the span of time occurring during one calendar date.

2. "CEMS-Derived Hourly Emission Rate" means a sulfur dioxide emission rate (expressed in tons per hour) determined using hourly averages and calculated using equation A-01 (below).

Equation A-01: $\text{CDHER} = \text{HASO2} \times \text{HASGFR} \times (4.98\text{E} - 09)$

Where:
CDHER = CEMS-Derived Hourly Emission Rate (tons/hour)
HASO2 = Hourly Average SO_2 Concentration (parts per million, wet basis)
HASGFR = Hourly Average Stack Gas Flow Rate (wet basis, standard cubic feet per minute)
4.98E-09 = A constant with a value of 4.98×10^{-9}
Equation A-01 is derived from conversion factors based upon the wet measurement of SO_2 and stack flow rate. If concentrations and stack gas flow rates are determined on a dry basis, a different equation must be used to determine emissions of sulfur dioxide, and the equation must be approved by the department.

3. "Clock Hour" means 1/24 of a calendar day and refers to any of the standard 60-minute periods in a day which are generally identified and separated on a clock by the whole numbers one through twelve.

4. "Complete 15-Minute Data Block" means an arithmetic average of a minimum of nine 1-minute values, or 60% of the duration of a 15-minute data block. A complete 15-minute data block must be derived from valid data, and obtained from a continuous sulfur dioxide monitor, continuous temperature monitor, or continuous flow rate monitor that measures SO_2 concentrations, temperature, or flow rate such that no more than 1 minute can elapse between measurements. A 15-minute data block refers to any one of the four 15-minute periods in a clock hour, commencing with the 1st, 16th, 31st, and 46th minute of the clock hour.

5. "Continuous Emission Monitoring System (CEMS)" means all equipment necessary to obtain an hourly emission rate of sulfur dioxide including, but not necessarily limited to: a continuous emission monitor (CEM) that determines sulfur dioxide concentrations in a stack gas; a continuous stack gas volumetric flow rate monitor that determines stack gas flow rates; and associated data acquisition equipment.

6. "Daily Emissions" means the amount of sulfur dioxide (SO_2) emitted in a calendar day (expressed in tons per day) as determined in accordance with the matrix contained in Table 1 and utilizing Equation A-02. The following table provides a template for determining daily emissions for the Acid Plant Stack.

TABLE 1. DAILY EMISSIONS MATRIX – ACID PLANT STACK		
# of CEMS-derived hourly emission rates available per calendar day	Stack operating hours per calendar day equals 24	Stack operating hours per calendar day not equal to 24
24 CEMS-derived hourly emission rates	Daily emissions = sum all CEMS-derived hourly emission rates for the given calendar day	Daily emissions = sum all CEMS-derived hourly emission rates for the given calendar day
Less than 24 and greater than or equal to 20 CEMS-derived hourly emission rates	Daily emissions calculated using equation A-02	Daily emissions calculated using equation A-02

Daily emissions for the Acid Plant Stack shall be determined in accordance with Rows 1 and 2 of Table 1, above, and Equation A-02 (below).

Equation A-02: $DEAPS = \left[\left(\sum CDHEROH \times OH\right) / OHCDER\right] + \sum CDHEROTOH + \sum DMHER$

Where:
DEAPS = Daily Emissions from Acid Plant Stack (tons/day)
$\sum$CDHEROH = sum of CEMS-Derived Hourly Emission Rates for Operating Hours
OH = number of Operating Hours
OHCDER = number of operating hours for which CEMS-derived emission rates are available
$\sum$CDHEROTOH = sum of CEMS-Derived Hourly Emission Rates for hours Other Than Operating Hours
$\sum$DMHER = sum of De Minimis Hourly Emission Rates

7. "De Minimis Hourly Emission Rate" means an emission rate for the acid plant stack, which shall apply during those clock hours that are not operating hours, and for which a CEMS-derived hourly emission rate is unavailable. The de minimis hourly emission rate is 0.00 tons per hour of sulfur dioxide for the acid plant stack.

8. "Furnace Lead" means the total tons of bullion and Speiss/Matte produced.

9. "Hourly Average" means an arithmetic average of all complete 15-minute data blocks for a clock hour. A minimum of three complete 15-minute data blocks are required to determine an hourly average for each monitor per clock hour.

10. "Natural Draft Opening" or "NDO" means any permanent opening that remains open while the facility is operating and is not connected to a ventilated duct. Garage doors, employee doors, and temporary openings necessary for maintenance and repairs shall not be considered as NDO, provided ASARCO keeps such openings in their closed position except when actually in use.

11. "Operating Hours" means:

    a. For the acid plant stack, those clock hours when the acid plant is operating, as determined by the use of contemporaneous operating logs, production logs, and/or other records that indicate the operating status of the acid plant.

    b. For any lead bearing affected facility, those clock hours when the affected facility is starting up, shutting down, using fuel, or processing materials, and lead emissions are expected from the source, building, or stack.

12. "Quarterly Data Recovery Rate" means the relationship between the number of operating hours in a calendar quarter when CEMS-derived hourly emission rates

are available for a stack in comparison to the number of corresponding operating hours during the calendar quarter, and expressed as a percentage. The quarterly data recovery rate for a stack shall be calculated in accordance with the following equation:

Equation A-03: $$QDRR = \left(\frac{CDHERCQOH}{OHCQ} \right) X \quad 100$$

Where:
QDRR = quarterly data recovery rate
CDHERCQOH = CEMS-Derived Hourly Emission Rates in a Calendar Quarter that are also Operating Hours
OHCQ = total number of Operating Hours in a Calendar Quarter

13. "Standard Conditions" means 20ºC (68ºF) and 1 atmosphere (29.92" Hg).

14. "Unusual Circumstances" means circumstances that are beyond ASARCO's control, such as earthquakes, lightning, area-wide power outages, or fire; but does not include malfunctions of any monitoring equipment or associated data acquisition equipment unless such malfunctions meet the following conditions:

    a. ASARCO has properly designed the continuous emission monitoring and stack flow rate monitoring systems, including the associated data acquisition systems (CEMS).

    b. ASARCO has properly operated and maintained the continuous emission monitors, stack flow rate monitors, and associated data acquisition systems (CEMS).

    c. ASARCO has maintained a complete inventory of those spare parts that are reasonably expected to fail, which would allow ASARCO to substantially replace the continuous emission and stack flow rate monitors, as well as the associated data acquisition systems (CEMS).

    d. ASARCO has maintained a larger inventory of spare parts for those CEMS parts that have shown a history of failure.

    e. ASARCO produces evidence that it has exhausted its spare parts inventory specific to the problem or malfunction and can show evidence that additional spare parts were ordered within two working days of the inventory being exhausted for the specific part.

    f. ASARCO produces evidence that it has taken all reasonable steps to minimize the period of non-operation of the monitor or associated data acquisition equipment (CEMS).

    g. ASARCO submits a report to the department, documenting that the malfunction meets the above conditions, within 1 week of occurrence.

ASARCO shall promptly notify the department by telephone of the occurrence of unusual circumstances, as defined herein, except that if telephone notification is not immediately possible, notification at the beginning of the next working day is acceptable.

15. "Valid Data" means data that is obtained from a continuous sulfur dioxide emission monitor, continuous temperature monitor, or continuous flow rate monitor, which meets the applicable specifications, operating requirements and quality assurance and control requirements contained in this permit.

B. Requirements:

1. All haul and access roads leading to the ore handling building shall be paved in order to facilitate any necessary cleanup caused by material dropping from mobile vehicles (ARM 17.8.710).

2. Total particulate matter emissions from the concentrate storage and handling building's 187-foot stack shall not exceed 20.81 lbs/hr (ARM 17.8.715).

3. Lead emissions from the concentrate storage and handling building's 187-foot stack shall not exceed 4.091 lbs/hr (ARM 17.8.715).

4. SO_2 emissions from the concentrate storage and handling building's 187-foot stack shall not exceed 46.00 lbs/hr (ARM 17.8.715).

5. Visible emissions from all sources constructed since November 23, 1968 are limited to 20% opacity. This includes, but is not limited to, the CSHB stack and the sulfuric acid plant (ARM 17.8.304).

6. Visible emissions from all fugitive emission sources covered by this permit are limited to 20% opacity (ARM 17.8.308).

7. SO_2 emissions from the sulfuric acid plant shall not exceed 620-ppm (parts per million) dry basis at standard conditions (68ºF and 29.92" Hg), averaged over 6 hours when the sulfuric acid plant is operating (ARM 17.8.715).

8. SO_2 emissions from the sulfuric acid plant shall not exceed 4.30 tons per calendar day at standard conditions (ARM 17.8.710).

9. ASARCO shall install and operate the acid dust handling and conveying system to handle the dust from the sinter plant cyclone, sinter plant baghouse system, and sinter plant hot cottrell system (ARM 17.8.710).

10. In order to limit fugitive emissions of lead from the Acid Dust Agglomerator Building, openings to the building enclosure shall not exceed 14 square feet. Man doors and temporary openings necessary for maintenance and repairs shall not count against this limitation, provided ASARCO keeps such openings in their closed position except when actually in use (ARM 17.8.710).

11. Emissions from the surge bin baghouse, Dustmaster, and building ventilation shall all be routed into the CSHB and discharged through the CSHB baghouses and stack (ARM 17.8.715).
12. Visible emissions from all point sources constructed prior to November 23, 1968 are subject to 40% opacity. This limit applies to, but is not limited to, the sinter D & L stack (ARM 17.8.304).

13. ASARCO shall meet the following requirements for the Blast Furnace and associated equipment, and the Blast Furnace Baghouse Stack (ARM 17.8.715):

    a. The Blast Furnace Baghouse and associated ventilation equipment shall be used to supply ventilation to and control emissions from the Blast Furnaces, Blast Furnace Tapping Platform including, but not limited to, the Forebay, Slag Pans, lead pots and the Blast Furnace Feed Floor, including the charge car enclosures.

    b. A ventilated enclosure, large enough to accept the charge car, shall be constructed around the top of each blast furnace. The natural draft openings of each enclosure shall not exceed 338 square feet.

    c. Only one Blast Furnace shall be operated at a time.

    d. Hoods shall be operated on the No. 1 and No. 3 Blast Furnace slag tapping pans and shall meet the following requirements:

        i. The hoods shall be large enough and shaped appropriately to effectively cover the slag pans.

        ii. The hoods shall be in place at all times the blast furnace is operating and the Jittney is in place.

    e. Hoods (first settler hood and slag pan hood), designed to effectively control emissions, shall be operated on each Jittney.

    f. Hoods designed to effectively control emissions shall be operated at the lead pots during tapping.

14. Visible emissions from the blast furnace baghouse stack shall not exceed 20% opacity (ARM 17.8.340 or ARM 17.8.715).

15. Total particulate emissions from the blast furnace baghouse stack shall not exceed 25.150 lbs/hr (ARM 17.8.715).

16. Lead emissions from the blast furnace baghouse stack shall not exceed 3.7145 lbs/hr (ARM 17.8.715).

17. ASARCO shall meet the following requirements for the Dross Plant, Dross Reverberatory Furnace and associated equipment, Plenum, and the Dross Plant Baghouse Stack (ARM 17.8.715).
    a. The natural draft openings of the Dross Building shall not exceed 560 square feet. This shall be accomplished by installing siding and roofing sheets on the Dross Building.

    b. All wall and roof penetrations (e.g., ducts, piping, etc.) in the Dross Building shall be sealed to the maximum extent practicable.

    c. ASARCO shall maintain the siding and roofing of the Dross Building in good repair. ASARCO shall repair any damage to the siding or roofing of the Dross Building within 10 days of ASARCO or the department discovering damage.

    d. The Dross Plant Baghouse and associated ventilation equipment shall be used to supply ventilation to and control emissions from the Dross Building.

    e. The Dross Plant Baghouse and associated ventilation equipment shall be used to supply ventilation to and control emissions from the Dross reverberatory furnace, the #4 lead kettle and launder, the charge hole, the Speiss/Matte tap, the Speiss/Matte launder, the lead granulator, the Dross Kettles (process emissions), lime feed system, and the Dross Building general ventilation while the Dross Plant is operating.

    f. The Dross Plant Baghouse shall have a maximum air-to-cloth ratio of 3.6 to 1.

    g. The emissions from the Dross Plant Baghouse shall be vented through the Dross Plant stack.

    h. The Dross Plant stack shall have a minimum height of 200 feet above ground level.

    i. Emissions generated from the burning of natural gas to heat Kettles #1, #2, #3 (previously designated as kettles #2, #4, and #5, respectively), and the #4 lead kettle shall be vented to combustion ventilation ducts. These ducts must run to the roof area and emissions will be collected by the ductwork providing general ventilation to the Dross Building.

    j. Each kettle shall have a ventilated hood, which shall be designed and operated to provide ventilation when the kettle is in use, including during the following activities: drossing (black skimming), pumping of molten lead, adding of fluxes, and stirring of fluxes.

    k. Hoods shall be operated on the Dross reverberatory furnace, the #4 lead kettle, the Speiss/Matte tap, the Speiss/Matte launder, the charge hole, and the

Speiss/Matte granulating pit.

l. The Dross reverberatory furnace charge hole ventilation volume shall be diverted to ventilate the Dross reverberatory furnace arch during non-charging activities.

m. ASARCO shall install and operate a furnace lead granulation system located inside the dross plant building consisting of one granulator, a tilt stand, a bypass storage bunker, reclaim hopper, conveyor transfer system and continuous furnace charging system.

n. Hoods shall be constructed and operated to control emissions from the lead granulator.

o. Dust from the Dross Plant Baghouse shall be transferred in a totally enclosed pneumatic conveying system to limit emissions from handling the baghouse dust (ARM 17.8.710).

18. Emissions from the Sinter Storage Baghouse shall be directed to the Dross Plant stack identified in Section II.B.17.h (ARM 17.8.710).

19. Total particulate emissions from the Dross Plant Baghouse shall not exceed 0.022 gr/dscf (ARM 17.8.340).

20. Emissions from the Dross Plant Stack shall meet the following values:

    a. Total particulate emissions shall not exceed 19.63 lbs/hr (ARM 17.8.715).

    b. Lead emissions shall not exceed 3.48 lbs/hr (ARM 17.8.715).

    c. Visible emissions shall not exceed 20% opacity (ARM 17.8.340 and ARM 17.8.715).

    d. SO_2 emissions shall not exceed 27.39 lbs/hr (ARM 17.8.710).

21. ASARCO shall produce no more than 176,000 tons of slag per year, as determined by plant accounting records (ARM 17.8.710).

22. ASARCO shall produce no more than 132,000 tons of furnace lead per year, as determined by plant accounting records (ARM 17.8.710).

23. ASARCO shall not operate a construction site or demolition project unless reasonable precautions are taken to control emissions of airborne particulate matter. Such emissions of airborne particulate matter shall not exhibit an opacity of 20% or greater averaged over 6 consecutive minutes. This shall include, but is not limited to, the removal and replacement of the roof and siding of the Dross Building (ARM 17.8.308).

24. ASARCO shall install and operate a blast furnace baghouse dust handling system, subject to the following conditions:

a. The blast furnace baghouse dust unloading and reclaiming area shall be enclosed. Local and general ventilation to the enclosure shall be provided, as needed to control particulate emissions, by the blast furnace baghouse dust cleanout baghouse. Exhaust from this baghouse shall be routed to the existing blast furnace baghouse stack (ARM 17.8.715).
b. Emissions from the blast furnace baghouse dust storage silo and Portland cement silo shall be controlled with separate pulse-jet baghouses. The discharge from these baghouses shall be routed to the dross plant stack (ARM 17.8.715).

c. Emissions from the agglomerator charge hopper shall be controlled with a pulse-jet baghouse. Emissions from this baghouse shall be routed to the sinter storage baghouse (ARM 17.8.715).

d. If the agglomerator is used to wet the dust prior to introduction to the charge car, local ventilation shall be provided at the inlet of the agglomerators to control particulate emissions. This ventilation shall be routed to the sinter storage baghouse. If ASARCO bypasses the agglomerator and feeds the dust directly to the charge car, the ventilation shall be relocated from the agglomerator inlet to the charge car inlet (ARM 17.8.715).

e. Emissions from the railcar loadout hopper shall be controlled with a pulse-jet baghouse. When loading railcars from the hopper, the railcars shall be totally enclosed and vented back to the charge hopper (ARM 17.8.715).

f. Particulate emissions from the railcar loadout hopper shall be limited to 0.015 gr/dscf (ARM 17.8.715).

g. Emissions from the charge car hopper shall be limited to 20% opacity (ARM 17.8.304).

h. The railcar loadout facility shall be limited to a maximum of 600 hours of operation per calendar quarter (ARM 17.8.710).

25. The 47 feeder bins (8Vk), used to feed blast furnace baghouse dust to the blast furnace, shall be permanently shut down within 30 days of the new blast furnace baghouse dust handling system becoming operational, but no later than January 6, 1997 (ARM 17.8.710).

26. ASARCO may still use front-end loaders to transport and load blast furnace baghouse dust into railcars. The reclamation of the blast furnace baghouse dust is subject to the limitations contained in the East Helena lead SIP (ARM 17.8.710).

27. When lead pots are being transferred to and from the blast furnace tapping area, the tops shall be completely covered (ARM 17.8.715).

28. The 130-ton acid dust bin may be used to provide an accumulation location for sinter plant baghouse dust and hot cottrell dust. The emissions generated from the use of the bin must be controlled by the 130-ton acid dust bin baghouse. Exhaust gasses from the baghouse must be discharged to the sinter plant baghouse (ARM 17.8.710).
29. Either the dross plant baghouse or the blast furnace baghouse shall be used to provide ventilation and particulate control of the speiss/matte granulating pit. If the system is reconfigured so the blast furnace baghouse is used to provide ventilation, ASARCO shall ensure that the airflow at the granulating pit, as well as the other sources controlled by the blast furnace baghouse, is adequate to control emissions from these sources.

30. ASARCO shall meet the following requirements for the HERO water treatment plant:

    a. The HERO Spray Dryer and Solids Disposal System shall, at a minimum, consist of a spray dryer, spray dryer baghouse, baghouse fan, bin vent baghouse, dust transfer system, dust storage silo, and a loadout ventilation fan (ARM 17.8.710 and 17.8.715).

    b. Particulate emissions from the spray dryer shall be controlled with a pulse-jet baghouse. The spray dryer baghouse shall be equipped with a broken bag detection system. The spray dryer baghouse shall be operated with a fully functional broken bag detection system. The broken bag detector must be installed, calibrated, and maintained in conformance with the guidance provided in EPA document "Fabric Filter Bag Leak Detection Guidance" (EPA-454/R-98-015), or its successor, and in conformance with the manufacturer's written specifications and recommendations. Before start-up of the spray dryer baghouse, ASARCO shall submit, to the department for approval, an Inspection and Maintenance Plan incorporating the requirements of EPA document "Fabric Filter Bag Leak Detection Guidance" (EPA-454/R-98-015), or its successor. ASARCO shall make any reasonable revisions required for department approval (ARM 17.8.710 and 17.8.715).

    c. Particulate matter emissions from the spray dryer baghouse shall be limited to 0.02 grains/dscf (ARM 17.8.715).

    d. Emissions from the spray dryer baghouse shall be limited to less than 20% opacity (ARM 17.8.308).

    e. Particulate emissions from the dust storage silo shall be controlled by the bin vent baghouse. Air exiting the bin vent baghouse can not vent directly to atmosphere; instead, the air must be returned to the inlet of the spray dryer baghouse (ARM 17.8.710).

    f. The loadout ventilation fan shall be used at all times when dry solids are transferred from the dust storage silo into truck(s). The air captured by the loadout ventilation fan can not vent directly to atmosphere; instead, the air must be returned to the inlet of the spray dryer baghouse (ARM 17.8.710).

g. Emissions from the HERO degassifier vent(s) shall be limited to less than 20% opacity (ARM 17.8.308).

31. ASARCO shall meet the following requirements for the Printed Circuit Board Melting System:

a. Printed circuit board material (CBM) shall not be processed in the Coreco® rotary melting furnace unless the John Zink® thermal oxidation unit is operating with an incineration temperature at or above 1800 degrees Fahrenheit. Emissions from the Coreco® rotary melting furnace shall be incinerated in the John Zink® thermal oxidation unit (ARM 17.8.715).

b. The exhaust from the John Zink® thermal oxidation unit shall be routed to the blast furnace baghouse's cleanout associated baghouse. Emissions from the blast furnace baghouse's cleanout associated baghouse shall be discharged through the blast furnace baghouse stack (ARM 17.8.715).

c. The incineration temperature of the John Zink® thermal oxidation unit shall be maintained at or above 1800 degrees Fahrenheit whenever CBM is being processed in the Coreco® rotary melting furnace. The temperature shall be monitored at the exhaust point, or another department approved location on the thermal oxidation unit, and the temperature shall be continuously measured and recorded (ARM 17.8.710).

d. No more than 3,800 tons of printed circuit board material may be processed in the Coreco® rotary melting furnace during any 12-month rolling period (ARM 17.8.710 and MCA 75-2-215).

e. The outlet of the Coreco® rotary melting furnace shall be sealed with a water bath used to collect the product, and with ductwork used to collect and route air emissions to the blast furnace baghouse's cleanout associated baghouse. The inlet and outlet of the Coreco® rotary melting furnace shall be equipped with department approved air seals (ARM 17.8.710).

f. Within 60 days of start-up of the Coreco® rotary melting furnace, ASARCO shall submit, to the department for approval, an Inspection and Maintenance Plan for the air seals located on the inlet and outlet of the Coreco® rotary melting furnace (ARM 17.8.710).

g. The Coreco® rotary melting furnace shall not be operated during those periods when dust unloading activities in the blast furnace baghouse require the use of the blast furnace baghouse's cleanout associated baghouse (ARM 17.8.710).

C. Testing Requirements:

1. ASARCO shall conduct an initial source test for opacity on the railcar loadout

hopper and demonstrate compliance with the limitation in Section II.B.24.g, within 180 days of startup of the hopper system. The opacity testing shall be conducted in accordance with the requirements of the Montana Source Test Protocol and Procedures Manual and shall continue for a minimum of 30 minutes. (ARM 17.8.105)

2. ASARCO shall conduct source tests on the Dross Plant Stack to determine compliance with the opacity, total particulate, SO_2 and lead limitations contained in Section II.B.20.c., B.20.a., B.20.d., and B.20.b., respectively, within 180 days of completion of construction and tie-in of the dross plant ventilation system (including transfer of the plenum) to the Dross Plant Baghouse and Stack, but no later than July 7, 1997. Tests shall be conducted annually thereafter. After 5 years of testing, ASARCO may request the testing frequency be reviewed for possible revision.

   The continuing opacity test shall be conducted in accordance with Section II.C.9. and consist of 30 minutes of opacity readings, concurrently with the total particulate and lead tests (ARM 17.8.340, ARM 17.8.105, and ARM 17.8.710).

3. ASARCO shall conduct source tests on the blast furnace baghouse stack to determine compliance with the opacity, total particulate, and lead limitations contained in Section II.B.14., B.15., and B.16., respectively, within 180 days of tie-in of the speiss/matte granulating pit to the blast furnace baghouse. Tests shall be conducted annually. After 5 years of testing, ASARCO may request the testing frequency be reviewed for possible revision.

   The opacity test shall be conducted in accordance with Section II.C.9. and consist of 30 minutes of opacity readings, concurrently with the total particulate and lead tests (ARM 17.8.105 and ARM 17.8.710).

4. ASARCO shall conduct source tests on the CSHB stack to determine compliance with the total particulate matter, lead, SO_2, and opacity limitations contained in Section II.B.2, 3, 4, and 5, within 180 days of start-up of the Acid dust handling and conveying system.

5. ASARCO shall conduct additional source tests on the CSHB stack for total particulate, lead, SO_2 and opacity, annually, to demonstrate compliance with the limitations in Section II.B.2, 3, 4, and 5. The test was conducted in August 1995 and shall be conducted annually. After 5 years of testing or after the 1998 test, ASARCO may request the testing frequency be reviewed for possible revision.

6. All total particulate matter compliance tests shall be conducted in accordance with 40 CFR Part 60, General Provisions and Appendix A, including Methods 1 through 5. All total particulate matter tests shall include an analysis of front-half emissions (for compliance). The initial compliance test shall include back-half emissions (for information only), done in accordance with Method 5 (ARM 17.8.710 and ARM 17.8.106).

7. All lead compliance tests shall be conducted in accordance with 40 CFR Part 60, Subpart A - General Provisions and Appendix A, including Method 12. All lead compliance tests shall contain a determination of front and back-half emissions (ARM 17.8.106 and ARM 17.8.710).
8. All SO_2 compliance tests shall be conducted in accordance with 40 CFR Part 60, Subpart A - General Provisions and Appendix A, including Method 6, Method 6C, or an equivalent Method approved by the department. Compliance with the SO_2 emission limitations may also be demonstrated using a certified CEMS (ARM 17.8.106 and ARM 17.8.710).

9. Opacity compliance tests shall be conducted in accordance with 40 CFR Part 60, Subpart A - General Provisions and Appendix A, including Method 9. Compliance with the opacity emission standards may also be demonstrated using a certified continuous opacity monitoring system (COMS) (ARM 17.8.106 and ARM 17.8.710).

10. Total particulate matter testing and opacity testing shall be conducted concurrently, per 40 CFR Part 60, Subpart A-General Provisions (ARM 17.8.710).

11. All source tests shall be performed in accordance with the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).

12. When testing the CSHB stack, ASARCO shall meet the following requirements and provide the following information as part of the test report (ARM 17.8.710):

    a. All individual processes that cause emissions within the CSHB shall be operating at the time of testing.

    b. All individual processes that are being ventilated by the SPVS shall be operating at the time of testing.

    c. Production numbers and activities occurring during the source testing for the SPVS shall be reported, including all points identified as ventilated, but not limited to, the following:

        i. Larry Pit Tail No. 2 & No. 4 Pans
        ii. Tail 3 Pan
        iii. Smooth Roll Down Day Mid 3 Pan
        iv. Vibrating Conveyor
        v. Moisture Screw
        vi. Head E2/D Belt
        vii. Nodulizer Drum Inlet Chute
        viii. J-Belt/Ignition Shuttle

ix. Grate Rapper
x. 1-4 Fan Shafts
xi. Pallet Repair
xii. Sinter Machine Tail

d. The operating status of the No. 5/cyclone system and the weak gas system at the time of the stack testing shall be reported, along with a listing and status (operating capacity) of the equipment being ventilated by the other systems, including the following points for the No. 5/cyclone system and weak gas system.

i. No. 1a pan conveyor
ii. No. 1 pan conveyor
iii. No. 2 pan conveyor
iv. Moisture screw
v. Spike roll discharge
vi. I-belt sample station
vii. Smooth rolls
viii. No. 3 pan conveyor
ix. Bucket elevator
x. Vibrating conveyor
xi. F-belt
xii. G-pan conveyor discharge
xiii. E-belt
xiv. No. 4 pan conveyor, bin and blast car
xv. Sinter bin
xvi. Weak gas take off

e. The operating status of the crushing mill during the stack testing shall be reported.

13. ASARCO shall report the operating status (including operating rate) of the following equipment during the Dross Plant Stack testing (ARM 17.8.710):

a. Dross Reverberatory Furnace
b. Kettles #1, #2, #3, and #4
c. Lead Granulator
d. Sinter Storage Baghouse

14. ASARCO shall test the HERO feed water (i.e., High-Density Sludge effluent) for SO_2 and lead using a department-approved protocol. Testing shall occur no later than 180 days after startup, or on another testing/monitoring schedule as may be approved by the department (ARM 17.8.105, 17.8.106, and 17.8.710).

15. ASARCO shall test the HERO spray dryer baghouse stack for opacity and particulate matter, concurrently, to determine compliance with the particulate matter and opacity emission limits contained in Section II.B.30.d and II.B.30.c, respectively, within 180 days of start-up of the baghouse, or on another

testing/monitoring schedule as may be approved by the department. The testing shall continue on an every-2-year basis or another testing/monitoring schedule as may be approved by the Department. All particulate matter and opacity compliance tests shall be conducted in accordance with Sections II.C.6, II.C.9, and II.C.10. (ARM 17.8.105, 17.8.106, and 17.8.710).

16. ASARCO shall initially test the HERO spray dryer baghouse stack for lead particulate matter, concurrently with the testing required by Section II.C.15, within 180 days of start-up of the baghouse, or on another testing/monitoring schedule as may be approved by the Department. All lead compliance tests shall be conducted in accordance with Section II.C.7. (ARM 17.8.105, 17.8.106, and 17.8.710).

17. The department may require further testing (ARM 17.8.105).

D. Operational and Emission Inventory Reporting Requirements:

1. ASARCO shall supply the department with annual production information for all emission points, as required by the department in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions identified in Section I.B of the permit (ARM 17.8.505).

   Production information shall be gathered on a calendar-year basis and submitted to the department by the date required in the emission inventory request. Information shall be in the units required by the department (ARM 17.8.505).

   In addition, ASARCO shall submit the following information, annually, to the department, by the date specified in the emission inventory request. This information is required for the annual emission inventory, as well as to verify compliance with permit conditions (ARM 17.8.505).

   a. Tons of new material through sinter machine
   b. Tons of sinter produced
   c. Amount of natural gas used at sinter machine
   d. Tons of coke used at sinter machine
   e. Sulfur content of coke
   f. Hours of operation of sinter machine
   g. Tons of material to blast furnace
   h. Amount of natural gas used at blast furnace
   i. Hours of operation of blast furnace
   j. Tons of coke used at blast furnace
   k. Sulfur content of coke
   l. Tons of material processed at sample mill
   m. Hours of operation of sample mill
   n. Tons of material processed at crushing mill
   o. Hours of operation of crushing mill
   p. Tons of lead produced

q. Hours of operation of Dross plant
r. Amount of natural gas used at Dross plant
s. Tons of material charged to reverberatory furnace
t. Hours of operation of reverberatory furnace
u. Amount of natural gas used at reverberatory furnace
v. Tons of acid dust handled
w. Tons of product sulfuric acid produced
x. Hours of operation of acid plant
y. Amount of natural gas used at acid plant
z. Tons of material handled at the CSHB facility
aa. Hours of operation of the CSHB facility
bb. Hours of operation of the sinter storage building baghouse
cc. Hours of operation of the SPVS
dd. Tons of material through the acid dust agglomerator building
ee. Hours of operation of the Dross Plant Baghouse
ff. Hours of operation of the lead granulator
gg. Vehicle miles traveled and type of vehicle category
hh. Gallons of diesel used in vehicles
ii. Fugitive dust information consisting of a listing of all plant vehicles, including:

    i. Vehicle type,
    ii. Vehicle weight,
    iii. Number of tires on vehicle,
    iv. Average trip length,
    v. Number of trips per day,
    vi. Average vehicle speed,
    vii. Area of activity, and
    viii. Vehicle fuel usage (gasoline or diesel) - annual total.

    If the information on vehicle size has not changed over the past year, ASARCO only needs to supply the vehicle type and the vehicle miles traveled (VMT) by each vehicle type as required in Sections II.D.1.gg. and hh. If changes occur, ASARCO shall supply the information in Section II.D.1.ii. for the changed vehicles.

jj. Tons of furnace lead produced
kk. Tons of slag produced
ll. Hours of operation of the baghouse dust railcar loadout hopper baghouse
mm. Gallons of feed water (i.e., High Density Sludge effluent) processed through the HERO degassifier vents
nn. Hours of operation of the HERO spray dryer system

2. ASARCO shall document, by month, the amount of CBM used in the Printed Circuit Board Rotary Melting system. By the 25th day of each month, ASARCO shall total the amount of CBM use during the previous 12 months to verify compliance with the limitation in Section II.B.31.d (ARM 17.8.710).

3. All records compiled in accordance with this permit must be maintained by ASARCO as a permanent business record for at least 5 years following the date of the measurement, must be available at the plant site for inspection by the department and must be submitted to the department upon request (ARM 17.8.710).
4. ASARCO shall notify the department of any construction or improvement project conducted, pursuant to ARM 17.8.705(1)(r), that would include a change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location, or fuel specifications, or would result in an increase in source capacity above its permitted operation or the addition of a new emissions unit.

   The notice must be submitted to the department, in writing, 10 days prior to start up or use of the proposed de minimis change, or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change, and must include the information requested in ARM 17.8.705(1)(r)(iv) (ARM 17.8.705).

E. Ambient Monitoring and Modeling Requirements:

1. Modeling for the SO_2 emissions from the SPVS must be included as part of the modeling for the SO_2 SIP. The emissions are identified as follows (ARM 17.8.710):

   SO_2 emissions are classified as existing emissions being redirected to the CSHB stack.

2. Modeling for the SO_2 emissions from the Dross Plant Stack must be included as part of the modeling for the SO_2 SIP.

3. The lead and SO_2 data from the ambient air monitoring network in the East Helena area is currently being reviewed as part of the lead and SO_2 SIPs. If the modeling shows additional high impact areas, additional monitoring may be required (ARM 17.8.710).

F. Continuous Emission Monitoring Systems - SO_2 (ARM 17.8.710):

1. ASARCO shall install, calibrate, maintain, and operate continuous emissions monitoring systems (CEMS) to monitor and record the sulfur dioxide (SO_2) concentrations of the gases discharged into the atmosphere from the sulfuric acid plant stack and to demonstrate compliance with the daily emission limit in Section II.B.8.

   a. The span of this system shall be set at 1500 ppm.

   b. The CEMS shall conform to all requirements of 40 CFR Part 60, Appendix B, Performance Specification 2 - Specifications and Test Procedures for SO_2 Continuous Emission Monitoring Systems in Stationary Sources (PS2) and

Performance Specification 6 - Specifications and Test Procedures for Continuous Emission Rate Monitoring System in Stationary Sources. ASARCO shall also implement quality assurance and quality control procedures in accordance with the requirements of 40 CFR Part 60, Appendix F - Quality Assurance Procedures.

c. ASARCO shall operate, maintain, and test all stack flow rate monitors required by this permit in accordance with the requirements of 40 CFR Part 75, Appendix A, Continuous Emission Monitoring, Specifications and Test Procedures and the Montana Source Testing Protocol and Procedures Manual (ARM 17.8.106). In addition, ASARCO shall conduct:

   i. A daily blow back or back purging of the pitot tube,
   ii. A quarterly check of stack velocities and flow rates by performing a velocity traverse,
   iii. A quarterly visual inspection of the pitot tubes, in conjunction with the quarterly stack velocities and flow rate checks, and
   iv. An annual Reference Method 2 test (Determination of Stack Gas Velocity and Volumetric Flow Rate).

   Notwithstanding the operation and maintenance requirements specified by 40 CFR Part 75, ASARCO shall not exceed a relative accuracy of 15%. ASARCO shall conduct stack flow rate monitor performance testing at the plant's normal operating load/production rate, and shall not be required to perform this at three plant operating loads, as specified in 40 CFR Part 75.

d. If the activities required in Section II.F.1.c.iii. indicate a worn or damaged pitot tube, the pitot tube will be replaced and a velocity traverse will be performed to confirm the accuracy of the new pitot tube.

e. ASARCO shall perform three zero/spans (Z/S) per day (one per 8-hour shift). ASARCO may conduct the daily Z/S checks using an electro-optical method; however, at least one Z/S per calendar week must be conducted using a certified calibration gas.

f. Notwithstanding the requirements of Section II.F.1.b. and e., if any Z/S exceeds 2.5 % calibration drift, ASARCO shall immediately initiate calibration procedures or corrective action to correct the problem.

g. Except as provided by Section II.F.1.i., ASARCO shall perform annual source testing using EPA-approved methods (Methods 1-4 and 6/6C, 40 CFR Part 60, Appendix A) or an equivalent method approved by the department, and in accordance with the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106), to accurately determine the performance of all continuous emission monitors and stack gas flow rate monitors.

h. Except as provided by Section II.F.1.i., ASARCO shall conduct quarterly Certified Gas Audits (CGA) or Relative Accuracy Audits (RAA).

i. ASARCO shall certify all continuous emission monitors on an annual basis using the Relative Accuracy Testing Audit (RATA) described in 40 CFR Part 60, Appendix F. The RATA testing will satisfy the requirements for one of the quarterly audits required by Section II.F.1.h., the annual source test required by Section II.F.1.g., and the annual Method 2 Test required by Section II.F.1.c.iv.

j. ASARCO shall develop, maintain, and utilize Quality Assurance and Quality Control (QA/QC), and Standard Operating Procedures (SOP) documents specifically for the instruments and equipment that ASARCO uses for CEMS and stack gas flow rate monitoring. These documents must detail specific operational controls, procedures, and requirements that are designed to ensure the collection of data, which meets the requirements of this permit. If any instrument or equipment is changed or other hardware is placed into service, new QA/QC and SOP documents must be developed as appropriate for the new equipment. These documents and any modifications thereto are subject to review and approval by the department, as described below.

   i. ASARCO shall submit the QA/QC and SOP documents for the existing CEMS to the department for review prior to implementation. Any modifications to the QA/QC and SOP documents shall be submitted to the department within 60 days after implementation. The department shall approve, require revision, or disapprove the QA/QC and SOP documents, or any modifications thereto, within 90 days after submittal by ASARCO.

   ii. ASARCO shall implement the QA/QC and SOP documents for the existing CEMS no later than July 1, 1994 and for any modification when the modification is installed or implemented. ASARCO shall continue to implement the QA/QC and SOP documents or any modifications until the receipt of a written notice of revision or disapproval from the department. Pending the department's action on any submitted QA/QC and SOP documents or modifications, CEMS data gathered using equipment or procedures to which such documents apply may be used to satisfy ASARCO's Quarterly Data Recovery Rate requirements if ASARCO is implementing such QA/QC and SOP documents.

   iii. Upon receipt of a written notice of revision or disapproval from the department, ASARCO may continue to implement the QA/QC and SOP documents or any modifications, but shall seek to correct any identified deficiencies and obtain department approval of the revised or new documents within 30 days. During this 30-day period, data from the CEMS may continue to be used to satisfy ASARCO's Quarterly Data Recovery Rate requirements if ASARCO is implementing such QA/QC and SOP documents. Data collected from the CEMS after this 30-day period, will be invalid and cannot be used to satisfy ASARCO's Quarterly Data Recovery Rate requirements, unless the QA/QC and SOP documents related to the CEMS have been approved by the department.

k. ASARCO shall perform the performance specification tests required in PS2 on the CEMS and submit the report to the department within 180 days of completion of construction and commencement of operation.

l. The CEMS data will be used to demonstrate compliance with the 4.30-ton/day limitation contained in Section II.B.8. ASARCO shall maintain compliance with the 4.30-ton/day limitation, as demonstrated by the CEMS.

2. ASARCO shall maintain compliance with the Quarterly Data Recovery requirements as follows:

a. The successful use of continuous emission and stack flow rate monitors by ASARCO is critical for the department to be able to ensure that ASARCO maintains compliance with the emission limits for the acid plant. Except for unusual circumstances, and subject to the best effort requirements of Section II.F.2.b, the quarterly data recovery rate for sulfur dioxide emissions from the acid plant stack shall be equal to or exceed 94 %.

Nothing in this section shall preclude enforcement action for a quarterly data recovery rate that is less than 100 %, but equal to or greater than 94 %, if the conditions in Section II.F.2.b. are not satisfied.

b. In addition to complying with the minimum quarterly data recovery rates specified in Section II.F.2.a, ASARCO shall undertake its best efforts to strive for and achieve the highest quarterly data recovery rates practical. The determination of what is practical and, therefore, acceptable data loss shall be made consistent with Section II.F.3.

c. Compliance with the quarterly data recovery rate requirements contained in Section II.F.2.a, shall be determined in accordance with Section II.A.12., with no exceptions for out-of-specification data or monitor downtime, unless such downtime is due to unusual circumstances as defined in Section II.A.14.

d. ASARCO shall have the burden of proof in demonstrating that an unusual circumstance has occurred through properly signed, contemporaneous operating logs, or other relevant evidence. If, as a result of unusual circumstances, monitoring equipment or associated data acquisition equipment are inoperable (CEMS not functioning) for more than 10 days, ASARCO may continue operation of the associated process (i.e., acid plant) only in accordance with the following:

i. Within 10 days of the occurrence of unusual circumstances, ASARCO shall submit to the department a corrective action plan that includes a schedule with appropriate milestones to accomplish as expeditiously as practicable, and within a period not to exceed 6 months, either:

(a) Correction of the failure, or

(b) Development, installation (if necessary), testing, maintenance and operation of a new continuous emission monitoring system.

ii. Within 10 days after or any time prior to the occurrence of unusual circumstances, ASARCO shall submit to the department an alternative monitoring plan that describes monitoring systems or procedures to monitor compliance with emission limits until the proposed corrective action plan has been approved and fully implemented. The alternative monitoring system must be sufficiently accurate or conservative to provide reasonable assurance of compliance with the emission limitations and should incorporate progressively more accurate equipment and methodologies based upon the length of time the continuous emission monitoring system will be non-operational. If ASARCO has obtained approval of an alternative monitoring plan prior to the occurrence of an unusual circumstance, ASARCO shall implement the approved plan within 10 days of the occurrence of an unusual circumstance.

iii. ASARCO may continue to operate the associated process (i.e., acid plant) if it is implementing an approved corrective action plan and alternative monitoring plan, or complies with the requirements of Section II.F.2.e., f., and/or g., as applicable (except where expressly provided otherwise).

e. The department shall have 20 days from receipt to review the corrective action and alternative monitoring plans described in Section II.F.2.d, and may approve, require revision, or disapprove such plans as appropriate to meet the specific objectives for each plan stated in Section II.F.2.c. and d. Consistent with the specific requirements of Section II.F.2.f and/or g., as appropriate, ASARCO may continue operating the associated process (i.e., acid plant) while the department conducts its review and makes a determination, even if the department fails to make a determination within 20 days.

f. Unless the department approves the proposed corrective action plan during the department's 20-day review period provided in Section II.F.2.e., ASARCO shall not implement the proposed plan during this period. ASARCO may implement the proposed corrective action plan after the department's 20-day review period has passed, if the department has failed to act in a timely manner. Within 20 days of receipt of a notice from the department that the proposed corrective action plan must be revised or is disapproved, ASARCO shall correct the deficiencies and obtain approval of the revised or new plan. ASARCO may continue operation of the associated process (i.e., acid plant), but shall cease operation of the respective process if the department's approval of a new or revised plan is not obtained within this latter 20-day period.

g. If prior approval has not been obtained, ASARCO may submit a proposed alternative monitoring plan within 10 days after the occurrence of an unusual circumstance, which shall be reviewed in accordance with Section II.F.2.e.

ASARCO shall implement the proposed plan immediately upon submittal and shall continue to implement the plan until notified in writing by the department that a revision is necessary or the plan is disapproved. Upon receipt of such written notification, ASARCO may continue to implement the proposed plan, but shall seek to correct any identified deficiencies and obtain department approval of the revised or new plan within 20 days. ASARCO may continue operation of the associated process (i.e., acid plant) while it awaits the department's determination, but shall cease operation of the respective process if the department's approval of a new or revised plan is not obtained within this latter 20-day period. If complete implementation of the approved corrective action plan does not result in fully operational CEMS, the department may require a new or revised alternative monitoring plan to account for the additional time during which the CEMS will not be operational.

3. In regard to the quarterly data recovery rate requirements contained in Section II.F.2.b., the determination of what is practical and therefore acceptable data loss shall consider whether:

   a. ASARCO has properly operated and maintained the continuous emission monitors, stack flow rate monitors, and associated data acquisition systems (CEMS), including the performance of preventive maintenance, the maintenance of the spare parts inventory described in Section II.A.14.c. and d., and the conduct of the quality assurance requirements described in Sections II.F.

   b. ASARCO has taken immediate and appropriate action to correct a malfunction in the continuous emission monitors, stack flow rate monitors or associated data acquisition systems (CEMS).

   c. Unusual circumstances have occurred, as defined in Section II.A.14.

   If requested in writing by the department, ASARCO shall provide, in writing, a detailed explanation, including all pertinent documentation of any data loss that has occurred under Section II.F.2.b and Section II.F.3.a.

4. ASARCO shall submit a written report of all excess emissions quarterly. Periods of excess emissions shall be defined as those emissions calculated on a calendar day which are greater than 4.30 tons/calendar day. The report shall be in the format contained in Attachment 2 and include, as a minimum, the following:

   a. The magnitude of excess emissions and the date and time of commencement and completion of each time period of excess emissions.

   b. All SO_2 continuous emission monitor data and stack gas flow rate monitor data necessary to determine that emission limits have been exceeded. The information shall include, for each calendar day on which emission limits are exceeded, hourly average sulfur dioxide concentrations, hourly average stack gas flow rates, CEMS-derived hourly emission rates, daily emissions, and the daily data recovery rate for the acid plant stack.

c. Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the affected facility. The nature and cause of any malfunction (if known), the corrective action taken or preventative measures adopted.

d. The date and time identifying each period during which the CEMS was inoperative. The nature of the system repairs or adjustments must also be reported.

e. When no excess emissions have occurred or the continuous monitoring system(s) have not been inoperative, repaired, or adjusted, such information shall be stated in the report.

f. The percentage of time the CEMS was operating. This shall be calculated as defined in Section II.A.12. ASARCO shall maintain a minimum of 94% monitor availability during source operation on a quarterly basis.

g. The percentage of time the CEMS indicated compliance. This shall be calculated as:

$$\left(1-\left[\frac{\text{total hours of excess emissions during source operating hours for the reporting period}}{\text{total hours of CEMS availability during reporting period}}\right]\right) \text{X } 100$$

This shall be reported as percent compliance.

h. The excess emission reports shall be submitted within 30 days following the end of each calendar quarter.

5. ASARCO shall inspect and audit the CEMS quarterly using Certified Gas Audits or RAA (Relative Accuracy Audits). ASARCO shall conduct these audits using the appropriate procedures. The results of these inspections and audits shall be included in the quarterly excess emission report.

6. ASARCO shall maintain a file of all measurements from the CEMS and performance testing measurements; all CEMS performance evaluations; all CEMS or monitoring device calibration checks and audits; and adjustments and maintenance performed on these systems or devices recorded in a permanent form suitable for inspection. The file shall be retained on site for at least 5 years following the date of such measurements and reports. This shall include, at the minimum, the following:

a. Hourly average sulfur dioxide concentrations in ppm
b. Hourly average stack volumetric flow rates in scfm
c. Hourly average stack gas temperature in °F

d. CEMS-derived hourly emission rates
e. Daily emissions of sulfur dioxide in tons per calendar day
f. Quarterly data recovery rate expressed in percent

7. Upon request by the department, ASARCO shall provide the department with any of the data archived in accordance with Section II.F.6. The data shall be submitted to the department in written format and, where possible, on magnetic media compatible with the department's data management system.

G. Continuous Opacity Monitoring System (COMS) or Continuous Emissions Monitoring System (CEMS) - Opacity (ARM 17.8.340 and ARM 17.8.710)

1. ASARCO shall calibrate, maintain, and operate COMS to monitor and record the opacity discharged into the atmosphere from the blast furnace baghouse stack and demonstrate compliance with the opacity limitation contained in Section II.B.14. of 20% (ARM 17.8.340 or ARM 17.8.710). ASARCO shall also install, calibrate, maintain, and operate a COMS to monitor and record the opacity discharged into the atmosphere from the Dross Plant Stack and demonstrate compliance with the opacity limitation contained in Section II.B.20.c. of 20% (ARM 17.8.340 and ARM 17.8.710).

   a. The span of this system shall be set at 100 % opacity.

   b. The COMS shall conform to all requirements of 40 CFR Part 60, Subpart R-Standards of Performance for Primary Lead Smelters and Appendix B-Performance Specification 1 - Specifications and Test Procedures for Opacity Continuous Emission Monitoring Systems in Stationary Sources (PS1).

   c. The COMS data will be used to demonstrate compliance with the 20% opacity limits in Sections II.B.14. and B.20.c.

   d. When the COMS is not operating for a period of greater than 24 hours, ASARCO shall monitor visible emissions from the stack where the monitor is not operating at least once every weekday (during daylight hours) using a certified visible emissions observer who will perform visible emissions observations and record the results. These observations shall be conducted in accordance with 40 CFR Part 60, Appendix A, Method 9.

   e. The COMS shall determine opacity readings based on a rolling 6-minute average.

   f. ASARCO shall implement the standard operating procedures manual and quality assurance plan for the blast furnace baghouse stack COMS as submitted to the department.

   g. ASARCO shall develop and implement a standard operating procedures manual and quality assurance plan for the Dross plant stack COMS. These documents shall be submitted to the department for approval within 180 days of completion of construction and commencement of operation of the Dross plant stack.

2. ASARCO shall conduct daily Z/S checks.

3. ASARCO shall inspect and audit the COMS, quarterly, using neutral density filters. These audits shall be conducted using the appropriate procedures and supplying the required information as identified on the sample forms in the EPA Technical Assistance Document: Performance Audits for Opacity Monitors (EPA-600/8-87-025, April 1987). The results of these inspections and audits shall be included in the quarterly excess emission reports.

4. Except for system breakdowns, repairs, calibration checks, and Z/S adjustments required under 40 CFR 60.13 (d), all continuous monitoring systems shall be in continuous operation and shall meet minimum frequency of operation required in 40 CFR 60.13(e)(1) and (2) per 40 CFR 60.13(e) (ARM 17.8.710).

5. ASARCO shall submit a written report of all excess emissions quarterly for each COMS. Periods of excess emission shall be defined as those emissions in excess of 20% opacity on a rolling 6-minute basis. The report shall be in the format contained in Attachment 2 and include, as a minimum, the following information:

   a. The magnitude of excess emissions and the date and time of commencement and completion of each time period of excess emissions.

   b. Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the affected facility. The nature and cause of any malfunction (if known), the corrective action taken or preventative measures adopted.

   c. The date and time identifying each period during which the COMS was inoperative. The nature of the system repairs or adjustments must also be reported.

   d. When no excess emissions have occurred or the continuous monitoring system(s) have not been inoperative, repaired, or adjusted, such information shall be stated in the report.

   e. The percentage of time the COMS was operating. This shall be calculated as:

$$\left(1-\left[\frac{\text{hours of COMS downtime during source operating hours for the reporting period}}{\text{hours the source operated during reporting period}}\right]\right) \text{X } 100$$

   f. The percentage of time the COMS indicated compliance. This shall be calculated as:

$$\left(1-\left[\frac{\text{total hours of excess opacity during source operating hours for the reporting period}}{\text{total hours of COMS availability during reporting period}}\right]\right) \text{X } 100$$

   This shall be reported as percent compliance.

g. The excess emission reports shall be submitted within 30 days following the end of each calendar quarter.

6. ASARCO shall maintain a file of all measurements from the COMS; all performance testing measurements; all COMS performance evaluations; all COMS or monitoring device calibration checks and audits; and adjustments and maintenance performed on these systems or devices recorded in a permanent form suitable for inspection. The file shall be retained on site for at least 5 years following the date of such measurements and reports.
7. Upon request by the department, ASARCO shall provide the department with any of the data archived in accordance with Section II.G.6. The data shall be submitted to the department in written format and, where possible, on magnetic media compatible with the department's data management system.

H. Notification:

ASARCO shall provide the department with written notification of the following dates within the specified time periods (ARM 17.8.710).

1. Anticipated completion of construction date of the Charge Car Enclosures, between 30 and 60 days prior to anticipated completion of construction date.

2. Actual completion of construction date of the Charge Car Enclosures, within 15 days after the actual completion of construction date.

3. Actual date of all continuous emission monitor certification activity, within 10 working days of the certification date.

4. Actual start-up date of the blast furnace baghouse dust railcar loadout hopper, within 15 days of the actual start-up date.

5. Actual start-up date of the blast furnace baghouse dust handling and charging system, within 15 days of the actual start-up date.

6. Actual date of connection of the 130-ton acid dust bin baghouse exhaust to a location prior to the sinter plant baghouse, within 15 days of the actual start-up date.

7. Completion of the redirection of the Speis/Matte granulating pit emissions from the Dross Plant baghouse to the Blast Furnace baghouse, within 15 days of completion.

8. Completion of the bypassing of the Blast Furnace Baghouse Dust Agglomerator and redirection of the local ventilation, within 15 days of completion.

9. Actual start-up date of the HERO water treatment plant, within 15 days of the actual start-up date.

10. Actual start-up date of the Printed Circuit Board Rotary Melting System, within 15 days of the actual start-up date.

Section III: General Conditions

A. Inspection – ASARCO shall allow the department's representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, auditing any monitoring equipment (CEMS, CERMS, COMS) or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.

B. Waiver - The permit and all the terms, conditions, and matters stated herein shall be deemed accepted if ASARCO fails to appeal as indicated below.

C. Compliance with Statutes and Regulations - Nothing in this permit shall be construed as relieving ASARCO of the responsibility for complying with any applicable federal or Montana statute, rule or standard, except as specifically provided in ARM 17.8.701, *et seq*. (ARM 17.8.717)

D. Enforcement - Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties and/or other enforcement, as specified in Section 75-2-401 *et seq*., MCA.

E. Appeals - Any person or persons jointly or severally adversely affected by the department's decision may request, within 15 days after the department renders its decision, upon affidavit setting forth the grounds therefor, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The department's decision on the application is not final unless 15 days have elapsed and there is no request for a hearing under this section. The filing of a request for a hearing postpones the effective date of the department's decision until the conclusion of the hearing and issuance of a final decision by the Board.

F. Permit Inspection - As required by ARM 17.8.716, Inspection of Permit, a copy of the air quality permit shall be made available for inspection by department personnel at the location of the permitted source.

G. Construction Commencement - Construction must begin within three years of permit issuance and proceed with due diligence until the project is complete or the permit shall be revoked. (ARM 17.8.731)

H. Permit Fees - Pursuant to Section 75-2-220, MCA, as amended by the 1991 Legislature, failure to pay the annual operation fee by ASARCO may be grounds for revocation of this permit, as required by that Section and rules adopted thereunder by the Board.

ATTACHMENT I: AMBIENT AIR MONITORING PLAN

The department reserves Attachment I for ambient air monitoring plans. There is no Attachment I included as part of this permit. This page is included to improve the readability of the permit. Refer to Section II.E. of this permit for information on ambient air monitoring.

ATTACHMENT 2: INSTRUCTIONS FOR COMPLETING EER
(EXCESS EMISSIONS AND MONITORING SYSTEMS REPORTS)

Part 1 Complete as shown.

Part 2 Complete as shown. Report total time the point source operated during the reporting period in hours. The determination of point source operating time includes time during unit startup, shutdown, malfunctions, or whenever pollutants (of any magnitude) are generated, regardless of unit condition or operating load.

Percent of time CEMS was available during point source operation is to be determined as described in Section II.A.12 of this permit.

Excess emissions include all time periods when emissions as measured by the CEMS exceed any applicable emission standard for any applicable time period.

Percent of time in compliance is to be determined as contained in Section II.G.4.g. of this permit.

Part 3 Complete a separate sheet for each pollutant control device associated with a CEMS. Be specific when identifying control equipment operating parameters. For example: primary and secondary amps and spark rate for ESPs; pressure drop and effluent temperature for baghouses; and liquid flow rate and pH levels for scrubbers. For the initial EER, include a diagram or schematic for each piece of control equipment.

Table I Use Table I as a guideline to report all excess emissions. Complete a separate sheet for each CEMS. Sequential numbering of each excess emission is recommended. For each excess emission, indicate:

- Time, duration and magnitude,
- Nature and cause,
- The action taken to correct the condition of excess emissions.

Do not use computer reason codes for corrective actions or nature and cause; instead, be specific in the explanation. If no excess emissions occur during the reporting period, it must be stated so.

Table II Use Table II as a guideline to report all CEMS upsets or malfunctions. Complete a separate sheet for each CEMS. List the time, duration, nature and extent of problems, as well as the action taken to return the CEMS to proper operation. Do not use reason codes for nature, extent or corrective actions. Include normal calibrations and maintenance as prescribed by the CEMS manufacturer. Do not include zero and span checks.

Table III Complete a separate sheet for each pollutant control device associated with a CEMS. Use Table III as a guideline to report operating status of control equipment during the excess emission. Follow the number sequence as recommended for excess emissions reporting. Report operating parameters consistent with Part 3, subpart f.

EXCESS EMISSIONS AND MONITORING SYSTEMS REPORT

PART 1

a. Emission Reporting Period ____

b. Report Date ____

c. Person Completing Report ____

d. Plant Name ____

e. Plant Location ____

f. Person Responsible for Review
and Integrity of Report ____

g. Mailing Address for 1.f. ____
Street Address or P.O. Box

____
City State Zip Code

h. Phone Number for 1.f. ____

i. Certification for Report Integrity, by person in 1.f.

THIS IS TO CERTIFY THAT THE INFORMATION PROVIDED IN THIS REPORT IS COMPLETE AND ACCURATE.

SIGNATURE ____

NAME ____

TITLE
____

DATE ____

j. Comments ____

____

____

____

PART 2 - Complete for each CEMS.

a. Point Source ____

b. CEMS Type (circle one) Opacity SO_2 NOx O_2 CO CO_2 TRS

c. Manufacturer ____

d. Model Number ____________________________

e. Serial Number ______________________________

f. Automatic Calibration Value: Zero____________________ Span____________________

g. Basis for Gas Measurement Data (wet or dry): ____________________________________

h. Date of Last CEMS Performance Test ____

i. Total Time Point Source Operated During Reporting Period ________________________

j. Percent of Time CEMS Was Available During Point Source Operation: _____________

Show calculations ____

____

k. Allowable Emission Rate ____

l. Percent of Time in Compliance ____

Show calculations ____

____

m. CEMS Repairs or Replaced Components Which Affected or Altered Calibration Values

____

____

____

____

PART 3 - Pollution Control Equipment Operating Parameter Monitor.
(Complete one sheet for each pollutant control device associated with a CEMS.)

a. Point source ______________________________

b. Pollutant (circle one): Opacity Particulate SO_2 NOx TRS

c. Type of Control Equipment ______________________________

d. Control Equipment Description and Identification (Model # and Serial #)

____

____

____

e. Control Equipment Operating Parameters, i.e., effluent temperature, pressure drop (ΔP), scrubber water flow rate & pH levels, primary & secondary amps, spark rate)

____

____

____

____

f. Control Equipment Performance Test Date______________________________

g. Control Equipment Operating Parameter During Performance Test ______________________________

____

____

____

____

h. Type and Amount of Material Produced or Processed During the Reporting Period

____

i. Type and Amount of Fuel Used During the Reporting Period ______________________________

____

Table I. Excess Emissions[1]

Date	Time From	Time To	Duration	Magnitude	Explanation/Corrective Action

[1]This should include the following:

1. Duration of excess emission in reporting period due to:
   a. Startup/shutdown.
   b. Control equipment problems.
   c. Process problems.
   d. Other known causes.
   e. Unknown causes.

2. Total duration of excess emissions.

3. $\text{Percent Excess Emissions} = \left(\frac{\text{Total duration of excess emissions}}{\text{Total source operating time}} \right) \times 100$

Table II. Continuous Emissions Monitoring System Operation Failures[2]

Date	From	To	Time Duration	Problem/Corrective Action

---

[2]This shall include the following:

1. CEMS downtime in reporting period due to:

    a. Monitor equipment malfunctions.
    b. Non-Monitor equipment malfunctions.
    c. Quality assurance calibrations.
    d. Other known causes.
    e. Unknown causes.

2. Total CMS Downtime.

3. $$\text{Percent Downtime} = \left(\frac{\text{Total CMS downtime}}{\text{Total source operating time}} \right) \times 100$$

Note: ASARCO shall provide the information requested for all CEMS and COMS monitors required by the permit. Quarterly Data Recovery Rates shall also be calculated for the SO_2 monitors in accordance with Section II.A.10.

Table III. Control Equipment Operation During Excess Emissions

Date	Time From	Time To	Duration	Operating Parameters	Corrective Action

PERMIT ANALYSIS
ASARCO, Incorporated
East Helena Smelter
Permit #2557-11

I. Introduction/Process Description

A. Site Location

The ASARCO East Helena plant is a primary lead smelter originally constructed in 1888. The smelter is located in the NW¼ of Section 36, Township 10 North, Range 3 West, Lewis and Clark County, within the City of East Helena, approximately three miles east of Helena.

B. Permit History:

ASARCO applied via **permit #2557,** issued June 6, 1989, to construct the Concentrate Storage and Handling Building (CSHB) with a ventilation system and three baghouses to control particulate and lead emissions. The building houses 2 cranes, 16 storage bins, blending area, 12 belt conveyor feeders and 1 feeder collection conveyor. All unprocessed, lead-bearing ore concentrate handling is now done in the enclosure.

Prior to construction of the CSHB, the ore concentrate materials were handled outside by front-end loaders. Blending was performed in the old New Deal Building until it burned down in July 1987. The New Deal Building had about 21,000 acfm of ventilating capacity for the feeders.

Permit #2557-01 was issued to ASARCO on July 6, 1993 for the construction of a ventilation system within ASARCO's sinter plant operation. The ventilation system is used along with the two existing systems. The system hereafter referred to as SPVS consists of hoods connected by ductwork to a baghouse with a capacity of 55000 acfm. The baghouse exhausts through the existing CSHB stack.

The permit alteration also incorporated all other existing permits issued to ASARCO (permits #2557, #1417, and #794-031775) and provided an enforceable tool for shutting down the zinc fuming plant and expiring the permits associated with the zinc plant (#529-011573, #581-072173, and #621-092673). The alteration also identified other permits previously issued to ASARCO, which were revoked (#1542 and #565-062573).

Permit #2557-02 was issued to ASARCO on March 23, 1994 to upgrade the existing sulfuric acid plant by converting it from a double absorption sulfuric acid plant to a single absorption (or single contact) plant. The project consists of modifying the service of the No. 2A gas-to-gas heat exchanger, ducting the sulfur dioxide (SO_2) gas stream through the No. 3 heat exchanger, and adding cesium-promoted catalyst for

certain beds of the acid plant converter.
The use of a single contact sulfuric acid plant instead of a double absorption plant at the East Helena plant is supported by the fact that the SO_2 gas strength resulting from the ore concentrate feed material being processed ranges between 2.5% and 3% by volume. It has been demonstrated that full double absorption cannot normally be maintained when the gas strength drops below 5% SO_2 without the use of a large heat exchanger train and additional heaters. The use of a large heat exchanger train and additional heaters results in a substantial cost in energy consumption for the acid plant. The project is expected to provide the following benefits:

1. Improve the capture of sulfur dioxide emissions and reduce emissions from the acid plant
2. Reduce sulfur trioxide emissions and help prevent opacity exceedances, which sometimes occur during start up of the acid plant
3. Reduce the natural gas and electrical consumption of the acid plant
4. Eliminate unnecessary sulfuric acid handling equipment and thereby reduce long-term maintenance concerns and costs
5. Allow for an alternative to the costly repair of the No. 2B heat exchanger and the intermediate absorption sections of the existing acid plant

The permit required ASARCO to install and operate a continuous emission monitoring system (CEMS) to monitor SO_2. The monitor is used to determine that ASARCO is meeting the emission limitations for the sulfuric acid plant contained in the permit. The SO_2 SIP may require more stringent requirements relating to the operation of the SO_2 CEMS concerning data recovery and monitor availability. These requirements will be addressed as part of the SIP process.

After the preliminary determination was issued by the department, ASARCO provided comments. As a result of ASARCO's comments and discussions with the department, the following changes were made to the permit. The opacity monitor was replaced with a requirement for ASARCO to perform Method 9 tests during each start up that occurs during the period between sunrise and sundown. Also, the ppm limitation was changed from a 1-hour average to a 6-hour average.

Also, based on discussions and a letter from ASARCO, the issuance of the Department Determination was delayed to allow for the resolution of the CEMS availability and reporting requirements to be included in the SO_2 SIP. A resolution as to what should be in the permit was arrived at on March 3, 1994. The resolution resulted in the addition of language relating to the monitoring requirements, availability requirements, and reporting requirements. The language used in the permit was as close as possible to the language contained in the SO_2 SIP for the East Helena area.

Permit #2557-03 was issued to ASARCO on April 27, 1994. The permit alteration was issued to allow ASARCO to construct a new acid dust handling and conveying system to replace the existing process. The new system handles the acid dust from the sinter plant cyclone, sinter plant baghouse system, and sinter plant hot cottrell. The system uses approximately 15,000 acfm of unused ventilation capacity from the

CSHB. The increased ventilation capacity was gained by changing the louvers on the existing fans and increasing the amperage of the fans.
The system created a decrease in fugitive particulate and lead emissions. The decreases came from the abandonment of the 130-ton acid dust bin and baghouse (17P), the acid dust handling building (17V), including the zigzag blender, and the acid dust incline conveyor and drop point into an open-top gondola railcar (17Va).

As a result of comments from ASARCO during the Preliminary Determination public comment period, several changes were made to the permit. A condition requiring ASARCO to discharge emissions from the surge bin baghouse, Dustmaster, and Agglomerator building ventilation through the CSHB and discharged through the CSHB baghouses and stack was added. The opacity limit on the D & L stack was added to the permit as a permit condition. The baghouse on the D & L stack had been permitted. The D & L stack is subject to 40% opacity since it was constructed prior to 1968 and has not been altered since it was installed.

During a meeting with ASARCO, they asked for an increase in particulate and lead emissions from the CSHB. After discussions, it was decided an increase in lead emissions was not necessary and was not allowed. The particulate emissions were reevaluated and an increase of 0.98 lbs/hr was included in the new CSHB stack limit of 20.810 lbs/hr of total particulate matter.

The department also included a requirement that the Agglomerator Building not have openings in excess of 14 square feet. The 14 square feet does not include the man doors since they will normally be closed. The 14 square feet was calculated as four (4) louvered vents measuring 22" x 22".

Permit #2557-04 was issued to ASARCO on June 6, 1994. The permit alteration was issued to construct and operate a new Dross reverberatory furnace, which began operation in 1995. The new furnace replaced the existing Dross reverberatory furnace. The Dross furnace is used to separate dross. Dross is a material that is formed when lead bullion from the blast furnace cools. The dross that is formed in the dross operation kettles on the bullion floor is transported in a batch process to the Dross reverberatory furnace by use of a skip and overhead crane. The dross, along with reagents, is charged to the Dross reverberatory furnace through a ventilated charge hole that penetrates the top of the furnace arch. The new furnace will have a hung arch. A hung arch has two advantages over the existing sprung arch roof. They are: 1) the ability to repair zones of high wear from above without requiring a cold shutdown, and 2) the compatibility with wall hold-downs located on the top of the refractory walls. The opening of the charge hole and charging of the furnace is one source of emissions from the furnace.

After the furnace is charged, the charge hole cover is replaced. The furnace is then heated by natural gas-fired burners to "cook" the dross material. The "cooking" separates the material into copper matte, copper speiss, and any residual lead, based on their density. Once the separation is complete and the volume of the three

components is sufficient, they are removed from the furnace by a procedure referred to as "tapping."
The speiss and matte are tapped from the side of the furnace through a water cooled, cast copper jacket. The hole in the jacket is opened by use of a burning oxygen lance. The speiss and matte flow down a brick lined launder to a process where the material is granulated. The final layer is the lead layer. The lead layer is maintained as cold as practical. The lead is tapped out of the side of the furnace through a water-cooled cast copper jacket. The lead is directed in molten state to a 60-ton steel kettle for storage.

The furnace is capable of handling 150 tons per day of dross. Typically however, 3.5 tons per hour (84 tons per day) of dross is fed to the dross reverberatory furnace. The feed is approximately 70 % lead on average.

The new Dross reverberatory furnace and changes to the ventilation system provide the following benefits. The new furnace has new refractory brick, which provides a tighter seal and thus tends to reduce emission "leaks" from the furnace and provides for a more energy efficient furnace. The furnace was constructed using tongue and groove direct-bonded magnesium-chrome brick for sidewalls and endwalls, wall holdbacks, and wall hold-downs. The brick has chemical resistance to the speiss and the matte layer to help ensure a long campaign life. The sidewall construction incorporates a single row of copper cooling fingers to maintain wall integrity near the top of the bath. The cooling fingers potentially freeze a protective layer of build up on the wall surface to slow down the rate of refractory deterioration.

The new Dross reverberatory furnace has two natural gas burners in the endwall. Each burner is rated at 9 million BTU/hr. The burners are fired approximately 6 hours per shift.

The proposed ventilation system incorporates more efficient transitions and better hood designs that enhance the system's ability to capture more emissions. The exhausting of furnace gases is done using a high velocity flue system. The high velocity system: 1) minimizes dust build-up and associated maintenance; 2) allows the dust to be collected from a single location; 3) is smaller and less expensive to maintain; 4) is easier to lay out in a manner to suit the furnace equipment; 5) eliminates the water-cooled damper in the gas stream; and 6) abolishes the drop-out box at the far end of the furnace.

In order to prevent dust from sticking in the ductwork, the gases from the Dross reverberatory furnace must be cooled to a temperature well below the freezing point of the dust. The dust exits the furnace at approximately 2200° F. The cooling is accomplished by providing a gap in the ductwork (between the furnace and the ductwork) where dilution air is pulled into the system. The fugitive emissions associated with the furnace feeding and tapping are controlled through the use of local exhaust.

The new ventilation system provides local ventilation on the Dross reverberatory furnace, the lead kettle, the matte/speiss tap, the matte/speiss launder, the charge hole, and the matte/speiss granulating pit. Under typical conditions, the total ventilation flow ranges between 125,833 ACFM and 69,684 ACFM. The plenum exhausts to the brick flue that is connected to the blast furnace baghouses. The only abnormal operation identified at the time of the application would be when the burners were running and no material was being processed. The burners are required to keep the furnace hot; the ventilation system is then turned down. The airflow under such a condition would be approximately 23,000 acfm.

ASARCO provided comments during the public comment period. The following changes were made to the preliminary determination. The numbering of sections contained in the comments is from the preliminary determination version of permit #2557-04.

1. The limit contained in Section II.B.6. was changed to incorporate the increase allowed from the CSHB stack due to the addition of the agglomerator.

2. The continuous opacity monitoring system requirements were changed. Section II.G.1.d. was changed to require a Method 9 at least once a day during weekdays. Section II.G.4. was changed to require continuous operation, except for the items identified in 40 CFR 60.13(e). This change was made to maintain consistency with the requirements contained in the New Source Performance Standards.

The department issued a draft Department Determination (DD) to ASARCO for comments. As a result of their review, the following changes were made: 1) added language to Section II.C.1 to allow ASARCO to petition the end of annual testing and changed reference from Section II.D.11 to II.C.11, 2) added "per 40 CFR 60.13(e)" to Section II.G.4., 3) changed language in footnote dealing with continuous emissions monitory system operation failures to read "all COMS and CEMS".

Permit alteration **#2557-05** was issued on January 16, 1996 to allow ASARCO to construct additional equipment and controls. The equipment was added to the facility to meet the requirements of the lead SIP for the East Helena nonattainment area.

1. The proposed alteration includes the following equipment and process changes:

    a. The construction of a stack with a minimum height of 200 feet (emissions from the Dross Plant Baghouse and from the existing sinter storage baghouse will be vented to atmosphere through this stack).

    b. The construction of a pulse-jet baghouse with approximately 225,000 acfm of flow used to control emissions from the Dross plant. The baghouse will be used to control fugitive particulate, PM_{10} and lead emissions, which are currently released as ground level fugitive emissions. The baghouse will be exhausted through the proposed Dross plant stack. The baghouse will provide at least 98% control efficiency for the lead and particulate emission gathered if the inlet grain loading of the pollutant is as least 1 gr/dscf.

c. Construction of ducting to vent the sinter storage baghouse to the Dross Plant Stack.
d. The construction of charge car enclosures on the top of each blast furnace and improved ventilation to the Blast Furnace Feed Floor. Previously, the feed floor of the blast furnace has been basically uncontrolled. This new system and ventilation will improve the collection of fugitive emissions from this activity. ASARCO will also be increasing the ventilation to the Blast Furnace thimble.

e. The installation of two lead bullion water granulating units. This process will reduce the emissions generated from the handling of molten lead bullion. The granulator will measure approximately 4 feet wide by 17 feet long and be designed to produce a maximum of approximately 15 tons of lead bullion per hour. One granulator will be constructed and installed for each blast furnace.

   The lead bullion tapped from the blast furnace will flow into the granulator water bath and immediately cool from approximately 1800° F to less than 200° F. The temperature is controlled to ensure no fugitive gaseous lead will be released at this point. The hooding that is currently used over the lead pots will remain in place to ventilate the point where molten lead bullion enters the granulator. The water bath will cause the molten lead to form irregularly shaped, curled lead flakes. The flakes will then be transported in an enclosed conveyor system.

   The lead pots will no longer be used or necessary except in cases where the blast furnace malfunctions. If such a malfunction occurs, the granulator will be moved and the lead pots will be used. The hoods for the granulator will be used to control emissions from the lead pots during such a malfunction.

f. The installation of an enclosed lead bullion conveying system to transport the solid lead flakes from the granulator to the rotary melters. No lead or other emissions are expected from the conveying system.

g. The installation of an outdoor lead bullion bunker for storage of the lead flakes if they can not be sent to the rotary melters.

h. Installing two rotary furnaces (melters) which use natural gas as fuel for heat.

   The rotary melters will be used to re-melt the solid lead flakes as the first step in the drossing process. The process separates the lead from the copper dross. The rotary melters will be designed to handle 10 tons per hour each of solid lead flakes. ASARCO plans to operate both rotary melters at the same time. The average amount handled will be in the range of 7.5 tons per hour for each rotary melter.

   The rotary melters will be approximately 25 feet in length and have an interior diameter of about 4 feet. Flat natural gas burners will penetrate the outer shell

of the furnaces to provide the heat to the rotating inner shell of the furnaces in three distinct zones. The first zone will be held at a temperature of approximately 600º F, the second zone at approximately 800º F to 1000º F, and the final zone at approximately 1000º F to 1200º F.
As solid lead flakes flow through each heating zone, the lead within the bullion will begin to liquefy. The liquid lead will flow along the bottom of the rotary melter until it reaches the discharge end. At the discharge end of the rotary melter, natural gas burner(s) will be installed as necessary to ensure clean separation. At this end, the liquid lead passes through a screen into a heated refractory launder. The lead flows along the launder until it is directed into the No. 1 Dross kettle (formerly #4 Dross kettle). The solid copper dross passes over the rotary furnace screen and discharges into a transfer container. The copper dross is then transported to the Dross reverberatory furnace.

The rotary melters will replace Dross kettles #1 and #3. The Dross kettles will no longer be needed since some of the separation will be occurring in the rotary melters. The rotary melters will be located in the general area of kettles #1 & #3. The use of the melters should reduce emissions since the rotary melters will more accurately control the temperature of the re-melting and the fugitive kettle emissions will no longer be generated.

ASARCO will continue to operate Dross kettles #2, #4, and #5. These will be renumbered as #1, #2, and #3, respectively.

i. The installation of improved enclosures and increased ventilation for Dross kettles #2, #4, and #5. For future reference, after the removal of kettles #1, #3, #6 and #7, the remaining kettles will be considered to be #1, #2, and #3 respectively.

Emissions generated from the burning of natural gas to heat kettles #1, #2, and #3 shall be vented to combustion ventilation ducts. These ducts must run to the roof area and emissions will be collected by the ductwork providing general ventilation to the Dross Building.

Each kettle shall have a ventilated hood which shall be designed and operated to provide ventilation at all times that the kettle is in use, including during the following activities: drossing (black skimming), pumping of molten lead, adding of fluxes, and stirring of fluxes.

j. Enclosing and supplying general ventilation to the Dross building. This will include re-roofing and re-siding the building, limiting the openings to the building, and enclosing the roof monitor. General ventilation will be provided to the Dross building and roof monitor area with the emissions being sent to the Dross plant baghouse.

k. Ducting to vent the Dross Reverberatory Furnace Plenum to the Dross Plant

Baghouse.

l. Eliminating Dross plant kettles #1, #3, #6, and #7 (existing numbering).

2. As part of the change of exhaust point of the plenum controlling emissions from the Dross reverberatory furnace, the New Source Performance Standards (NSPS) requirements will no longer apply to the blast furnace baghouse stack. The NSPS requirements are based on the process equipment. Since the process equipment triggering NSPS requirement will now exhaust through the Dross plant baghouse, the NSPS standards will not apply to the blast furnace baghouse stack.

   The department has determined, based on the amount of emissions exhausted through the blast furnace baghouse stack and the changes proposed to the collection and control of emissions by the blast furnace baghouse, that the COMS requirements shall remain in place on the blast furnace baghouse stack even after the emissions from the plenum are transferred to the Dross plant stack.

   This permit alteration establishes pounds per hour limits on the blast furnace baghouse stack and the Dross plant stack for particulate and lead. An emission limit for SO_2 has also been established for the Dross plant stack. The SO_2 emissions from the Blast Furnace baghouse stack are determined at this time based on an envelope equation contained in the primary SO_2 SIP. The changes in this permit alteration should cause a redirection in SO_2 emissions due to the moving of emissions from the Dross reverberatory furnace.

3. This permit also removed testing requirements, initiated in permit #2557-04, for tests that have been completed and accepted by the department.

Permit #2557-06 was issued on March 13, 1996 to allow ASARCO to construct a blast furnace baghouse dust handling system. The construction of the system is required by the East Helena lead SIP and will significantly reduce particulate and lead emissions from the handling, storage and charging of blast furnace baghouse dust.

The system will consist of the following equipment and operational modifications.

1. The first part of the proposal involves construction of an enclosure over the blast furnace baghouse dust unloading and reclaiming area. Previously, baghouse dust has been removed from the baghouse cellar using front-end loaders and placed into a concrete storage bunker. This operation has not been enclosed in the past and has been the source of significant fugitive emissions. The proposed enclosure will cover the baghouse dust unloading area and concrete storage bunker, as well as the dense-phase pneumatic dust handling system described below.

   Local ventilation at various emission points and general building ventilation will be provided by the construction of a blast furnace baghouse dust cleanout baghouse. The baghouse will be a pulse-jet design with a nominal flow rate of

45,500 acfm. The exhaust from this baghouse will be routed to the blast furnace baghouse stack. The increase in emissions routed to the blast furnace baghouse stack from this permitting action will be offset by a comparable decrease from the projects authorized by Permit #2557-05. Allowable, or expected actual, emissions from the blast furnace baghouse stack will not be changed by this alteration.
This project is expected to provide a decrease in particulate emissions from the blast furnace baghouse cleanout of 1.87 tons/year and a decrease in lead emissions of 0.74 tons/year. This is consistent with the 95% capture efficiency given in the East Helena lead SIP for this project.

2. This alteration also authorizes the construction of a dense-phase pneumatic dust handling system as the primary method for conveying the blast furnace baghouse dust. Previously, the baghouse dust was transferred from the baghouse cellar to the concrete storage bunker and from the storage bunker to open railcars or to the ore storage yard. Baghouse dust handling was done exclusively with front-end loaders. The material in the railcars was then bottom-dumped into the open 47 feeder charging bins for charging to the blast furnace or, if the cadmium content of the baghouse dust is high enough, shipped off site for further processing. This entire process is a significant source of fugitive emissions.

   Under the system, the front-end loaders will remove the baghouse dust from the baghouse cellar and dump the material through a grizzly. The oversized material removed by the grizzly will be returned to the smelting process. The fines pass through the grizzly and into a hopper. A screw conveyor at the bottom of the hopper transfers the dust to a bucket elevator, which delivers the material through a controlled diverter valve to either a delumper or the concrete storage bunker. The fines that pass through the delumper discharge to another controlled diverter valve and into one of two enclosed dense-phase pneumatic conveying vessels. The material from these vessels is pneumatically transferred through another diverter valve to either a 12-ton capacity railcar loadout hopper or a 250-ton capacity blast furnace baghouse dust storage silo.

   Emissions from the railcar loadout hopper will be controlled with a pulse-jet baghouse with a nominal flow rate of 3,500 acfm. Discharge from this baghouse will be vented to atmosphere. Emissions from the blast furnace baghouse dust storage silo will be controlled with a pulse-jet baghouse with a nominal flow rate of 2,500 acfm. Discharge from the baghouse dust storage silo baghouse along with the discharge from the Portland cement silo baghouse, discussed below, will be routed to the Dross Plant stack.

   The railcar loadout hopper is normally used when the concentration of cadmium in the baghouse dust is high enough to make recovery cost effective. The dust is loaded from the charge hopper to totally enclosed railcars for off-site shipment and processing. Ventilation for the railcars is provided by the railcar loadout hopper baghouse.

Baghouse dust scheduled to be charged back to the blast furnace will be pneumatically conveyed (dilute-phase) from the blast furnace baghouse dust storage silo, along with Portland cement, to a 6-ton capacity agglomerator charge hopper. The Portland cement will be stored in a 50-ton capacity storage silo with a pulse-jet baghouse (nominal flow rate 1,400 acfm) for particulate control. The agglomerator charge hopper will also be fitted with a pulse-jet baghouse (nominal flow rate 1,400 acfm). The mixture from the agglomerator charge hopper will be gravity fed into one of two agglomerators where it will be blended with water prior to being transferred to the blast furnace charge car.

Emissions from the charge hopper baghouse, as well as from local ventilation to be provided at the inlet to the agglomerators, will be routed to the sinter storage baghouse. This additional flow to the baghouse will be offset by removal of a comparable flow from projects authorized by permit #2557-05. Neither allowable nor estimated actual emissions from the sinter storage baghouse will be changed by this alteration.

Use of the pneumatic dust handling system and enclosed railcar loadout system will significantly reduce particulate and lead emissions from this operation. However, no credit was taken in the East Helena lead SIP for any emission reduction related to the enclosure of railcars, ventilation of the railcar loadout hopper, or enclosed conveyance of dust to the railcar loadout hopper. ASARCO may still transport and load blast furnace baghouse dust into railcars with front-end loaders. The reclamation of blast furnace baghouse dust is subject to the limitations contained in the lead SIP.

The third phase of this project is the abandonment of the 47 feeder charging bins after installation of the blast furnace baghouse dust charging system described above. These bins have been a significant source of fugitive particulate and lead emissions. The discontinued use of these bins in expected to reduce total particulate emissions by 6.17 tons/year and reduce lead emissions by 2.47 tons/year.

This permit also re-establishes the opacity limit for the sinter D&L stack at 40%. This limit was in dispute because of alterations to the sinter plant (see permit analysis for permit #2557-06). The department has since determined that the alterations performed on the sinter plant, completed in 1978, were not extensive enough to warrant a change to the opacity limitation.

After issuance of the departments preliminary determination (PD), ASARCO requested that the limits for lead, total particulate and SO_2 emissions from the SPVS baghouse and the lead and total particulate limits for the CSHB baghouse (Section II.B.1-5 of the PD) be removed. The discharge from the two baghouses are routed to the CSHB stack which has end-of-stack limits for lead, total particulate and SO_2. Emission limits on the individual pieces of equipment are redundant. It would also be difficult to demonstrate compliance with individual limits because testing is only performed on the stack itself.

The department has agreed that the end-of-stack emission limits for lead, total particulate and SO_2 are sufficient to protect the ambient air quality of the area. Because the stack limit is the sum of the individual limits, this limit is also consistent with the BACT determinations made for each source. End-of-stack emission limits are also consistent with the East Helena lead and SO_2 SIPs.
Permit #2557-07 was issued May 29, 1996. The permit allows the construction of a lead granulation system within the dross plant building and allows ASARCO to make changes to the process of handling molten lead contained in permit #2557-06. The changes are necessary due to design problems with the previously proposed granulation system. The previous design called for the use of a lead granulation system located at the blast furnace tapping floor, a conveying system, and two rotary melters. This equipment will no longer be installed. ASARCO's current design will continue to use lead pots to collect and transfer molten lead, but change the process from pouring the molten lead into the kettles to direct charging in most cases. The molten lead will either be directly charged to the dross reverberatory furnace or granulated in a lead granulation system constructed in the dross plant building. The dross kettles will no longer be used to receive furnace lead. ASARCO anticipates directly charging between 50% and 70% of the molten lead into the dross reverberatory furnace. The remaining molten lead will be sent to the granulation system.

Once granulated, the lead will either be sent to a hopper or a storage bunker. The lead sent to the storage bunker will be transferred to the hopper by front-end loader when needed. From the hopper the granulated lead will be conveyed to the dross reverberatory furnace. It is anticipated that the granulated lead will be fed to the furnace at a rate in the range of 2 to 15 tons per hour.

With the molten furnace lead being charged directly to the dross reverberatory furnace, the molten furnace lead will no longer be processed through the dross plant receiving kettles. The dross plant receiving kettles will now be used to receive lead tapped from the dross reverberatory furnace.

During the public comment period, ASARCO provided comments on the PD. As a result of the comments, changes were made to the PD. The following is a summary of some of the changes made to the permit.

1. References to the lead granulation system only being operated when the dross reverberatory furnace is not operational have been removed since the granulator will be used on a regular basis regardless of the status of the reverberatory furnace.

2. Section II.B.7. was changed to identify the limit only applies while the sulfuric acid plant is operating. This change was made for clarification purposes. As identified in Section II.A.7., no emissions come from the stack when the plant is not operating.

3. Section II.F.1. was changed to include the correct reference to the daily emission limit in Section II.B.8.

4. Two changes were made to remove requirements that had been previously met by ASARCO.

Permit modification #2557-08 was issued on January 3, 1997 to allow ASARCO to use the existing 130-ton acid dust bin and associated baghouse. Permit #2557-06 required this equipment and the acid dust bin building be abandoned once the new acid dust handling system was constructed. During the construction and start-up of the new system, ASARCO experienced problems with plugging. A system review indicated that the dust from the hot cottrell was electrically charged and caused plugs in the system.

ASARCO requested the ability to use the existing 130-ton acid dust bin as an accumulation point for the sinter baghouse dust and hot cottrell dust. The zigzag blender and other points of emissions in the acid dust handling building (17V) must still be abandoned, except for the equipment associated with the 130-ton acid dust bin which must be controlled by the acid dust bin baghouse. The emissions will be exhausted through the associated baghouse. The baghouse exhaust will be vented to the sinter plant baghouse. This change will result in the emissions being controlled by two baghouses in series prior to discharge to atmosphere. Due to the low volume of airflow from the 130-ton acid dust bin baghouse, the emissions will not affect actual or allowable emission rates from the sinter plant stack.

The original stack for the 130-ton acid dust bin and baghouse identified as 17P in the lead SIP must still be abandoned. The proposed changes will not require any review or changes to the East Helena Lead Stipulation or SIP since the lead and particulate emissions to atmosphere must exhaust through the sinter plant stack and there is no change in allowable emissions.

Permit modification #2557-09 was issued on April 5, 1998 to allow a change in operational requirements of the blast furnace baghouse dust handling system. Since the installation of this system, ASARCO had experienced problems with the baghouse dust agglomerator. Once wetted, the dust was extremely difficult to remove from the agglomerator. Agglomeration of the material is ASARCO's preferred method of preparing the material for reintroduction to the blast furnace; however, ASARCO had not been able to operate this unit satisfactorily. The modification allowed ASARCO to bypass the agglomerator and load the dust directly to the charge car as long as the baghouse ventilation was redirected from the agglomerator opening to the charge car opening. The operational change did not result in a change in actual or allowable emissions from the system.

The modification also allowed ASARCO to redirect the emissions from the speiss granulating pit. At the time of the permitting action, these emissions were routed to the Dross Plant Baghouse. With the granulating pit emissions directed to this baghouse, ASARCO experienced blinding of the bags, unacceptably high pressure drops across the baghouse and significantly decreased bag life. The apparent cause of this problem was

the moisture content of the emissions from the pit. ASARCO tried various additives to absorb the moisture such as Pearlyte and diatomaceous earth. These additives did not prove adequate. ASARCO requested that they be allowed to use the blast furnace baghouse (BFBH) to control this source instead of the dross plant baghouse. The granulating pit previously had been controlled with the BFBH without incident. Based on ASARCO's analysis, this change would not result in a significant reduction in the capture velocity at the other pick up points controlled by the BFBH.
ASARCO was required, by their stipulation for the East Helena lead SIP, to control the granulating pit with the Dross Plant Baghouse. Corresponding changes to the language in the lead SIP were adopted by the Board of Environmental Review on August 28, 1998 to allowed the change in baghouse operations. This change did not result in an increase in the allowable emissions from either the blast furnace baghouse or the dross plant baghouse.

The modification also allowed ASARCO to reduce the opacity testing on the acid plant. A February 1, 1991 order from the department required ASARCO to perform opacity readings on every start up of the acid plant. A stop order issued by the department on March 11, 1998 terminated the requirement to perform the opacity readings.

Requirements no longer applicable to the facility were also removed in this modification. They included superceded limits and testing requirements on the blast furnace baghouse stack (Sections II.B.14 & 15 and II.C.3 of Permit #2557-08) and completed notification requirements.

Permit alteration #2557-10 was issued on August 3, 2000 for the installation of a new High Efficiency Reverse Osmosis (HERO) water treatment plant. ASARCO needed the HERO plant to be able to comply with lower discharge limits in their water quality permit, which becomes effective December 1, 2000. The HERO process consists of three steps:

1. Hardness removal in an ion exchange system
2. Carbon dioxide removal in a forced air degassifier
3. Reverse osmosis operating at a pH between 9 and 11

The HERO process results in two discharge streams. The permeate (treated water) stream can be discharged or reused in the plant for "clean" water needs. The reject (concentrated brine) stream is reused in the smelter or converted to dry solids in a spray dryer for landfill disposal, or a combination of the two.

There are two air discharge points for the HERO plant: the degassifier vent and the spray dryer baghouse stack. In the degassifier, low-pressure air is blown counter-currently through two columns to strip CO_2 from the water following hardness removal. The air/CO_2 mixture along with dissolved gases, such as SO_2, are stripped and vented to atmosphere. The spray dryer converts reject water (at 6 to 12 % solids) into dry solids, which can be landfilled. The reject water is injected into a spray dryer through high-pressure nozzles and evaporated by high temperature air, which is heated by natural gas and blown into the spray dryer. The heated air and evaporated dry solids are pulled into the spray dryer baghouse, where the dry solids are collected by fabric filters and the "clean" air vented to atmosphere. The dry solids are collected in two hoppers at the bottom of the spray dryer baghouse.

The dry solids from the two hoppers are pneumatically conveyed in a pipeline through two rotary air locks into the top of the dust storage silo. This air is filtered through the bin vent baghouse, with the solids falling into a storage silo. The bin vent baghouse is not an emitting unit; air exiting this baghouse returns to the inlet of the spray dryer baghouse. The dry solids in the storage silo are pneumatically conveyed through another rotary air lock into a truck. A ventilation fan on the loadout spout captures the solids released at this point and returns them to the inlet of the spray dryer baghouse.

Also, during this permitting action, the department acted on two de mimimis requests submitted by ASARCO. The first one involved the repackaging of off-spec photographic paper into smaller bales, so that the paper could be more efficiently loaded into the blast furnace. The second request dealt with pneumatic injection of filings from the manufacturing of printed circuit boards. Instead of adding the filings to the blast furnace from the top, ASARCO proposed to inject this material into the smelt zone of the blast furnace through existing furnace tuyeres. The department determined that these changes are de mimimis, and thus did not require a preconstruction permit. However, this determination was included in this permitting action for recordkeeping purposes. Permit #**2557-10** replaced permit #2557-09.

C. Current Permit Action:

The current permit action is an alteration of permit #2557-10. ASARCO proposes to use an existing rotary melting furnace and install a new thermal oxidation unit. The rotary furnace will enable ASARCO to recover the precious metals contained in the printed circuit board material (CBM). The rotary melter project consists of three main steps:

1. The partial combustion and depolymerization of shredded CBM under starved air conditions in an indirect fired rotary kiln
2. Discharge of the partially melted CBM from the rotary kiln into a sealed water bath and, after quenching, transfer of the CBM residue to the blast furnace
3. Incineration of the volatile organic compounds (VOCs), evolved by the depolymerization process in the kiln, in a thermal oxidation unit

Natural gas is combusted in three burners to indirectly heat the kiln. The natural gas combustion emissions are vented, uncontrolled, to atmosphere. The inlet and outlet of the kiln are equipped with special rotary seals to minimize the entry of air and to maintain a starved air combustion zone inside the kiln. An additional benefit of the seals is to minimize the release of VOCs. The feed hopper is equipped with two slide gates to control air and gaseous pollutant movement on the inlet side of the kiln.

At the outlet of the kiln the melted CBM is quenched in a water bath, which also serves as an atmospheric seal. The VOC emissions are routed via ductwork to the thermal oxidation unit. There the VOCs are incinerated by temperatures above 1800°F. The emissions from the incinerator are cooled by the addition of outside air, and then routed to the blast furnace baghouse cleanout baghouse. After particle removal in the baghouse, the remaining emissions exhaust through the blast furnace baghouse stack. Permit **#2557-11** will replace permit #2557-10.

D. Additional Information:

Additional information, such as applicable rules and regulations, Best Available Control Technology (BACT) determinations, air quality impacts, and environmental assessments, is included in the analysis associated with each change to the permits identified above.

II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the Administrative Rules of Montana (ARM) and are available, upon request, from the department. Upon request, the department will provide references for locations of complete copies of all applicable rules and regulations, or copies where appropriate.

A. ARM 17.8, Subchapter 1, General Provisions, including, but not limited to:

1. <u>ARM 17.8.105 Testing Requirements</u>. Any person or persons responsible for the emissions of any air contaminant into the outdoor atmosphere shall, upon written request of the department, provide the facilities and necessary equipment, including instruments and sensing devices, and shall conduct tests, emission or ambient, for such periods of time as may be necessary using methods approved by the department.

2. <u>ARM 17.8.106 Source Testing Protocol</u>. The requirements of this rule apply to any emission source testing conducted by the department, any source, or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq*., MCA. ASARCO shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual, including, but not limited to, using the proper test methods and supplying the required reports. A copy of the Montana Source Test Protocol and Procedures Manual is available from the department upon request.

3. <u>ARM 17.8.110 Malfunctions</u>. The department must be notified promptly, by telephone, whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation, or to continue for a period greater than 4 hours.

4. ARM 17.8.111 Circumvention. No person shall cause or permit the installation or use of any device or any means which, without resulting in reduction in the total amount of air contaminant emitted, conceals or dilutes an emission of air contaminant which would otherwise violate an air pollution control regulation. No equipment that may produce emissions shall be operated or maintained in such a manner that a public nuisance is created.

B. ARM 17.8, Subchapter 2, Ambient Air Quality, including, but not limited to:

1. ARM 17.8.204 Ambient Air Monitoring Quality Assurance Procedures
2. ARM 17.8.210 Ambient Air Quality Standards for Sulfur Dioxide
3. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide
4. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide
5. ARM 17.8.213 Ambient Air Quality Standard for Ozone
6. ARM 17.8.214 Ambient Air Quality Standard for Hydrogen Sulfide
7. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter
8. ARM 17.8.221 Ambient Air Quality Standard for Visibility
9. ARM 17.8.222 Ambient Air Quality Standard for Lead
10. ARM 17.8.223 Ambient Air Quality Standard for PM_{10}
11. ARM 17.8.230 Fluoride in Forage

ASARCO must maintain compliance with the applicable ambient air quality standards. There will be minor increases in lead, SO_2 and PM_{10} emissions from this alteration. The department has determined that the project authorized by this permitting action will not endanger the control strategies outlined in the East Helena lead and SO_2 SIPs, thus maintaining protection of the ambient air quality standards.

C. ARM 17.8, Subchapter 3, Emission Standards, including, but not limited to:

1. ARM 17.8.304 Visible Air Contaminants. This rule requires that no person may cause or authorize emissions to be discharged to an outdoor atmosphere from any source installed on or before November 23, 1968, that exhibit an opacity of 40% or greater averaged over 6 consecutive minutes, and no person may cause or authorize emissions to be discharged to an outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.

2. ARM 17.8.308 Particulate Matter, Airborne. This rule requires an opacity limitation of 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate. Under this rule, ASARCO shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter.

3. ARM 17.8.309 Particulate Matter -- Fuel Burning Equipment. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere

particulate matter caused by the combustion of fuel in excess of the amount determined by this section.

4. ARM 17.8.310 Particulate Matter -- Industrial Process. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter in excess of the amount set forth in this section.

5. ARM 17.8.340 Standard of Performance for New Stationary Sources. This rule incorporates, by reference, 40 CFR Part 60, Standards of Performance for New Stationary Sources (NSPS). The owner or operator of any stationary source or modification, as defined and applied in 40 CFR Part 60, shall comply with the NSPS. The ASARCO – East Helena Smelter is an NSPS affected source because it meets the definitions in 40 CFR Part 60. Subpart R, Standards of performance for Primary Lead Smelters. However, the project covered by this permit alteration is not an affected facility as defined in Subpart R; therefore, the requirements of Subpart R are not applicable to the Printed Circuit Board Rotary Melting system.

D. ARM 17.8, Subchapter 5 - Air Quality Permit Application, Operation and Open Burning Fees, including, but not limited to:

1. ARM 17.8.504 Air Quality Permit Application Fees. This rule requires that an applicant submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to the department. ASARCO paid the required fee.

2. ARM 17.8.505 Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to the department by each source of air contaminants holding an air quality permit, excluding an open burning permit, issued by the department. The air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

   An air quality operation fee is separate and distinct from an air quality permit application fee. The annual assessment and collection of the air quality operation fee, described above, shall take place on a calendar-year basis. The department may insert into any final permit, issued after the effective date of these rules, such conditions as may be necessary to require the payment of an air quality operation fee on a calendar-year basis, including provisions which pro-rate the required fee amount.

E. ARM 17.8, Subchapter 7, Permit, Construction and Operation of Air Contaminant Sources, including but not limited to:

1. ARM 17.8.704 General Procedures for Air Quality Preconstruction Permitting.

This air quality preconstruction permit contains requirements and conditions applicable to both construction and subsequent use of the permitted equipment.

2. ARM 17.8.705 When Permit Required -- Exclusions. This rule requires a facility to obtain an air quality permit or permit alteration if they construct, alter, or use any air contaminant sources having the potential to emit more than 25 tons per year of any pollutant, or more than 5 tons per year of lead. ASARCO has the potential to emit (PTE) more then 25 tons per year of NO_x, PM_{10}, SO_2, and more than 5 tons per year of lead; therefore, a permit is required.
3. ARM 17.8.706 New or Altered Sources and Stacks -- Permit Application Requirements. This rule requires that an application for an air quality permit be submitted for a new or altered source or stack. ASARCO submitted a permit application.

4. ARM 17.8.710 Conditions for Issuance of Permit. This rule requires that ASARCO demonstrate compliance with applicable rules and standards before a permit can be issued. In addition, a permit may be issued with such conditions as are necessary to assure compliance with all applicable rules and standards. ASARCO has demonstrated compliance with applicable rules and standards as required for permit issuance.

5. ARM 17.8.715 Emission Control Requirements. This rule requires a source to install on a new or altered source, the maximum air pollution control capability technically practicable and economically feasible, except that BACT shall be utilized. ASARCO conducted a BACT analysis and the proposed emission controls constitute BACT.

6. ARM 17.8.716 Inspection of Permit. This rule requires that air quality permits be made available for inspection by the department at the location of the source.

7. ARM 17.8.717 Compliance with Other Statutes and Rules. This rule states that nothing in the permit shall be construed as relieving ASARCO of the responsibility for complying with any applicable federal or Montana statute, rule or standard, except as specifically provided in ARM 17.8.101, *et seq*.

8. ARM 17.8.720 Public Review of Permit Applications. This rule requires that the applicant notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application for a permit. The required public notice for the permit application was published in the Helena Independent Record.

9. ARM 17.8.731 Duration of Permit. An air quality permit shall be valid until revoked or modified as provided in this subchapter, except that a permit issued prior to construction of a new or altered source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit; which, in no event, may be less than 1 year after the

permit is issued.

10. ARM 17.8.733 Modification of Permit. An air quality permit may be modified for changes in any applicable rules and standards adopted by the board, or for changed conditions of operation at a source or stack which do not result in an increase in emissions because of those changed conditions. A source may not increase its emissions beyond those found in its permit unless the source applies for and receives another permit.

F. ARM 17.8, Subchapter 8 - Prevention of Significant Deterioration of Air Quality, including, but not limited to:

ARM 17.8.818 Review of Major Stationary Sources and Major Modifications -- Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to regulation under the Federal Clean Air Act (FCAA) that it would emit, except as this subchapter would otherwise allow.

ASARCO is a listed source and the facility emissions are greater than 100 tons per year, therefore, the facility is major. The changes authorized by this proposed permitting action will not cause an increase in emissions greater than significance levels. Therefore, the proposed action is not considered a major modification and is not subject to the requirements of this subchapter.

PSD Significance Levels

Pollutant	Net Emission Increase (tons/year)	Significance Levels (tons/year)
CO	7.28	100
NO_x	39.47	40
PM_{10}	4.85	15
O_3 (VOCs)	8.72	40
SO_2	0.04	40
Lead	0.09	0.6

G. ARM 17.8, Subchapter 9 - Permit Requirements for Major Stationary Sources or Major Modifications Locating Within Nonattainment Areas, including, but not limited to:

ARM 17.8.904 When Air Quality Preconstruction Permit Required. Any new major stationary source or major modification which would locate anywhere in an area designated as nonattainment for a national ambient air quality standard under 40 CFR 81.327 and which is major for the pollutant for which the area is designated nonattainment, shall, prior to construction, obtain from the department an air quality preconstruction permit in accordance with subchapter 7 and all requirements contained in this subchapter if applicable.

The area surrounding the East Helena facility is considered nonattainment for lead and SO_2. ASARCO is a major source for lead and SO_2. However, the net emissions increase for this permitting action is below significant levels. Therefore, the proposed change is not a major modification and the requirements of this subchapter do not apply.

NSR Significance Levels

Pollutant	Net Emission Increase (tons/year)	Significance Levels (tons/year)
SO_2	0.04	40
Lead	0.09	0.6

H. ARM 17.8, Subchapter 12 - Operating Permit Program Applicability, including, but not limited to:

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any stationary source having:

   a. PTE > 10 tons/year of any one HAP (hazardous air pollutant), or PTE > 25 tons/year of a combination of all HAPs, or lesser quantity as the department may establish by rule
   b. PTE > 100 tons/year of any pollutant
   c. Sources with the PTE > 70 tons/year of PM_{10} in a serious PM_{10} non-attainment area

2. ARM 17.8.1204 Air Quality Operating Permit Program Applicability. Title V of the FCAA Amendments of 1990 requires that all sources, as defined in ARM 17.8.1204(1), obtain a Title V Operating Permit. In reviewing and proposing air quality permit #2557-11 for ASARCO, the following conclusions were made:

   a. The facility's PTE is greater than 100 tons/year for SO_2, and PM_{10}.

   b. The facility's PTE is less than 10 tons/year for any single HAP and less than 25 tons/year for all HAPs.

   c. This source is not located in a serious PM_{10} non-attainment area.

   d. This facility is not subject to any current NSPS.

   e. This facility is subject to a current NESHAP standard.

   f. This source is not a Title IV affected source, nor a solid waste combustion unit.

   g. This source is an EPA designated Title V source.

   Based on these facts, the department has determined that ASARCO is subject to the Title V operating permit program. ASARCO submitted a Title V operating permit application on April 19, 1996, which was deemed administratively complete on May 19, 1996. ASARCO submitted an updated Title V operating permit application on April 21, 2000.

I. Montana Code Annotated (MCA) 75-2-103, Definitions provides, in part, as follows:

1. “Incinerator” means any single or multiple-chambered combustion device that burns combustible material, alone or with a supplemental fuel or catalytic combustion assistance, primarily for the purpose of removal, destruction, disposal, or volume reduction of all or any portion of the input material.

2. “Solid waste” means all putrescible or nonputrescible solid, semisolid, liquid, or gaseous wastes, including, but not limited to … air pollution control facilities…

J. MCA 75-2-215, Solid or Hazardous Waste Incineration - additional permit requirements:

1. MCA 75-2-215 requires air quality permits for all new commercial solid or hazardous waste incinerators. ASARCO will therefore have to obtain an air quality permit.

2. MCA 75-2-215 requires ASARCO to provide, to the department's satisfaction, a characterization and estimate of emissions and ambient concentrations of air pollutants, including hazardous air pollutants from the incineration of gaseous wastes. The department has determined that the information submitted in this permit application fulfills this requirement.

3. MCA 75-2-215 requires that the department reach a determination that the projected emissions and ambient concentrations constitute a negligible risk to public health, safety and welfare. The department completed a health risk assessment based on an emissions inventory and ambient air quality modeling for this proposal. Based on the results of the emission inventory, modeling, and the health risk assessment, the department has determined that ASARCO’s proposal complies with this requirement.

4. MCA 75-2-215 requires the application of pollution control equipment or procedures that meet or exceed BACT. The department has determined that the proposed thermal oxidation unit (i.e., incinerator) constitutes BACT.

III. BACT Determination

A BACT determination is required for each new or altered source. ASARCO shall install, on the new or altered source, the maximum air pollution control capability technically practicable and economically feasible, except that BACT shall be utilized.

The department reviewed some available methods of controlling emissions as well as previous BACT determinations. The following are options that the department reviewed in order to make a BACT determination.

A. Volatile Organic Compounds (VOCs) and Hazardous Air Pollutants (HAPS)

The majority of the VOC and HAPS emissions from the proposed Printed Circuit Board Rotary Melting system result from the volatilization of the organic portion of the printed circuit board material. There is a very small amount of VOCs and HAPS generated by the combustion of natural gas, which is used to indirectly heat the rotary furnace and to incinerate the VOCs and HAPS in the thermal oxidation unit. The VOCs and HAPS generated as a result of heating the rotary furnace were not considered in this analysis. The VOCs and HAPS from volatilization of the organic portion of the printed circuit board material are collected and routed to the thermal oxidation unit for incineration. After incineration, the exhaust gases are cooled by the addition of ambient air and routed to the blast furnace baghouse's cleanout baghouse.

1. Chiller Condenser Units – Chiller condenser units have collection and removal efficiencies of approximately 60-70%. ASARCO proposes to use a technology (thermal oxidation) with a much higher control efficiency. For this reason, a chiller condenser unit is not considered BACT for the Printed Circuit Board Rotary Melting system.

2. Carbon Adsorption Systems – Carbon adsorption systems have higher control efficiencies than chiller condensers but lower than thermal oxidation units, which has been proposed by ASARCO. The equipment installation and associated operating costs are higher than those for thermal oxidation units. Additionally, the spent carbon canisters can potentially create a hazardous waste disposal issue. For these reasons, a carbon adsorption system is not considered BACT for the Printed Circuit Board Rotary Melting system.

3. No Controls – This option would potentially release over 833 tons per year of VOCs, which includes HAPS, lead and other heavy metals, into the local airshed. This scenario represents unacceptable environmental impacts. Since ASARCO proposes to use a control technology with a much higher level of control, the department has determined that the no control option does not constitute BACT in this case.

4. Thermal Oxidation – Thermal oxidation units combine high temperatures with turbulence and sufficient retention time to reduce hazardous compounds into safe, simple compounds, such as carbon dioxide and water. Incinerators are very efficient, given sufficient residence time and temperatures above 1600°F, with destruction and removal efficiencies (DRE) commonly above 99.5%. Incinerators achieve high DREs with installation and operational costs less than similar technologies. ASARCO proposes an incinerator with a combustion temperature limit greater than or equal to 1800°F. Given the high destruction removal efficiencies, and the lower installation and operational costs compared to similar technologies, the department has determined that an incinerator constitutes BACT in this case

B. Particulate Matter Emissions

Particulate matter (PM) emissions from the proposed Printed Circuit Board Rotary

Melting system result from the volatilization of the organic portion of the printed circuit board material. There is a very small amount of PM generated by the combustion of natural gas, which is used to indirectly heat the rotary furnace and to incinerate the VOCs and HAPS in the thermal oxidation unit. The PM generated as a result of heating the rotary furnace was not considered in this analysis. The PM from the volatilization of the organic portion of the printed circuit board material is collected and routed to the thermal oxidation unit for incineration. After incineration, the exhaust gases, and remaining PM, are cooled by the addition of ambient air and routed to the blast furnace baghouse's cleanout associated baghouse. The PM will then be collected by the blast furnace baghouse's cleanout associated baghouse.

1. No control – This option would potentially release approximately 147 tons per year of PM, which includes lead and other heavy metals, into an airshed that is nonattainment for the ambient lead standard. This scenario represents unacceptable environmental impacts. Since ASARCO proposes to use a control technology with a much higher level of control, the department has determined that the no control option does not constitute BACT in this case.

2. Electrostatic Precipitator (ESP) – In an ESP, the PM is given an electrical charge and then collected on a surface possessing the opposite electrical charge. ESPs are very efficient at removing small particles with efficiencies commonly ranging from 95 to 99% plus. However, ESPs achieve high removal efficiencies with installation and operational costs higher than similar technologies. Since ASARCO proposes to use a control technology with an equivalent level of control but lower economic costs, the department has determined that an ESP does not constitute BACT in this case.

3. Wet Scrubber – A wet scrubber removes PM by impaction and interception. Wet scrubbers are typically installed when the collected material can be used, or is easier to handle, in a wet form. Wet scrubbers are less efficient than baghouses or ESPs in removing PM, with efficiencies ranging from 60 to 80 %, depending on particle size. Wet scrubbers also generate wastewater, which has to be disposed of properly. Since ASARCO proposes to use a control technology with a higher level of control, the department has determined that a wet scrubber does not constitute BACT in this case.

4. Baghouse - Fabric filters are used to collect the dust suspended in the air. The air stream passes through the fabric filter, which collects some of the dust. Most of the collection is accomplished by the layer of dust, referred to as filter cake, which builds up on the surface of the fabric. Baghouses are very efficient at removing small particles with efficiencies commonly ranging from 95 to 99% plus. Baghouses achieve high removal efficiencies with installation and operational costs less than similar technologies. ASARCO proposes to use the blast furnace baghouse's cleanout associated baghouse for their proposed Printed Circuit Board Rotary Melting system. Given the high removal efficiencies, and the lower installation and operational costs compared to similar technologies, the department has determined that a baghouse constitutes BACT in this case.

C. Oxides of Nitrogen

No control – The installation of control equipment, along with the associated operating costs, make control options economically impractical on a cost per ton basis for the small amount of NO_x generated by the proposed Printed Circuit Board Rotary Melting system. For this reason, no control has been determined to be BACT in this case.

Summary: The control options selected have controls and control costs comparable to other recently permitted similar sources and are capable of achieving the desired results.

IV. Emission Inventory for the Rotary Melting Furnace and Thermal Oxidation Unit

(Note: based on information submitted by ASARCO in their permit application.)

A. Rotary Melting Furnace – Natural Gas Combustion Emissions (indirect heating)
Maximum hourly fuel heat input = 6 MMBtu/hour
Natural gas heating value = 950 Btu/scf
Max. hourly fuel input rate = 6 MMBtu/hour * 1 scf/950 Btu = 0.00632 MMscf/hour

PM_{10} Emissions
Emission Factor = 7.6 lb/ 10^6 scf natural gas (AP-42, Table 1.4-2, July 1998)
7.6 lb / 10^6 scf * 0.00632 x 10^6 scf / hr = 0.048 lb/hr
0.048 lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **0.21 tons/year**

Sulfur Dioxide Emissions
Emission Factor = 0.6 lb/ 10^6 scf natural gas (AP-42, Table 1.4-2, July 1998)
0.6 lb / 10^6 scf * 0.00632 x 10^6 scf / hr = 0.00379 lb/hr
0.00379 lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **0.02 tons/year**

Nitrogen Oxides Emissions
Emission Factor = 100 lb/ 10^6 scf natural gas (AP-42, Table 1.4-1, July 1998)
100 lb / 10^6 scf * 0.00632 x 10^6 scf / hr = 0.63158 lb/hr
0.63158 lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **2.77 tons/year**

Carbon Monoxide Emissions
Emission Factor = 84 lb/ 10^6 scf natural gas (AP-42, Table 1.4-1, July 1998)
84 lb / 10^6 scf * 0.00632 x 10^6 scf / hr = 0.53053 lb/hr
0.53053 lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **2.32 tons/year**

Volatile Organic Compounds (VOC) Emissions
Emission Factor = 5.5 lb/ 10^6 scf natural gas (AP-42, Table 1.4-2, July 1998)
5.5 lb / 10^6 scf * 0.00632 x 10^6 scf / hr = 0.03474 lb/hr
0.03474 lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **0.15 tons/year**

Lead (Pb) Emissions

Emission Factor = 0.0005 lb/ 10^6 scf natural gas (AP-42, Table 1.4-2, July 1998)
0.0005 lb / 10^6 scf * 0.00632 x 10^6 scf / hr = 3.15789 x 10^{-6} lb/hr
3.15789 x 10^{-6} lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **0.00 tons/year**

B. Fugitive Dust - Material Handling & Mobile Heavy Equipment
Projected maximum CBM handling rate = 200 tons/month
Projected additional vehicle traffic = 1 vehicle mile traveled (VMT) per day

Total Particulate Matter Emissions – Material Handling
Material handling emission factor = 0.547 lb/ton (Asarco E. Helena Pb SIP)
0.547 lb/ton * 200 tons/month * 12 months/year * 1 ton/2000 lb = **0.66 tons/year**

Total Particulate Matter Emissions – Mobile Equipment
Vehicle fugitive dust emission factor = 1.13 lb/VMT (Asarco E. Helena Pb SIP)
2.13 lb/VMT * 1 VMT/day * 365 days/year * 1 ton/2000 lb = **0.21 tons/year**

Total Particulate Matter Emissions – Mobile Equipment + Material Handling
0.66 tons/year + 0.21 tons/year = **0.87 tons/ year**

C. Thermal Oxidation Unit– Natural Gas Combustion Emissions (direct heating)
Maximum hourly fuel heat input = 9 MMBtu/hour
Natural gas heating value = 950 Btu/scf
Max. hourly fuel input rate = 9 MMBtu/hour * 1 scf/950 Btu = 0.00947 MMscf/hour

PM_{10} Emissions
Emission Factor = 7.6 lb/ 10^6 scf natural gas (AP-42, Table 1.4-2, July 1998)
7.6 lb / 10^6 scf * 0.00947 x 10^6 scf / hr = 0.072 lb/hr
0.072 lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **0.32 tons/year**

Sulfur Dioxide Emissions
Emission Factor = 0.6 lb/ 10^6 scf natural gas (AP-42, Table 1.4-2, July 1998)
0.6 lb / 10^6 scf * 0.00947 x 10^6 scf / hr = 0.00568 lb/hr
0.00568 lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **0.02 tons/year**

Nitrogen Oxides Emissions
Emission Factor = 100 lb/ 10^6 scf natural gas (AP-42, Table 1.4-1, July 1998)
100 lb / 10^6 scf * 0.00947 x 10^6 scf / hr = 0.94737 lb/hr
0.94737 lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **4.15 tons/year**

Carbon Monoxide Emissions
Emission Factor = 84 lb/ 10^6 scf natural gas (AP-42, Table 1.4-1, July 1998)
84 lb / 10^6 scf * 0.00947 x 10^6 scf / hr = 0.79579 lb/hr
0.79579 lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **3.49 tons/year**

Volatile Organic Compounds (VOC) Emissions

Emission Factor = 5.5 lb/ 10^6 scf natural gas (AP-42, Table 1.4-2, July 1998)
5.5 lb / 10^6 scf * 0.00947 x 10^6 scf / hr = 0.05211 lb/hr
0.05211 lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **0.23 tons/year**

Lead (Pb) Emissions
Emission Factor = 0.0005 lb/ 10^6 scf natural gas (AP-42, Table 1.4-2, July 1998)
0.0005 lb / 10^6 scf * 0.00947 x 10^6 scf / hr = 4.73684 x 10^{-6} lb/hr
4.73684 x 10^{-6} lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **0.00 tons/year**

D. Thermal Oxidation Unit–CBM Incineration Emissions
(Does not include emissions from natural gas combustion)
Maximum hourly CBM material feed rate = 1,800 lb/hour
Incineration temperature $\geq$ 1,800°F
Annual CBM throughput limit = 3,800 tons/year OR
Annual CBM throughput limit = 4,222.2 hours/year @ 1,800 lb/hour
DRE = destruction and removal efficiency

PM_{10} Emissions
Incinerator air volume through blast furnace baghouse cleanout baghouse
Scfm = acfm * pressure correction * temperature correction
Scfm = 18,514 * (25.94/29.92) * [(68°F + 460)/(250°F + 460)]
Scfm = 11,936.7 standard cubic feet per minute
Dry scfm = scfm * (1 – volume fraction of water vapor)
Dry scfm = 11,936.7 * (1 - 0)
Dry scfm = 11,937 dscfm
Emission Factor = 0.02 grains / dscf (standard baghouse limit)
11,937 dscfm * 0.02 grains/dscfm * 60 min/hr * 1 lb/7,000 grains = 2.05 lb/hour
2.05 lb/hour * 4,222.2 hr/yr * 1 ton/2,000 lbs= **4.32 tons / year**

Lead (Pb) Emissions
Printed circuit boards contain approximately 2.0% lead (ASARCO)
Emission Factor = 0.02 grains / dscf * 0.02 = 0.0004 grains/dscf (baghouse limit)
11,937 dscfm * 0.0004 grains/dscfm * 60 min/hr * 1 lb/7,000 grains = 0.0409 lb/hour
0.0409 lb/hour * 4,222.2 hr/yr * 1 ton/2,000 lbs= **0.09 tons / year**

Nickel (Ni) Emissions
Printed circuit boards contain approximately 2.0% nickel (ASARCO)
Emission Factor = 0.02 grains / dscf * 0.02 = 0.0004 grains/dscf (baghouse limit)
11,937 dscfm * 0.0004 grains/dscfm * 60 min/hr * 1 lb/7,000 grains = 0.0409 lb/hour
0.0409 lb/hour * 4,222.2 hr/yr * 1 ton/2,000 lbs= **0.09 tons / year**

Antimony (Sb) Emissions
Printed circuit boards contain approximately 0.4% antimony (ASARCO)
Emission Factor = 0.02 grains / dscf * 0.02 = 0.00008 grains/dscf (baghouse limit)
11,937 dscfm * 0.00008 gr/dscfm * 60 min/hr * 1 lb/7,000 grains = 0.008185 lb/hour
0.008185 lb/hour * 4,222.2 hr/yr * 1 ton/2,000 lbs= **0.02 tons / year**

Carbon Monoxide Emissions
(Assume 100% conversion of CBM carbon to CO, 99.9 % DRE)
Emission Factor = 695.52 lb/hr (Banks Engineering, 6-29-00)
Estimated DRE = 99.9 % (Banks Engineering, 6-29-00)
695.52 lb/hr * 4,222.2 hr/yr * 1 ton/2,000 lb * (1-0.999) = **1.47 tons/year**

Volatile Organic Compounds (VOC) Emissions
(~27.1% by weight of CBM feedstock will volatilize, of that ~19% will combust)
(1,800 lb/hr * 0.271) * [(100-19)/100] = 395.12 lb/hr (Banks Engineering, 6-29-00)
Estimated DRE = 99.0 % (Banks Engineering, 6-29-00)
395.12 lb/hr * 4,222.2 hr/yr * 1 ton/2,000 lb * (1-0.99) = **8.34 tons/year**

Sulfur Dioxide Emissions
None- sulfur not detectable in CBM (Banks Engineering, 6-29-00)

Nitrogen Oxides Emissions
(Assuming 100% conversion of nitrogen in Acrylonitrile to NO_x)
Emission Factor = 15.42 lb/hr (Banks Engineering, 6-29-00)
15.42 lb/hr * 4,222.2 hr/yr * 1 ton/2,000 lb = **32.55 tons/year**

Hydrogen Cyanide (HCN) Emissions
(Assuming 100% conversion of nitrogen in Acrylonitrile to HCN)
Emission Factor = 9.05 lb/hr (Banks Engineering, 6-29-00)
Estimated DRE = 99.0 % (Banks Engineering, 6-29-00)
9.05 lb/hr * 4,222.2 hr/yr * 1 ton/2,000 lb * (1-0.99) = **0.19 tons/year**

Acrylonitrile Emissions
(ABS plastic =~30% of CBM, Acrylonitrile =~15% of ABS plastic in VOCs)
Emission factor = 395.12 lb/hr * 0.30 * 0.15 = 17.78 lb/hr (Banks Engineering)
Estimated DRE = 99.5 % (Banks Engineering, 6-29-00)
17.78 lb/hr * 4,222.2 hr/yr * 1 ton/2,000 lb * (1-0.995) = **0.19 tons/year**

Butadiene Emissions
(ABS plastic =~30% of CBM, butadiene =~10% of ABS plastic in VOCs)
Emission factor = 395.12 lb/hr * 0.30 * 0.10 = 11.85 lb/hr (Banks Engineering)
Estimated DRE = 99.9 % (Banks Engineering, 6-29-00)
11.85 lb/hr * 4,222.2 hr/yr * 1 ton/2,000 lb * (1-0.999) = **0.03 tons/year**

Styrene Emissions
(ABS plastic =~30% of CBM, styrene =~75% of ABS plastic in VOCs)
Emission factor = 395.12 lb/hr * 0.30 * 0.75 = 88.90 lb/hr (Banks Engineering)
Estimated DRE = 99.9 % (Banks Engineering, 6-29-00)
88.90 lb/hr * 4,222.2 hr/yr * 1 ton/2,000 lb * (1-0.999) = **0.19 tons/year**

Toluene Emissions

(Not found in CBM, assume 100% conversion from styrene)
Emission factor = 78.65 lb/hr (Banks Engineering, 6-29-00)
Estimated DRE = 99.9 % (Banks Engineering, 6-29-00)
78.65 lb/hr * 4,222.2 hr/yr * 1 ton/2,000 lb * (1-0.999) = **0.17 tons/year**

Methylene Chloride Emissions
(CBM < 3 ppm of Methylene chloride, assume 0% conversion, 27.1% VOCs)
Emission Factor = 1800 lb/hr * 0.271 * 0.000003 = 0.001463 lb/hr (Banks Eng.)
Estimated DRE = 99.9 % (Banks Engineering, 6-29-00)
0.001463 lb/hr * 4,222.2 hr/yr * 1 ton/2,000 lb * (1-0.999) = **0.000003 tons/year**

Hydrogen Chloride (HCl) Emissions
(CBM < 3 ppm of Methylene chloride, assume 100% conversion to HCl)
Emission Factor = 0.001256 lb/hr (Banks Engineering 6-29-00)
Estimated DRE = 0.0 % (Banks Engineering, 6-29-00)
0.001256 lb/hr * 4,222.2 hr/yr * 1 ton/2,000 lb * = **0.0027 tons/year**

Methyl Chloride Emissions
(CBM < 3 ppm of Methylene chloride, assume 100% conversion to methyl chloride)
Emission Factor = = 0.001717 lb/hr (Banks Engineering 6-29-00)
Estimated DRE = 99.9 % (Banks Engineering, 6-29-00)
0.001717 lb/hr * 4,222.2 hr/yr * 1 ton/2,000 lb * (1-0.999) = **0.000004 tons/year**

Phenol Emissions
(~30% of CBM = Bisphenol A Polycarbonate [2 phenol groups] & Triphenyl Phosphate [3 phenol groups], assume all phenol groups are released)
Emission factor = 256.15 lb/hr (Banks Engineering, 6-29-00)
Estimated DRE = 99.9 % (Banks Engineering, 6-29-00)
256.15 lb/hr * 4,222.2 hr/yr * 1 ton/2,000 lb * (1-0.999) = **0.54 tons/year**

V. Emissions inventories for equipment permitted since 1990

A. Hero Degassifier Vents (no air emissions controls, both vents operating)

Sulfur Dioxide Emissions
SO_2 concentration in feed water = 22 mg/liter
Feed water process rate = 120 gallons/minute
SO_2 stripping removal efficiency = 100 %
22 mg/l * 2.205E-06 lbs/mg * 1 liter/0.26417 gallons = 0.000184 lbs/gallon
0.000184 lbs/gal * 120 gal/min * 60 min/hr = 1.322 lbs/hr
1.322 lbs/hr * 8,760 hrs/yr * 1 ton/2,000 lbs = **5.79 tons/year SO_2**

B. Hero Spray Dryer System (baghouse control)

Total Air Volume Flow Rate = 1 + 2 + 3 = 11,139 dscfm

1. Spray Dryer air flow

Scfm = acfm * pressure correction * temperature correction
Scfm = 20,000 * (25.94/29.92) * [(68°F + 460)/(270°F + 460)]
Scfm = 12,540 standard cubic feet per minute
Dry scfm = scfm * (1 – volume fraction of water vapor)
Dry scfm = 12,540 * (1 - 0.223)
Dry scfm = 9,745 dscfm

2. Dust transfer system air flow
   Scfm = acfm * pressure correction * temperature correction
   Scfm = 306 * (25.94/29.92) * [(68°F + 460)/(100°F + 460)]
   Scfm = 250 standard cubic feet per minute
   Dry scfm = scfm * (1 – volume fraction of water vapor)
   Dry scfm = 250 * (1 - 0)
   Dry scfm = 250 dscfm
3. Loadout spout ventilation fan air flow
   Scfm = acfm * pressure correction * temperature correction
   Scfm = 1,400 * (25.94/29.92) * [(68°F + 460)/(100°F + 460)]
   Scfm = 1,144 standard cubic feet per minute
   Dry scfm = scfm * (1 – volume fraction of water vapor)
   Dry scfm = 1,144 * (1-0)
   Dry scfm = 1,144 dscfm

Operational Information:

4. TSP grain loading = 0.02 grains/dscfm (OEM data)

5. Concentration of solids in HERO reject water (from 1999 pilot test)
   Total solids = 6,860 mg/liter
   Lead (Pb) = 0.32 mg/liter
   Arsenic = 1.41 mg/liter
   Cadmium = 0.024 mg/liter
   Manganese = 0.08 mg/liter
   Nickel = 0.096 mg/liter
   Antimony = 60.8 mg/liter
   Selenium = 10.8 mg/liter

6. Natural gas usage = 11,000 ft^3 / hour (evaporate 12 gpm of HERO reject water)

Total Particulate Matter Emissions
11,139 dscfm * 0.02 grains/dscfm * 60 min/hr * 1 lb/7,000 grains = 1.91 lb/hour
1.91 lb/hour * 8,760 hr/yr * 1 ton/2,000 lbs= **8.36 tons / year**

PM_{10} Emissions – 8.36 tons / year
(Estimated equal to total PM because the emissions are controlled by a baghouse)

Lead (Pb) Emissions
Total PM emission rate * (dry solids concentration ratio of Pb/total)

1.91 lb/hr * [(0.32 mg/L – Pb)/(6860 mg/L – total)] = 0.00009 lb/hr
0.00009 lb/hr * 8,760 hr/yr * 1 ton/2,000 lbs = **0.0004 tons / year**

Arsenic (As) Emissions
Total PM emission rate * (dry solids concentration ratio of As/total)
1.91 lb/hr * [(1.41 mg/L – As)/(6860 mg/L – total)] = 0.00039 lb/hr
0.00039 lb/hr * 8,760 hr/yr * 1 ton/2,000 lbs = **0.0017 tons / year**

Cadmium (Cd) Emissions
Total PM emission rate * (dry solids concentration ratio of Cd/total)
1.91 lb/hr * [(0.024 mg/L – Cd)/(6860 mg/L – total)] = 0.00001 lb/hr
0.00001 lb/hr * 8,760 hr/yr * 1 ton/2,000 lbs = **0.00003 tons / year**

Manganese (Mn) Emissions
Total PM emission rate * (dry solids concentration ratio of Mn/total)
1.91 lb/hr * [(0.08 mg/L – Mn)/(6860 mg/L – total)] = 0.00002 lb/hr
0.00002 lb/hr * 8,760 hr/yr * 1 ton/2,000 lbs = **0.0001 tons / year**

Nickel (Ni) Emissions
Total PM emission rate * (dry solids concentration ratio of Ni/total)
1.91 lb/hr * [(0.096 mg/L – Ni)/(6860 mg/L – total)] = 0.00003 lb/hr
0.00003 lb/hr * 8,760 hr/yr * 1 ton/2,000 lbs = **0.00012 tons / year**

Antimony (Sb) Emissions
Total PM emission rate * (dry solids concentration ratio of Sb/total)
1.91 lb/hr * [(60.8 mg/L – Sb)/(6860 mg/L – total)] = 0.017 lb/hr
0.017 lb/hr * 8,760 hr/yr * 1 ton/2,000 lbs = **0.074 tons / year**

Selenium (Se) Emissions
Total PM emission rate * (dry solids concentration ratio of Se/total)
1.91 lb/hr * [(10.8 mg/L – Se)/(6860 mg/L – total)] = 0.003 lb/hr
0.003 lb/hr * 8,760 hr/yr * 1 ton/2,000 lbs = **0.013 tons / year**

Sulfur Dioxide Emissions
Emission Factor = 0.6 lb/ 10^6 scf natural gas (AP-42, Table 1.4-2, July 1998)
0.6 lb/ 10^6 scf * 0.011 x 10^6 scf = 0.007 lb/hr
0.007 lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **0.029 tons/year**
Nitrogen Oxides Emissions
Emission Factor = 100 lb/ 10^6 scf natural gas (AP-42, Table 1.4-1, July 1998)
100 lb/ 10^6 scf * 0.011 x 10^6 scf = 1.10 lb/hr
1.10 lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **4.82 tons/year**

Carbon Monoxide Emissions
Emission Factor = 84 lb/ 10^6 scf natural gas (AP-42, Table 1.4-1, July 1998)
84 lb/ 10^6 scf * 0.011 x 10^6 scf = 0.92 lb/hr

0.92 lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **4.05 tons/year**

Volatile Organic Compounds (VOC) Emissions
Emission Factor = 5.5 lb/ 10^6 scf natural gas (AP-42, Table 1.4-2, July 1998)
5.5 lb/ 10^6 scf * 0.011 x 10^6 scf = 0.061 lb/hr
0.061 lb/hr * 8,760 hr/yr * 1 ton/2,000 lb = **0.26 tons/year**

C. Acid Dust Handling System (Air Flow = 15000 acfm)

Total Particulate Matter Emissions
Grain Loading = 0.0090 gr/dscf
15000 acfm * (26.0“Hg/29.92“Hg) * [(460 + 68 °F) / (460+70 °F)] = 12,985.57 scfm
12,985.57 scfm*[1-(2% H_2O/100%)] = 12,725.86 dscfm
12,725.86 dscfm * (60 minutes/hour)*(1 lb/7000 gr) * (0.0090 gr/dscf) = 0.982 lbs/hr
Total PM = 0.982 lbs/hr * 8760 hrs/yr / 2000 lbs/ton = **4.30 tons/year**
Lead Emissions = No Change in allowable.
Sulfur dioxide emissions = No change in allowable

Silicon emissions
Silicon grain loading = 0.000009 gr/dscf
15000 acfm * (26.0“Hg/29.92“Hg) * [(460 + 68 °F) / (460+70 °F)] = 12,985.57 scfm
12,985.57 scfm*[1-(2% H_2O/100%)] = 12,725.86 dscfm
12,725.86 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.000009 gr/dscf) = 0.001 lbs/hr
Silicone = 0.001 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.004 tons/year**

Iron emissions
Iron grain loading = 0.000387 gr/dscf
15000 acfm * (26.0“Hg/29.92“Hg) * [(460 + 68 °F) / (460+70 °F)] = 12,985.57 scfm
12,985.57 scfm*[1-(2% H_2O/100%)] = 12,725.86 dscfm
12,725.86 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.000387 gr/dscf) = 0.041 lbs/hr
Iron = 0.041 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.18 tons/year**

Calcium Emissions
Calcium grain loading = 0.000234 gr/dscf
15000 acfm * (26.0“Hg/29.92“Hg) * [(460 + 68 °F) / (460+70 °F)] = 12,985.57 scfm
12,985.57 scfm*[1-(2% H_2O/100%)] = 12,725.86 dscfm
12,725.86 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.000234 gr/dscf) = 0.025 lbs/hr
Calcium = 0.025 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.11 tons/year**

Aluminum Emissions
Aluminum grain loading = 0.000018 gr/dscf
15000 acfm * (26.0“Hg/29.92“Hg) * [(460 + 68 °F) / (460+70 °F)] = 12,985.57 scfm
12,985.57 scfm*[1-(2% H_2O/100%)] = 12,725.86 dscfm
12,725.86 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.000018 gr/dscf) = 0.002 lbs/hr
Aluminum = 0.002 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.01 tons/year**

Barium Emissions
Barium grain loading = 0.000009 gr/dscf
15000 acfm * (26.0"Hg/29.92"Hg) * [(460 + 68 °F) / (460+70 °F)] = 12,985.57 scfm
12,985.57 scfm*[1-(2% H_2O/100%)] = 12,725.86 dscfm
12,725.86 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.000009 gr/dscf) = 0.001 lbs/hr
Barium = 0.001 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.004 tons/year**

Potassium Emissions
Potassium grain loading = 0.000017 gr/dscf
15000 acfm * (26.0"Hg/29.92"Hg) * [(460 + 68 °F) / (460+70 °F)] = 12,985.57 scfm
12,985.57 scfm*[1-(2% H_2O/100%)] = 12,725.86 dscfm
12,725.86 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.000017 gr/dscf) = 0.02 lbs/hr
Potassium = 0.002 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.01 tons/year**

Zinc Emissions
Zinc grain loading = 0.000315 gr/dscf
15000 acfm * (26.0"Hg/29.92"Hg) * [(460 + 68 °F) / (460+70 °F)] = 12,985.57 scfm
12,985.57 scfm*[1-(2% H_2O/100%)] = 12,725.86 dscfm
12,725.86 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.000315 gr/dscf) = 0.033 lbs/hr
Zinc = 0.033 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.15 tons/year**

Copper Emissions
Copper grain loading = 0.000117 gr/dscf
15000 acfm * (26.0"Hg/29.92"Hg) * [(460 + 68 °F) / (460+70 °F)] = 12,985.57 scfm
12,985.57 scfm*[1-(2% H_2O/100%)] = 12,725.86 dscfm
12,725.86 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.000117 gr/dscf) = 0.012 lbs/hr
Copper = 0.012 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.05 tons/year**

Chloride Emissions
Chloride grain loading = 0.000018 gr/dscf
15000 acfm * (26.0"Hg/29.92"Hg) * [(460 + 68 °F) / (460+70 °F)] = 12,985.57 scfm
12,985.57 scfm*[1-(2% H_2O/100%)] = 12,725.86 dscfm
12,725.86 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.000018 gr/dscf) = 0.002 lbs/hr
Chloride = 0.002 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.01 tons/year**

D. Sulfuric Acid Plant Emissions (single absorption, 1990 production information)

Production = 89190 Tons of 94 % H_2SO_4
Operating Hours = 7665 Hours
Natural Gas Used = 12,5987 MCF
Control Efficiency = 80.0 % (Sulfur Oxides)

TSP Emissions
TSP Emission Factor = 1.63 lbs/hour (from 1990 Lead SIP Emission Inventory)
E(TSP) = 7,665 hours/yr * 1.63 lbs/hour operated

E(TSP) = 12,526.9 lbs/yr * 2,000 lbs/ton = **6.26 tons/yr**

PM_{10} Emissions
PM_{10} Emission Factor = 0.95 lbs/hour (from 1990 Lead SIP Emission Inventory)
E(PM_{10}) = 7,665 hours/yr * 0.95 lbs/hour operated)
E(PM_{10}) = 7,251.9 lbs/yr * 2,000 lbs/ton = **3.63 tons/yr**

Sulfur dioxide emissions (stack gas concentration = 620 ppm)
81,700 acfm*(26.0“Hg/29.92“Hg) * [(460 + 68 °F) / (460+175 °F)] = 59,032.89 scfm
59,032.89 scfm*[1-(2% H_2O/100%)] = 57,852.23 dscfm
57,852.23 dscfm*(60 minutes/hour)*(0.0000001696)*(620 ppm) = 364.99 lbs/hr
SO_2 = 364.99 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **1,598.69 tons/year**

NO_x Emissions
Emission factor = 140.00 lbs/MMcf of natural gas burned
(From AIRS emission factor listing SCC Code 30390003)
E(NO_x) = 125.987 MMcf/Yr * 140.00 lbs/MMcf burned
E(NO_x) = 17,638.2 lbs/yr * 8,760 hrs/yr * 2,000 lbs/ton = **8.82 tons/yr**

VOC Emissions
VOC Emission Factor = 2.80 lbs/MMcf of natural gas burned
(From AIRS emission factor listing SCC Code 30390003)
E(VOC) = 125.987 MMcf/yr * 2.80 lbs/MMcf burned
E(VOC) = 352.8 lbs/yr * 8,760 hrs/yr * 2,000 lbs/ton = **0.18 tons/yr**

CO Emissions
CO Emission Factor = 20.00 lbs/MMcf of natural gas burned
(From AIRS emission factor listing SCC Code 30390003)
E(CO) = 125.987 MMcf/yr * 20.00 lbs/MMcf burned
E(CO) = 2519.7 lbs/yr * 8,760 hrs/yr * 2,000 lbs/ton = **1.26 tons/yr**

Lead (Pb) Emissions
Pb Emission Factor = 0.0208 lbs/hour of operation
(From 1990 Lead SIP Emission Inventory)
E(Pb) = 7,665 hours/yr * 0.0208 lbs/hour operated)
E(Pb) = 159.4 lbs/yr * 2,000 lbs/ton = **0.08 tons/yr**

E. Sinter Plant Ventilation System Emissions (Air Flow = 55,000 acfm)

Total Particulate Matter Emissions
Grain Loading = 0.0220 gr/dscf
55,000 acfm * (26.0“Hg/29.92“Hg) * [(460 + 68°F) / (460+87°F)] = 46,133.99 scfm
46,133.99 scfm*[1-(2% H_2O/100%)] = 45,211.31 dscfm
45,211.31 dscfm * (60 minutes/hour)*(1 lb/7000 gr) * (0.022 gr/dscf) = 8.526 lbs/hr
Total PM = 8.526 lbs/hr * 8760 hrs/yr / 2000 lbs/ton = **37.34 tons/year**

Lead Emissions
Lead Grain Loading = 0.0023 gr/dscf
55,000 acfm * (26.0“Hg/29.92“Hg) * [(460 + 68 °F) / (460+87 °F)] = 46,133.99 scfm
46,133.99 scfm*[1-(2% H_2O/100%)] = 45,211.31 dscfm
45,211.31 dscfm * (60 minutes/hour)*(1 lb/7000 gr) * (0.0023 gr/dscf) = 0.891 lbs/hr
Lead = 0.891 lbs/hr * 8760 hrs/yr / 2000 lbs/ton = **3.90 tons/year**

Sulfur dioxide emissions (stack gas concentration = 100 ppm)
55,000 acfm*(26.0“Hg/29.92“Hg) * [(460 + 68°F) / (460+87°F)] = 46,133.99 scfm
46,133.99 scfm*[1-(2% H_2O/100%)] = 45,211.31 dscfm
45,211.31 dscfm*(60 minutes/hour)*(0.0000001696)*(100 ppm) = 46.007 lbs/hr
SO_2 = 46.007 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **201.51 tons/year**

Silicon emissions
Silicon grain loading = 0.001386 gr/dscf
55,000 acfm * (26.0“Hg/29.92“Hg) * [(460 + 68 °F) / (460+87 °F)] = 46,133.99 scfm
46,133.99 scfm*[1-(2% H_2O/100%)] = 45,211.31 dscfm
45,211.31 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.001386 gr/dscf) = 0.537 lbs/hr
Silicone = 0.537 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **2.35 tons/year**

Iron emissions
Iron grain loading = 0.000396 gr/dscf
55,000 acfm * (26.0“Hg/29.92“Hg) * [(460 + 68 °F) / (460+87 °F)] = 46,133.99 scfm
46,133.99 scfm*[1-(2% H_2O/100%)] = 45,211.31 dscfm
45,211.31 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.000396 gr/dscf) = 0.153 lbs/hr
Iron = 0.153 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.67 tons/year**

Calcium Emissions
Calcium grain loading = 0.000352 gr/dscf
55,000 acfm * (26.0“Hg/29.92“Hg) * [(460 + 68 °F) / (460+87 °F)] = 46,133.99 scfm
46,133.99 scfm*[1-(2% H_2O/100%)] = 45,211.31 dscfm
45,211.31 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.000352 gr/dscf) = 0.136 lbs/hr
Calcium = 0.136 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.60 tons/year**

Aluminum Emissions
Aluminum grain loading = 0.00033 gr/dscf
55,000 acfm * (26.0“Hg/29.92“Hg) * [(460 + 68 °F) / (460+87 °F)] = 46,133.99 scfm
46,133.99 scfm*[1-(2% H_2O/100%)] = 45,211.31 dscfm
45,211.31 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.00033 gr/dscf) = 0.128 lbs/hr
Aluminum = 0.128 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.56 tons/year**

Barium Emissions
Barium grain loading = 0.000308 gr/dscf
55,000 acfm * (26.0“Hg/29.92“Hg) * [(460 + 68 °F) / (460+87 °F)] = 46,133.99 scfm
46,133.99 scfm*[1-(2% H_2O/100%)] = 45,211.31 dscfm

45,211.31 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.000308 gr/dscf) = 0.119 lbs/hr
Barium = 0.119 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.52 tons/year**

Potassium Emissions
Potassium grain loading = 0.000242 gr/dscf
55,000 acfm * (26.0"Hg/29.92"Hg) * [(460 + 68 °F) / (460+87 °F)] = 46,133.99 scfm
46,133.99 scfm*[1-(2% H_2O/100%)] = 45,211.31 dscfm
45,211.31 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.000242 gr/dscf) = 0.094 lbs/hr
Potassium = 0.094 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.41 tons/year**

Zinc Emissions
Zinc grain loading = 0.00022 gr/dscf
55,000 acfm * (26.0"Hg/29.92"Hg) * [(460 + 68 °F) / (460+87 °F)] = 46,133.99 scfm
46,133.99 scfm*[1-(2% H_2O/100%)] = 45,211.31 dscfm
45,211.31 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.00022 gr/dscf) = 0.085 lbs/hr
Zinc = 0.085 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.37 tons/year**

Copper Emissions
Copper grain loading = 0.00022 gr/dscf
55,000 acfm * (26.0"Hg/29.92"Hg) * [(460 + 68 °F) / (460+87 °F)] = 46,133.99 scfm
46,133.99 scfm*[1-(2% H_2O/100%)] = 45,211.31 dscfm
45,211.31 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.00022 gr/dscf) = 0.085 lbs/hr
Copper = 0.085 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.37 tons/year**

Chloride Emissions
Chloride grain loading = 0.000132 gr/dscf
55,000 acfm * (26.0"Hg/29.92"Hg) * [(460 + 68 °F) / (460+87 °F)] = 46,133.99 scfm
46,133.99 scfm*[1-(2% H_2O/100%)] = 45,211.31 dscfm
45,211.31 dscfm*(60 minutes/hour)*(1 lb/7000 gr)*(0.000132 gr/dscf) = 0.051 lbs/hr
Chloride = 0.051 lbs/hr * (8760 hrs/year)/ (2000 lbs/ton) = **0.22 tons/year**

F. Blast Furnace Baghouse Stack Emissions

Total Particulate Matter Emissions
Grain loading = 0.0033 gr/dscf (INFO FROM ASARCO)
Uncertainty factor = 3 (INFO FROM ASARCO)
Proposed grain loading = 0.0033 x 3 = 0.01 gr/dscf (INFO FROM ASARCO)
Calculated lbs/hr = 25.1500 lbs/hr

PM_{10} Emissions
(Estimated equal to TSP emissions since the emissions are controlled by a baghouse)

Lead Emissions
Percentage of particulate = 14.77 %
25.1500 lbs/hr x 0.1477 = 3.7147 lbs/hr

Arsenic Emissions

Percentage of particulate = 7.07 %
25.1500 lbs/hr x 0.0707 = 1.7781 lbs/hr

Antimony Emissions
Percentage of particulate = 0.08 %
25.1500 lbs/hr x 0.0008 = 0.0201 lbs/hr

Cadmium Emissions
Percentage of particulate = 9.75 %
25.1500 lbs/hr x 0.0975 = 2.4521 lbs/hr

Copper Emissions
Percentage of particulate = 0.08 %
25.1500 lbs/hr x 0.0008 = 0.0201 lbs/hr

Manganese Emissions
Percentage of particulate = 0.0018 %
25.1500 lbs/hr x 0.000018 = 0.0005 lbs/hr

Zinc Emissions
Percentage of particulate = 14.61 %
25.1500 lbs/hr x 0.1461 = 3.6744 lbs/hr

Sulfur Dioxide Emissions - The allowable emissions won't change. The current blast furnace stack envelope in the primary SO_2 SIP provides the limit. The actual emissions are expected to decrease.

G. Dross Plant Stack Emissions

Total Particulate Matter Emissions
Grain loading = 0.00439 gr/dscf (INFO FROM ASARCO)
Uncertainty factor = 3 (INFO FROM ASARCO)
Proposed grain loading = 3 x 0.00439 = 0.0132 gr/dscf (INFO FROM ASARCO)
Calculated lbs/hr = 19.6300 lbs/hr

PM_{10} Emissions
(Estimated equal to TSP emissions since the emissions are controlled by a baghouse)

Lead Emissions
Percentage of particulate = 17.76 %
19.6300 lbs/hr x 0.1776 = 3.4863 lbs/hr

Arsenic Emissions
Percentage of particulate = 0.62 %
19.6300 lbs/hr x 0.0062 = 0.1217 lbs/hr

Antimony Emissions
Percentage of particulate = 3.05 %
19.6300 lbs/hr x 0.0305 = 0.5987 lbs/hr

Cadmium Emissions
Percentage of particulate =0.18 %
19.6300 lbs/hr x 0.0018 = 0.0353 lbs/hr

Copper Emissions
Percentage of particulate = 2.54 %
19.6300 lbs/hr x 0.0254 = 0.4986 lbs/hr

Manganese Emissions
Percentage of particulate = 0.0025 %
19.6300 lbs/hr x 0.000025 = 0.0005 lbs/hr

Zinc Emissions
Percentage of particulate = 0.78 %
19.6300 lbs/hr x 0.0078 = 0.1531 lbs/hr

Sulfur Dioxide Emissions
SO_2 = 9.13 lbs/hr (Asarco Draeger Tube data downstream of dross reverberatory furnace)
Uncertainty factor = 3 (Info. from ASARCO)
9.13 lbs/hr x 3 = 27.39 lbs/hr

VI. Emission Inventory - Criteria Pollutants (tons/year, 1990 production information)

TABLE A. TOTAL PLANTWIDE EMMISSIONS ESTIMATE (tpy)

Source	TSP	PM_{10}	SO_2	NO_x	VOC	CO	Pb
Point	78.4	95.0	18,654.9	34.5	0.9	8.4	8.1
Volume	118.3	40.6	78.5	0.0	0.0	0.0	14.1
Totals	196.7	135.6	18,733.4	34.5	0.9	8.4	22.2

TABLE B. POINT SOURCE EMISSIONS SUMMARY (tpy)

Source	TSP	PM_{10}	SO_2	NO_x	VOC	CO	Pb
Sample mill baghouse	0.1	0.2	0.0	0.0	0.0	0.0	0.0
Crushing mill baghouse	0.3	0.1	0.0	0.0	0.0	0.0	0.0
Crushing mill #2	0.2	0.1	0.0	0.0	0.0	0.0	0.0
Crushing mill #3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
CSHB system	17.2	5.7	0.0	0.0	0.0	0.0	0.4
Sinter plant stack	10.2	10.4	11,839.3	6.1	0.1	0.9	1.9
Acid plant stack	6.3	3.6	1,598.7	8.8	0.2	1.3	0.1
Sinter storage stack	1.8	1.2	0.0	0.0	0.0	0.0	0.3
Tetrahedrite dryer	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Dross plant vent#1	0.3	0.2	0.0	3.1	0.1	0.4	0.1
Dross plant vent#2	0.5	0.3	0.0	0.0	0.0	0.0	0.1
Dross plant vent#6	0.2	0.1	0.0	0.0	0.0	0.0	0.0
Dross plant vent#7	0.2	0.1	0.0	0.0	0.0	0.0	0.0
Blast furnace stack	31.6	63.9	5,211.1	11.7	0.2	1.7	4.9
Acid dust bin vent	1.0	0.6	0.0	0.0	0.0	0.0	0.3
Hero spray dryer	8.4	8.4	0.0	4.8	0.3	4.1	0.0
Hero degassifier vents	0.0	0.0	5.8	0.0	0.0	0.0	0.0
TOTALS	78.4	95.0	18,654.9	34.5	0.9	8.4	8.1

TABLE C. VOLUME SOURCE EMISSIONS SUMMARY (tpy)							
Source	TSP	PM_{10}	SO_2	NO_x	VOC	CO	Pb
Crushing mill building	3.5	1.3	0.0	0.0	0.0	0.0	0.4
Old ore storage yard	1.1	0.4	0.0	0.0	0.0	0.0	0.2
Sinter building	23.4	11.6	34.9	0.0	0.0	0.0	2.6
Cottrell penthouse	0.4	0.1	0.4	0.0	0.0	0.0	0.2
Breaking floor building	0.2	0.1	0.0	0.0	0.0	0.0	0.0
Blast furnace charge area	0.8	0.4	0.0	0.0	0.0	0.0	0.0
Sinter handling payloader	2.4	0.8	0.0	0.0	0.0	0.0	0.8
Matte handling payloader	0.3	0.1	0.0	0.0	0.0	0.0	0.0
Byproduct dust to bins	1.1	0.4	0.0	0.0	0.0	0.0	0.3
Blast furnace feed area	11.3	6.7	3.8	0.0	0.0	0.0	0.7
Blast furnace tap area	2.0	0.4	12.5	0.0	0.0	0.0	0.3
Slag handling	2.0	0.7	0.0	0.0	0.0	0.0	0.0
Slag pile dumping	6.4	2.2	0.0	0.0	0.0	0.0	0.1
Dross plant	56.8	13.1	0.4	0.0	0.0	0.0	7.8
Dust bin building	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Blast furnace baghouse clean	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Blast furnace flue clean	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water treatment plant	0.0	0.0	9.0	0.0	0.0	0.0	0.0
Mist precipitator building	0.0	0.0	11.9	0.0	0.0	0.0	0.0
Acid pump tank building	0.0	0.0	1.7	0.0	0.0	0.0	0.0
Wet scrubber area	0.0	0.0	3.9	0.0	0.0	0.0	0.0
Fugitive road dust	6.5	2.3	0.0	0.0	0.0	0.0	0.7
TOTALS	118.3	40.6	78.5	0.0	0.0	0.0	14.1

Calculations supporting the totals are contained in previous versions of the permit, including permit #2557-06, and in the NAWC Report AQ 91-6A, May 1992.

VII. Air Toxics

There may be minor emission increases of heavy metals and hazardous air pollutants from this proposed action.

VIII. Existing Air Quality

ASARCO's primary lead smelter is located in an area designated as non-attainment for lead and SO_2. The current status of the nonattainment areas are as follows:

A. The lead SIP has been prepared, including a stipulation signed by ASARCO, and submitted to EPA for approval. The lead SIP has been determined to be administratively complete by EPA. The sanctions related to the lead SIP have ceased.

B. EPA has approved the SO_2 SIP for the primary standard. The SIP for the secondary SO_2 standard is currently being prepared. The requirement for two-for-one SO_2 offsets began on July 19, 1995. Highway funding sanctions were imposed on January 19, 1996. ASARCO has prepared modeling results for the secondary SO_2 standard. The department is preparing a nonattainment area SIP, which will contain a "bubbled" emission limitation similar to the one contained in the primary SO_2 SIP.

C. The East Helena area of Lewis and Clark County has been designated as unclassified for PM_{10} and the nonattainment status for TSP (total suspended particulate) has been removed.

This permitting action potentially increases emissions from the facility by the following amounts:

- SO_2 – 0.04 tons/year
- PM_{10} – 4.85 tons/year
- NO_x – 39.47 tons/year
- CO – 7.28 tons/year
- Lead – 0.09 tons/year
- VOC – 8.72 tons/year
- TSP – 0.87 tons/year
- Nickel – 0.09 tons/year
- Antimony – 0.02 tons/year
- Hydrogen cyanide – 0.19 tons/year
- Acrylonitrile – 0.19 tons/year
- Butadiene – 0.03 tons/year
- Styrene – 0.19 tons/year
- Toluene – 0.17 tons/year
- Methylene Chloride – 0.000003 tons/year
- Hydrogen chloride – 0.0027 tons/year
- Methyl chloride – 0.000004 tons/year, and
- Phenol – 0.54 tons/year.

Minor air quality impacts are expected from these small increases.

IX. Health Risk Assessment

A health risk assessment was conducted for the permitting action to determine if the incinerator complied with the negligible risk requirement of MCA 75-2-215. The emission inventory did not contain sufficient quantities of any pollutant on the department's list of pollutants for which non-inhalation impacts had to be considered; therefore, the department determined that inhalation risk was the only pathway to consider. Only those hazardous air pollutants (HAPS) which could be reasonably expected from the printed circuit board material were considered in the emission inventory, summarized in VIII.C. The department considers the risks estimated in the risk assessment (see Table D) to comply with the requirement to demonstrate negligible risk to human health and the environment.

TABLE D. HAPS Inhalation Health Risk Assessment				
Chemical Compound	Annual Concentration ($\mu g/m^3$)	Cancer ELCR[1] Chronic	Non – Cancer Hazard Quotient	
			Chronic	Acute
Butadiene	1.63 E-04	4.56 E-08	ND[2]	ND
Styrene	1.21 E-03	ND	1.21 E-06	ND
Acrylonitrile	1.21 E-03	8.23 E-08	6.05 E-04	ND
Hydrogen Chloride	1.76 E-05	ND	ND	ND
Toluene	1.07 E-03	ND	2.68 E-06	ND
Phenol	3.53 E-03	ND	7.84 E-05	ND
Methylene Chloride	2.04 E-08	9.59 E-15	6.80 E-12	5.83 E-12
Hydrogen Cyanide	1.23 E-03	ND	1.76 E-05	ND
Lead	2.58 E-04	ND	1.72 E-04	ND
Nickel	2.58 E-04	6.19 E-08	1.08 E-03	2.58 E-04
Antimony	5.16 E-05	ND	2.58 E-04	ND
Total Risks	N/A	1.90 E-07	2.21 E-03	2.58 E-04

[1] ELCR = excess lifetime cancer risks [2] ND = no data

The department considers the risks estimated in the risk assessment to be compliance with the requirement to demonstrate negligible risk to the public health.

X. Taking or Damaging Implication Analysis

As required by 2-10-101 through 105, MCA, the department has conducted a private property taking and damaging assessment and has determined there are no taking or damaging implications.

XI. Environmental Assessment

An environmental assessment, required by the Montana Environmental Policy Act, was completed for this project. A copy is attached.

DEPARTMENT OF ENVIRONMENTAL QUALITY
Permitting and Compliance Division
Air and Waste Management Bureau
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FINAL ENVIRONMENTAL ASSESSMENT

Issued For: ASARCO, Inc.
East Helena Smelter
P.O. Box 1230
East Helena, MT 59635

Air Quality Permit Number: 2557-11

Preliminary Determination Issued: 8/11/00
Department Decision Issued: 9/1/00
Final Permit Issued: 9/17/00

1. **Legal Description of Site**: The ASARCO East Helena Smelter is located in the NW ¼ of Section 36, Township 10N, Range 3W, in Lewis and Clark County, Montana.

2. **Description of Project:** The Department proposes to issue a permit for the installation and operation of an existing rotary melting furnace and a new thermal oxidation unit. The rotary furnace will enable ASARCO to recover the precious metals contained in the printed circuit board material (CBM). The rotary melter project consists of three main steps:

   A. The partial combustion and depolymerization of shredded CBM under starved air conditions in an indirect fired rotary kiln
   B. Discharge of the partially melted CBM from the rotary kiln into a sealed water bath, and after quenching, transfer of the CBM residue to the blast furnace
   C. Incineration of the volatile organic compounds (VOCs), evolved by the depolymerization process in the kiln, in a thermal oxidation unit

   Natural gas is combusted in three burners to indirectly heat the kiln. The natural gas combustion emissions are vented, uncontrolled, to atmosphere. The inlet and outlet of the kiln are equipped with special rotary seals to minimize the entry of air and to maintain a starved air combustion zone inside the kiln. An additional benefit of the seals is to minimize the release of VOCs. The feed hopper is equipped with two slide gates to control air & gaseous pollutant movement on the inlet side of the kiln.

At the outlet of the kiln the melted CBM is quenched in a water bath, which also serves as an atmospheric seal. The VOC emissions are routed via ductwork to the thermal oxidation unit. There, the VOCs are incinerated by temperatures above 1800°F. The emissions from the incinerator are cooled by the addition of outside air, and then routed to the blast furnace baghouse cleanout baghouse. After particle removal in the baghouse the remaining emissions exhaust through the blast furnace baghouse stack.

3. **Objective of project**: The rotary melting furnace will allow ASARCO to recycle printed circuit boards. The precious metals can then be recovered by ASARCO's smelting operation and sold.

4. **Alternatives considered**: The no action alternative would be to not issue the permit. Emissions from the project will be kept at reasonable limits by installation and operation of BACT controls. For this reason, the no action alternative was considered and rejected.

5. **A listing of mitigation, stipulations and other controls**: Enforceable conditions, including a best available control technology analysis, are contained in proposed permit #2557-11.

6. **Regulatory effects on private property:** The department has considered alternatives to the conditions imposed in this permit as part of the permit development. The department has determined that the permit conditions are reasonably necessary to ensure compliance with applicable requirements and demonstrate compliance with those requirements and do not unduly restrict private property rights.

7. **Potential physical and biological effects:** The following table summarizes the potential physical and biological effects of the proposed project on the human environment. The "no action alternative" was discussed previously.

Potential Physical and Biological Effects							
		Major	Moderate	Minor	None	Unknown	Comments
A	Terrestrial and Aquatic Life and Habitats			X			yes
B	Water Quality, Quantity and Distribution			X			yes
C	Geology and Soil Quality, Stability and Moisture				X		yes
D	Vegetation Cover, Quantity and Quality				X		yes
E	Aesthetics				X		yes
F	Air Quality		X				yes
G	Unique Endangered, Fragile or Limited Environmental Resource				X		yes
H	Demands on Environmental Resource of Water, Air and Energy			X			yes
I	Historical and Archaeological Sites				X		yes
J	Cumulative and Secondary Impacts		X				yes

Summary of Comments On Potential Physical & Biological Effects Table

A. Terrestrial and Aquatic Life and Habitats

There would be no impacts to the terrestrial and aquatic life and habitats in the immediate area of the proposed project.

B. Water Quality, Quantity, and Distribution

There might be minor impacts to water quality from the proposed project. After the printed circuit board material is volatized in the rotary furnace it is discharged into a water bath to be cooled. The contaminated water will have to be treated by ASARCO's wastewater treatment.

C. Geology and Soil Quality, Stability, and Moisture

The rotary melting furnace and thermal oxidation unit would be constructed on the site of an existing lead smelter. No further impacts are expected to the geology and soil quality, stability, and moisture on the site.

D. Vegetation Cover, Quantity, and Quality

There would be no impacts to the vegetation cover quantity and quality.

E. Aesthetics

The rotary melting furnace and thermal oxidation unit would be constructed on the site of an existing lead smelter. No further impacts are expected to the aesthetics of the existing facility.

F. Air Quality

The air quality in the area would be impacted by the addition of the rotary melting furnace and thermal oxidation unit. Air quality impacts would be minimized by placing BACT control on the thermal oxidation unit. The BACT control chosen for the rotary melting furnace is a thermal oxidation unit with operating temperature limits, followed by a baghouse with opacity and particulate matter emission limits. Additional BACT control is the annual restriction on the amount of material processed in the rotary kiln.

G**.** Unique, Endangered, Fragile or Limited Environmental Resource

It is unlikely that any unique, endangered, fragile or limited environmental resource would be adversely affected by the proposed project because this project will occur at an existing facility.

H. Demands on Environmental Resource of Water, Air, and Energy

The current project would place additional demands on the air and energy resources in the area. The energy demands of running the rotary melting furnace and thermal oxidation unit would be satisfied by using natural gas and electricity from Montana Power. As part of operating the rotary melting furnace and thermal oxidation unit, the facility would emit pollutants to the surrounding air. As a result, the surrounding air quality would be impacted. However, physical and operational controls on the equipment, and permit conditions would minimize the impacts.

I. Historical and Archaeological Sites

It is unlikely that any historical or archaeological sites would be adversely affected by the proposed project because this project will occur at an existing facility.

J. Cumulative and Secondary Impacts

Overall, the cumulative and secondary impacts from this project would result in moderate impacts to the immediate area. Air pollution from the facility would be controlled by department-determined BACT and conditions in proposed permit #2557-11. For a more detailed review of potential cumulative and secondary impacts resulting from the proposed project refer to item #L, Cumulative and Secondary Impacts, in the Potential Economic and Social Effects section of this Environmental Assessment.

8. **Potential economic and social effects:** The following table summarizes the potential economic and social effects of the proposed project on the human environment. The "no action alternative" was discussed previously.

Potential Economic and Social Effects							
		Major	Moderate	Minor	None	Unknown	Comments
A	Social Structures and Mores				X		yes
B	Cultural Uniqueness and Diversity				X		yes
C	Local and State Tax Base and Tax Revenue			X			yes
D	Agricultural or Industrial Production			X			yes
E	Human Health			X			yes
F	Access to and Quality of Recreational and Wilderness Activities				X		yes
G	Quantity and Distribution of Employment				X		yes
H	Distribution of Population				X		yes
I	Demands for Government Services			X			yes
J	Industrial and Commercial Activity			X			yes
K	Locally Adopted Environmental Plans and Goals			X			yes
L	Cumulative and Secondary Impacts			X			yes

Summary of Comments on Potential Economic & Social Effects Table

A. Social Structures and Mores

There would be no change in social structures or mores as a result of the addition of the rotary melting furnace and thermal oxidation unit.

B. Cultural Uniqueness and Diversity

There would be no change to the cultural uniqueness and diversity of the area as a result of the addition of the rotary melting furnace and thermal oxidation unit.

C. Local and State Tax Base and Tax Revenue

The rotary melting furnace and thermal oxidation unit would have little, if any effects on the local and state tax base and tax revenue.

D. Agricultural or Industrial Production

The rotary melting furnace and thermal oxidation unit operations would take place on-site at an existing lead smelter, an area unsuitable for agricultural grazing or production. However, some of the local area is suitable for agricultural grazing or production, but the proposed project is small enough that any potential impact is minimal. The proposed operations may have a positive impact on local industrial production.

E. Human Health

Proposed permit #2557-11 incorporates conditions to ensure that the rotary melting furnace and thermal oxidation unit would be operated in compliance with all applicable air quality rules and standards. These rules and standards are designed to be protective of human health. A health risk assessment was conducted for the permitting action to determine if the incinerator complied with the negligible risk requirement of MCA 75-2-215. The air dispersion modeling team of the department's Monitoring & Data Management Bureau reviewed the proposed HAPS increases and determined that the modeling used in the risk assessment was performed correctly. The emission inventory did not contain sufficient quantities of any hazardous air pollutant (HAPS) on the department's list of HAPS for which non-inhalation impacts had to be considered; therefore, the department determined that inhalation risk was the only pathway to consider. The department considers the risks estimated in the risk assessment to comply with the requirement to demonstrate negligible risk to human health and the environment.

F. Access to and Quality of Recreational and Wilderness Activities

The proposed operations would not affect any access to, or quality of recreational and wilderness activities.

G. Quantity and Distribution of Employment

Activities from the proposed operations would not affect the quantity and distribution of employment in the area. ASARCO does not project the addition of any permanent new employees for project operations.

H. Distribution of Population

The proposed operations would not disrupt the normal population distribution in the area.

I. Demands of Government Services

Minor increases may be seen in traffic on existing roads in the area as a result of construction activities. In addition, government services would be required for acquiring the appropriate permits from government agencies. Demands for government services would be minimal.

J. Industrial and Commercial Activity

Only minor impacts to industrial or commercial activity in the area would be expected as a result of constructing the rotary melting furnace and thermal oxidation unit. Commercial activity would remain unaffected by this project.

K. Locally Adopted Environmental Plans and Goals

The construction of the rotary melting furnace and thermal oxidation unit is designed around the State's goal of minimizing air pollutant discharges under the department's air quality permitting program. The State standards will protect the surrounding environment.

L. Cumulative and Secondary Impacts

Overall, the cumulative and secondary impacts from this project would result in minor impacts to the immediate area. Air pollution from the rotary melting furnace and thermal oxidation unit would be controlled by conditions in proposed permit #2557-11. The risks estimated in the human health risk assessment demonstrate negligible risk to human health and the environment.

The cumulative impact of constructing the rotary melting furnace and thermal oxidation unit is expected to be moderate. The individual air emissions would be minor compared to the current emissions at the existing lead smelter and the ASARCO facility would comply with all applicable air quality standards. There are additional controls on the facility due to requirements in the SO_2 and Lead State Implementation Plans (SIP), and the Consent Decree (Montana First Judicial District Court, Lewis & Clark County, 9 November 1999).

This facility is also within a quarter mile of the American Chemet facility and the Town of East Helena. Ambient air quality monitoring in the area indicates that air emissions in the area are within applicable state and federal standards, even though the area is still designated as nonattainment for SO_2 and lead. The air dispersion modeling team of the department's Monitoring & Data Management Bureau reviewed the proposed emission increases and determined that the there will not be a significant impact on ambient concentrations of SO_2 and lead in the East Helena nonattainment area. It is not anticipated that the proposed rotary melting furnace and thermal oxidation unit, along with the existing industrial facilities and non-industrial sources, would have any significant cumulative impacts.

Recommendation: No EIS is required.

If an EIS is not required, explain why the EA is an appropriate level of analysis: The limitations in proposed permit #2557-11 will restrict air emissions from the rotary melting furnace and thermal oxidation unit. By applying the conditions that were derived through the BACT determination, the air emissions from the facility will be controlled and the effects on the surrounding air quality minimized. The results from the EA of the rotary melting furnace and thermal oxidation unit indicate that minimal impacts will result from the addition of the rotary melting furnace and thermal oxidation unit. For these reasons, the EA is the appropriate level of analysis and an EIS is not required.

Other groups or agencies contacted or which may have overlapping jurisdiction: Montana Department of Environmental Quality –Hazardous Waste Site Cleanup Bureau.

Individuals or groups contributing to this EA: Department of Environmental Quality - Permitting & Compliance, and Planning, Prevention & Assistance Divisions.

Analysis prepared by: Robert K. Jeffrey
Date: August 9, 2000