PLAINTIFF'S EXHIBIT

ASA-770

ENGINEERING ASSESSMENT AND PROPOSED COMPLIANCE PLAN

FOR

ASARCO'S
EL PASO COPPER, LEAD, AND ZINC SMELTER

EL PASO, TEXAS

PREPARED BY:

MELVIN E. CASSADY
USDOL/OSHA/HRT

MICHAEL O. VARNER
ASARCO

MICHAEL WRIGHT
USWA

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FOR ASARCO INCORPORATED - EL PASO, TEXAS

The authors of this report visited Asarco's primary smelter in El Paso, Texas, on January 10-15, 1982, in order to determine those additional engineering and work practice controls feasible at this time for the reduction of occupational exposure to inorganic arsenic. The El Paso Plant was revisited on April 11-15, 1983, in order to determine those additional engineering and work practice controls feasible at this time for the reduction of occupational exposure to inorganic lead. The process description is attached to this report as Appendix A. Based on this assessment and other investigations, we recommend that Asarco install the controls and meet the other obligations set forth below; and that the smelter not be cited during the life of this agreement for violation of the requirement to install feasible engineering and work practice controls, as set forth in 29 CFR 1910.1018(g)(1) and 29 CFR 1910.1025(e)(1), if these controls are installed and obligations met. This tripartite agreement will be deemed to satisfy the compliance plan requirements of 29 CFR 1910.1018(g)(2) and 29 CFR 1910.1025(e)(3)(ii)[(A-E)] during the life of this agreement. These recommendations apply only to those job titles originally identified by the company as exceeding the permissible exposure limits for inorganic arsenic or lead. Those job titles are listed in Appendix B. In addition, these recommendations are not meant to preclude citations under other provisions of the inorganic arsenic or lead standards or other applicable standards; nor are they meant to affect the right of a worker or worker's representative to request, or the government to initiate, an inspection of the smelter; nor are they meant to release the company or the Union from any obligations contained in existing or future OSHA settlement agreements, or the collective bargaining agreement. Furthermore, nothing in this agreement shall be interpreted as modifying, limiting or altering management's right to assign job duties to employees at the El Paso Plant; nor shall it be construed to add to, diminish or otherwise modify the rights and obligations under the current or successor collective bargaining agreements, of Asarco, the USWA and the employees it represents. Any reference to the "PEL" in this document refers to the arsenic or lead PEL.

I. CONTROLS

A. TRANSPORTATION DEPARTMENT

1. Loco Crane and Loco Crane Helper: The loco crane operators will be studied to determine the source of exposure. If the inside of the cab is over the PEL a significant amount of time, Asarco will install a positive pressure, filtered air system in

accordance with the priority system outlined in Section III. Asarco will install an automatic water spray system for the outside storage area and will apply sufficient moisture to reduce reentrainment by wind and movement. All outdoor storage piles of dusty bulk materials containing 1% or more lead or 0.2% or more arsenic will be chemically stabilized. When such piles are broken, they shall be resealed as soon as practicable, but within 24 hours.

2. Moisture Sampler: Asarco will conduct more intensive sampling and observation in order to identify work practices so as to reduce exposures. The automatic sprinkler system, referred to in A.1., should also help reduce exposure to the moisture sampler.

3. Sampler: Asarco's East Helena, Montana, smelter is redesigning a pipe sampler and will be evaluating it to see if exposure levels are reduced. Asarco's El Paso smelter will use the redesigned tool if it proves successful.

4. Buckers, Plateman, and Moisture Sampler: Asarco will pave the roadway west of the sample mill to reduce reentrainment potential. Asarco will also observe the way the buckers perform their tasks and see if the tasks can be done in another manner to reduce exposures. The sample mill already has an extensive ventilation system. Sample mill personnel will continue to properly use the ventilation system. Asarco will evaluate the use of transparent plastic strips over the front portion of some hoods as a means of improving dust collection. Asarco will also study the feasibility and effectiveness of further reductions in the air pressure used for cleaning sample mill equipment between lots. Asarco will make the following major modifications in the sample mill:

   (a) New, enclosed rod mills, incorporating a ventilated clean-out system, will be installed.

   (b) A positive pressure, filtered air system will be installed in the sample mill. The high-grade operations will be relocated in order to take advantage of this system.

   (c) The sample mill local exhaust ventilation system, including the make-up air supply, will be revamped.

(d) An enclosed v-blender will be installed.

(e) Asarco will investigate the feasibility of an isolation arrangement, incorporating a protective shield during equipment clean-up between sample lots.

5. Laborer: The transportation laborer will be studied to determine the tasks that contribute significantly to his exposure. An administrative work practice program will be developed based on the results of this study.

6. Cat Operator (Outside) and Payloader Operator: Asarco will perform additional sampling inside the cabs. If a cab is over the PEL a significant amount of time, Asarco will install a positive pressure, filtered air system in accordance with the priority system outlined in Section III.

7. Overhead Crane: The crane operator will be studied to determine the source of exposure. If the crane cab exceeds the PEL a significant amount of time, the existing filtered, pressurized air system will be upgraded.

8. Control Room Operator: The ore unloading control room will be sampled to determine airborne arsenic levels. If the control room is over the PEL a significant amount of time, Asarco will install a positive pressure, filtered air system. The door should remain closed at all times.

9. All Jobs: High-arsenic and lead materials will be identified before processing so that workers can take appropriate precautionary measures. In particular, workers in the unloading building basement will be notified by the foreman before flue dust is dumped. Additionally, sampling will be conducted in the unloading lunchroom. If the levels exceed the PEL a significant amount of time, boot brushes will be installed; and, a positive pressure filtered air system will be installed in accordance with the priority system outlined in Section III.

B. MILL DEPARTMENT

All Personnel:

To the extent feasible, Asarco will discontinue the use of the crushing mill for lead and arsenic-bearing material. High-arsenic and lead material will be identified before processing so

that workers can take appropriate precautionary measures. Asarco will perform a study of the crushing plant, in order to correlate worker exposure with the lead and arsenic concentrations in bulk material, and with plant operations. In addition, Asarco will investigate the feasibility and effectiveness of water washdown as an alternative to compressed air for cleanup between lots; the use of chemical dust suppressants during operations; and the installation of a local exhaust ventilation system. Asarco will modify work practices as necessary. In addition, Asarco will evaluate the feasibility of reducing the air pressure requirements for air lancing as a clean-up procedure between different ore runs.

C. YARD DEPARTMENT

1. Power Sweeper, Motorman, Switchman, Front-End Loader, and Sweeper Operator: Asarco will perform additional sampling inside the cabs. If the inside of a cab is in excess of the PEL a significant amount of time, Asarco will install a positive pressure, filtered air system in accordance with the priority system outlined in Section III.

2. Heavy Equipment Operator, Forklift, and Backhoe: Asarco will determine what heavy equipment can utilize positive pressure, filtered air systems safely. Asarco will perform additional air sampling for all equipment having an enclosed cab. If the inside of a cab is in excess of the PEL a significant amount of time, Asarco will install a positive pressure, filtered air system in accordance with the priority system outlined in Section III (where it does not present a safety hazard). If a piece of equipment does not have an enclosed cab, and if the operator exceeds the PEL a significant amount of time while operating the equipment, Asarco will, where feasible and safe, install a cab with a positive pressure, filtered air system in accordance with the priority system outlined in Section III.

3. Truck Driver: The truck driver will be studied to determine the source of exposure. If the inside of a cab is over the PEL a significant amount of time, Asarco will install a positive pressure, filtered air system in accordance with the priority system outlined in Section III.

4. Slag Hauler: Asarco will maintain water truck activity to reduce dusting. Asarco will also perform additional air sampling inside of the cab.

If the inside of the cab is in excess of the PEL a significant amount of time, Asarco will install a positive pressure, filtered air system in accordance with the priority system outlined in Section III.

5. Tool Room Attendant: Asarco will have the yard crew or other personnel clean all equipment before returning it to the tool room attendant. Asarco will also provide proper facilities for such cleaning. If the tool room attendant's exposure remains above the PEL a significant amount of time, Asarco will implement additional administrative procedures to reduce exposure and investigate the feasibility of moving the tool room to a lower exposure area.

6. Trackboss: Asarco will stress that the trackboss stand upwind during pouring (if possible).

7. Switchman and Motorman: The switchman and motorman will be studied to determine the source of exposure. If the inside of the cab or motorman shed is over the PEL a significant amount of the time, Asarco will install a positive pressure, filtered air system in the cab and/or motorman shed in accordance with the priority system outlined in Section III.

8. Boiler Cleanup: Asarco will investigate the feasibility and effectiveness of additional automatic soot blowers. As much draft as practicable will be maintained on the reverbs during boiler cleanup.

9. Laborer: The comments under I.Q.1., Maintenance, are applicable to the laborers.

10. General - The controls specified in A.1. should help reduce exposures to yard personnel. In addition, Asarco will construct a station and establish a work practice, under which mobile equipment will be vacuumed and, if necessary, washed after each day's use in a regulated or contaminated area. Asarco will also assign adequate personnel to hydrolaser tasks, in order to assure that such tasks are done safely. Proper training will be provided for all employees assigned to use the hydrolaser.

D. SINTER PLANT

1. All Personnel: The following controls will be installed/implemented:

a. The hood over the ignition area will be extended;

b. Venturis for wind boxes will be maintained to prevent leakage. Worn venturis will be replaced immediately;

c. The sinter machine will be maintained under negative pressure;

d. Inspection and access doors will be kept closed, replaced where necessary, and modified, where appropriate, to open upwards;

e. Asarco will perform sampling in the sinter control room to determine if the existing positive pressure, filtered air system is adequate. If the control room exceeds the PEL a significant amount of time, the existing system will be upgraded.

f. In its training program, Asarco will emphasize the need to use and maintain equipment which affects exposure to arsenic and lead, such as access doors, skirting, ventilation fans, and enclosures.

g. Asarco will conduct daily inspections of the sinter plant in order to assure that leaks and sources of spillage are promptly identified and corrected, and that spillage is promptly cleaned up.

h. Asarco will investigate the feasibility of using larger shot in the shot cleaners, thereby reducing the frequency of hand clean-out.

i. Asarco will investigate the feasibility, effectiveness, and necessity of providing an enclosed, roofed area for excess sinter storage.

2. Payloader: The payloader operator will be studied to determine the source of exposure. If the payloader cab is above the PEL a significant amount of time, Asarco will install a positive pressure, filtered air system in accordance with the priority system outlined in Section III.

3. Attendant: Asarco will perform additional air sampling. If these samples are in excess of the PEL a significant amount of time, Asarco will provide the attendant with a clean air station in

accordance with the priority system outlined in Section III.

E. BLAST FURNACE

1. Scaleman (Car Loader): The present system is computerized to sense the load level and to activate the local exhaust ventilation. The system is not working properly, resulting in generation of considerable dust at times. Asarco will improve the computerized system or replace it with a manual system operated remotely. After the system is installed, Asarco will evaluate the control room and employee exposure further to see if additional controls are necessary. If air levels in the control room are above the PEL a significant amount of time, Asarco will install a positive pressure, filtered air system for the control room in accordance with the priority system outlined in Section III. Asarco will increase the air volume for the charge car loading ventilation system, and modify the hooding and/or provide better enclosure. The charge car loading system at Glover will be evaluated for possible application to El Paso. Asarco will investigate the feasibility of automatically wetting the charge cars after filling, in order to minimize emissions during transport and dumping. Asarco will install a system for ventilating the charge car loading operation when the sinter plant is down, unless the PEL can be met without it when the sinter plant is down.

2. Bullgang and Airgunman: Asarco will evaluate the effectiveness of using fogging nozzles where appropriate during repair of the furnaces.

3. Scrap Burner: Asarco will investigate the feasibility of relocating scrap burning to a less contaminated area. Asarco will also ensure that scrap is cleaned before cutting insofar as possible. Where possible, a low volume/high velocity exhaust system will be used.

4. Front-End Loader: Asarco will perform additional sampling inside the cab. If the inside of the cab is in excess of the PEL a significant amount of time, Asarco will install a positive pressure, filtered air system in accordance with the priority system outlined in Section III.

5. Feeder: Asarco will upgrade the existing ventilation system on the blast furnace. Asarco will study the feasibility of operating the charge

car remotely. If it can be operated remotely, the feederman will be placed in a clean air booth and observe feeding visually or by TV camera. If it is found to be feasible, this modification will be made in accordance with the priority system outlined in Section III. Asarco will utilize a water spray system on the blast furnace top, in order to minimize the generation of dust. Asarco will also require plant personnel to maintain an adequate amount of furnace charge in the shaft to reduce the emissions from the blast furnace. Asarco will improve maintenance and clean up on the charge deck. Asarco will redesign the thimbles in order to eliminate the interior braces, which warp easily, making clean-up and control more difficult.

6. Furnaceman: The upgraded ventilation system on the blast furnace should greatly improve conditions in the furnaceman's work area. Asarco will also maintain hoods in proper working order. If these items do not successfully reduce the exposure below the PEL, Asarco will investigate the feasibility of utilizing a clean air station and, if feasible, install such a station in accordance with the priority system outlined in Section III.

7. Conveyorman: The above improvements in the Blast Furnace and Sinter Plant should help reduce the conveyorman exposure. In addition, the conveyorman will be studied to further define sources of exposure and an appropriate control plan will be implemented.

8. General: Asarco will install a constant air volume control system for the blast furnace tuyeres. The East Helena Plant is currently developing a mobile, ventilated lead pot cover for use with the locos. If these covers prove effective, they will be installed at El Paso. The East Helena and Glover blast furnaces utilize newer step-type designs which reduce emissions due to charge bridging, and simplify ventilation problems. Asarco will evaluate the feasibility and effectiveness of replacing the three existing El Paso blast furnaces with two larger furnaces of the type used at East Helena and Glover.

F. DROSS REVERB DEPARTMENT

All Personnel: Asarco will move the switch for the dross reverb ventilation to the tapping area. Asarco will install an East Helena-type, or similar ventilation and damper system for the dross reverb charge port and tap holes. Asarco will install hooding

and ventilation for the dross kettles. These systems will be tied into the blast furnace ventilation system, or another system with sufficient capacity. Asarco will replace the existing crane cab with a cab incorporating a positive pressure, filtered air system, designed to eliminate the necessity of reaching out of the enclosure to change directions. If these measures do not reduce exposures to below the PEL, Asarco will prepare a preliminary plan for the total replacement of the existing Dross Reverb Department.

ZINC

G. ZINC FUMING FURNACE

1. Furnaceman, Furnaceman Helper, Laborer, and Control Room Operator: In conjunction with the converter building control plan, Asarco will evaluate additional ventilation for the zinc fuming furnace, and investigate the effectiveness of ventilating the bumping block. These improvements, if found to be feasible, effective, and necessary, will be made in accordance with the priority system outlined in Section III. Asarco will also evaluate the control room to see if a positive pressure filtered air system is necessary.

2. Coal Mill Operator: Asarco will resample the coal mill operator and evaluate his source of exposure. A control plan will be prepared based on the evaluation.

3. Fume Loader and Baghouseman: Asarco will make certain that vibrators for chutes are in place and that all leaks and holes in the system are repaired, welded, or otherwise patched. Asarco will also investigate the feasbility of using a central vacuum system for housekeeping in this area and, if it proves feasible, install such a system in accordance with the priority system outlined in Section III. Local exhaust ventilation at transfer points will be upgraded where necessary.

4. Diesel Motor and Switchman: Asarco will resample the cab. If it exceeds the PEL a significant amount of time, Asarco will install a positive pressure, filtered air system in accordance with the priority system outlined in Section III.

5. Kiln Operator and Switchman: Asarco will pave the area east of the kilns and, if necessary, increase water truck and sweeper activity. Asarco will also investigate the possible use of a chemical dust suppressant. Asarco will maintain the kiln exhaust

collars in good repair.

6. Airgunman: Asarco will evaluate and, if necessary, improve work practices and ensure that the exhaust ventilation is left on while working inside the furnace.

7. Pulverizer: Asarco will resample this job and if it exceeds the PEL a significant amount of time, Asarco will evaluate the job to determine the controls necessary to reduce exposures, installing such controls in accordance with the priority system outlined in Section III.

The parties agreed on the above controls as part of the original arsenic evaluation. However, the zinc fuming operation has been discontinued due to the depressed zinc market. If the decision is made to start-up again, the tripartite team will revisit the plant to further evaluate the operation.

COPPER

H. ROASTERS

All Personnel: Asarco is investigating the installation of a fan on the bypass to the main stack for use during roaster shut down to prevent smokey conditions at the roaster feed and tripper floors. Asarco will also investigate the feasibility of installing a central vacuum system in the Roaster Department to help cleanup spills at the fire floor and tripper floor. If it is found to be feasible, Asarco will install such a system in accordance with the priority system outlined in Section III. If these controls do not reduce exposures to below the PEL, Asarco will install a clean air station unless the parties agree that a different control would be more effective. Asarco will develop an administrative work practice program for the flue dust puller and will make certain that leaks in the flue dust system are given high priority for repair.

Asarco has implemented, and will continue to debug, a computerized gas flow management system for the sinter plant, roaster and converter flues, and acid plant. This system greatly reduces roaster puffing. Asarco will install secondary hooding on the #4 roaster. If the hooding proves effective, it will be installed on the other roasters. The air inlet to the spray chamber will be redesigned to better distribute collected dust, thereby reducing the frequency of clean-out. Asarco will investigate the feasibility and effectiveness of alternate methods for removing dust from the spray chambers, such as screw or drag conveyors, or water

wash. The ventilation system in the calcine loading tunnels will be upgraded, with increased air flow.

I. REVERB DEPARTMENT

1. Larry Car: Asarco El Paso personnel will discuss with Tacoma personnel the feasibility and effectiveness of using level sensors to determine when larry cars are filled. Asarco will maintain the seal between the larry car discharge and the feeder gun and will study the feasibility of installing local exhaust for the larry cars at the calcine charge hole, installing such exhaust, if feasible, in accordance with the priority system outlined in Section III. Asarco will install removable covers for larry cars, similar to those at Tacoma, unless such covers are infeasible because of space limitation.

2. Skimmer, Tapper, Hot Slagmán, Charge Floor Cleanup and Airgunman: Asarco will: (a) replace the sides of the hood for the converter slag return launder, add a flange to the front edge of the hood, and complete a study to determine if an increase of air volume is necessary; (b) use the "Super Sucker" to clean the high line when conditions allow: (c) add additional cover sections on the matte launder where appropriate; and, (d) install a hooding and ventilation system on the launders for the slag tap area and holding furnace.

3. All personnel: Asarco will perform a study of the larry car operator, in order to determine the contribution to exposure of calcine loading, transporting and charging. Asarco will install vibrators on the larry cars in order to eliminate the use of sledge hammers. Asarco will study the feasibility and effectiveness of utilizing a vacuum system for cleaning the reverb charge deck and arch.

J. CONVERTER DEPARTMENT

1. Skimmer and Puncher: Asarco will evaluate the feasibility and effectiveness of secondary hoods for the converters. If the secondary hoods are not installed or if they do not reduce exposures below the PEL, Asarco will enclose the skimmer shacks and install positive pressure, filtered air systems in the shacks and the foreman's office (if they exceed the PEL a significant amount of time). Asarco will also evaluate the feasibility and effectiveness of a ventilated bumping block.

2. Craneman: Asarco will investigate the feasibility of upgrading the ventilation system in the cabs and redesigning the cabs to allow the cranemen to observe their lifts without opening windows.

3. Laborer and Crane Chaser: Asarco will investigate the feasibility of enclosing and ventilating the receiving ladle for converter boiler dust.

4. General: Asarco will minimize the transport of blast furnace slag through the converter building.

K. ANODE DEPARTMENT

All Jobs: After the above changes have been made in the Reverb and Converter Departments, the Anode Department will be reevaluated. If exposures continue to exceed the PEL a significant amount of time, a control plan will be prepared for review by the parties.

L. ACID PLANT

All Jobs: The jobs in the acid plant will be studied to determine sources of exposure. A control plan will be prepared for review by the parties if the PEL is exceeded a significant amount of time.

M. BAGHOUSE DEPARTMENT

1. Tender and Assistant Tender: Asarco will develop a work practice program for the tenders to minimize dust exposure.

2. Payloader Operator: Asarco will replace the present payloader with a Walden loader, having an enclosed positive pressure, filtered air cab.

3. Helper: Asarco will develop and implement a work practice program for the helper. Asarco will also install a movable inspection or access door for the zig-zag blender and will provide local exhaust ventilation for the blender if it is determined that the operation exceeds the PEL a significant amount of time. Asarco will install a clean air station for the zig-zag operator, designing it in such a way that the operation can be controlled, as much as is practicable, from inside. Asarco will put a high priority on zig-zag blender maintenance.

   Asarco will investigate the feasibility and effectiveness of alternate methods of dust handling, including pneumatic conveying.

4. Hot Cottrell Attendant: Asarco will evaluate the hot cottrell attendant to determine the source of exposure. Asarco will also develop a work practice program. Asarco will study the feasibility and effectiveness of installing a central vacuum cleaner for the settled dust accumulations on the top floor of the Cottrell and install such a system, if feasible, in accordance with the priority system outlined in Section III.

5. Water Treatment Operator: Asarco will reevaluate this job to determine the source of exposure. If exposure exceeds the PEL a significant amount of time, Asarco will develop a work practice program.

6. Janitor: Asarco will ensure that the janitor does not dry sweep the changeroom and lunchroom but utilizes sweeping compound or water. Asarco will also make available boot brushes and require their use before entering the lunchroom.

7. Power Sweeper: Asarco will conduct sampling inside the cabs of the power sweepers in use. If the PEL is exceeded a significant amount of time, Asarco will install a positive pressure, filtered air system in accordance with the priority system outlined in Section III. Asarco will also study the feasibility and effectiveness of paving additional areas near the baghouse.

8. Dust Puller: Asarco will investigate methods for conveying flue dust directly from the baghouse to its destination. An appropriate method(s) will be chosen and implemented.

9. Foreman: Asarco will sample the foreman to determine the source of exposure. The foreman's office will also be sampled. If the office area exceeds the PEL a significant amount of time, Asarco will install a positive pressure, filtered air system in accordance with the priority system outlined in Section III.

10. All Jobs: Asarco will maintain (and if necessary, increase) water truck and sprinkling system and vacuuming activity in the baghouse areas. Because the existing changehouse is inadequate, Asarco will ensure that proper changing and showering facilities are provided for baghouse personnel. These facilities will include a downdraft booth to remove contaminants from work clothes. Asarco will repair leaks in the Sinter Plant ventilation baghouse fan housing as soon as possible after they

occur. A clean, convenient area will be provided for baghouse personnel to wash their respirators during the day.

N. COTTRELL

1. Operator and Conditioningman: Asarco will evaluate both job titles to determine the source of exposure. Asarco will also develop a work practice program. Asarco will study the feasibility and effectiveness of installing a central vacuum cleaning system to clean surfaces before performing work, and install such a system if feasible in accordance with the priority system outlined in Section III.

2. Dust Puller: Asarco will develop a work practice program for the dust puller. Asarco will also make certain that leaks in the screw conveyor are repaired as soon as possible.

3. Laborer (Pug Mill Operator): Asarco will upgrade the existing deteriorated ventilation system and hood around the pug mill. Asarco will also test the effectiveness of using fogging nozzles to wet the flue dust. Asarco will install a clean air station for the blender operator in accordance with the priority system outlined in Section III.

4. All Jobs: A high-volume vacuum system will be used when feasible and effective for clean-up under the cottrell. Cottrell maintenance and sealing will be upgraded in order to decrease leakage. The pugmill housing will be upgraded, ventilation improved, and the pugmill will be exhausted through a new scrubber or other suitable air cleaning device. Asarco will evaluate the feasibility and effectivenss of alternate systems for conveying flue dust from the cottrells to the rail cars, or other destinations. An appropriate method(s) will be chosen and implemented. In the meantime, transfer point maintenance will be improved, transfer point ventilation will be installed, fogging nozzles will be used if feasible and effective, and the railroad cars and socks or chutes into them will be better enclosed. If visible dust escapes during car loading, a car shed will be constructed.

O. ANTIMONY PLANT

Asarco will modify the hoods and increase the ventilation on the matte tap, and the antimony furnace

generally. Asarco will implement screw or drag conveying, or an alternate system, for the spray-dryer cleanout material. Asarco will enclose the operator's control panel in a clean-air station, if it is determined that the operator receives a significant exposure during time spent at the panel.

P. CADMIUM PLANT

1. All Jobs: Asarco will repair and upgrade the existing ventilation system at the packaging station. Asarco will evaluate exposures inside the mobile equipment and breakroom. If levels exceed the PEL a significant amount of time, a positive pressure, filtered air system will be installed in accordance with the priority system outlined in Section III. Asarco will also extend the pavement east of the cadmium plant and increase the housekeeping activities of the sweeper and/or water truck. Asarco will install a downdraft booth for cleaning coveralls. Asarco will also investigate the feasibility of installing a clean air station for the cadmium plant personnel. If feasible, the clean air station will be installed in accordance with the priority system outlined in Section III. In accordance with Section I.T.3., Asarco will monitor and evaluate state-of-the-art development of alternative technology for processing cadmium with a view toward possible replacement of the existing production process with an economically feasible one involving lower worker exposure.

2. Craneman/Payloader and Crane Operator: Asarco will evaluate the exposure of the crane/payloader operator. If the crane cab exceeds the PEL a significant amount of time, Asarco will upgrade the existing Lintern positive pressure, filtered air system or replace it with a larger unit in accordance with the priority system outlined in Section III. Asarco will also evaluate the feasibility and effectiveness of utilizing a payloader with a positive pressure, filtered air cab.

3. Fireman and Assistant Fireman: Asarco will investigate the feasibility of installing a canopy type hood over the Godfrey roaster (similar to Tacoma design). Asarco will also investigate the feasibility of replacing manual flue dust handling with pneumatic, screw conveyance, or other methods.

Q. MAINTENANCE AND POWER HOUSE

1. Mechanical/Maintenance and Power House Personnel:

Many of the controls listed above will reduce exposure of maintenance personnel. However, fixed engineering controls are not always practicable for some maintenance jobs, particularly those which arise from upset conditions. Therefore, Asarco will stress and enforce good work practices. For example, the welders shall continue to use the portable low-volume/high velocity exhaust systems while working in shops and where feasible, out in the plant. Asarco will make such units available in sufficient quantities to allow their use wherever it is feasible and necessary.

Asarco will evaluate each job in the Maintenance Shops over the PEL and develop an administrative work practice guide for these jobs. Asarco will also designate an area for and provide the proper equipment for decontaminating equipment and material that have been used in the regulated areas of the plant before repairing or welding operations. If exposures are not reduced to or below the PEL, then local exhaust ventilation will be installed where it is feasible and would prove effective.

ASARCO will ensure that portable shop vacuum cleaners used for arsenic and lead bearing dust are equipped with filters capable of removing lead and arsenic with high efficiency.

2. Truck Driver, Crane Car Operator, Mobile Crane Operator (Grove and Galion): The crane cabs will be studied to determine sources and levels of exposure. If the inside of the cabs are over the PEL a significant amount of time, then Asarco will install a positive pressure, filtered air system in accordance with the priority system outlined in Section III.

R. SUPERVISORY

Supervisors, foremen, and/or assistant foremen exceed the PEL in several areas. The engineering controls mandated by this agreement which limit the exposure of production workers, such as ventilation systems and clean-air stations, also apply to supervisory personnel.

S. LABORATORY AND ASSAYING

Asarco will isolate the furnace room. Asarco will install additional ventilation on specific equipment, where necessary, to reduce exposures to below the PEL.

T. RESEARCH

1. Positive Pressure Systems - Asarco will evaluate the positive pressure, filtered air systems and components now available on the market for crane and vehicle cabs, clean-air stations, control rooms, and other applications. This evaluation will include the equipment's effectiveness, reliability, maintenance requirements, and other characteristics. Based on this evaluation, Asarco will develop a list of performance specifications for each type of unit. Asarco will list the specific available equipment currently meeting these requirements. This list will be updated annually. If no satisfactory unit is available for a particular application, ASARCO will work with equipment manufacturers or, if necessary, through its own Central Engineering Department or a contractor with the goal of ensuring that such a unit is designed and made available.

2. Exposure Survey - Asarco will study the contribution to employee exposure of specific tasks, equipment and processes throughout the plant. Asarco, the USWA and OSHA agree that such a survey could provide more useful information at this time than a continuation of the current quarterly employee exposure sampling. Therefore, Asarco will submit a variance application to OSHA containing a priority list and dates for source surveys in each plant area, a protocol for the first such survey, and a revised schedule for employee exposure monitoring.

3. Long Term Engineering and Research - Asarco, the USWA, and OSHA agree that ultimate compliance with the PEL in many job categories through engineering and work practice controls alone would require long-range technological improvements in production processes and the capture of air contaminants. Therefore, Asarco will monitor world developments, continue, and, as necessary, modify its engineering and research program in these areas. In particular, Asarco will give special attention to:

   a. The handling of dust collected in baghouses, electrostatic precipitators, and other air-filtering devices.

   b. Local exhaust ventilation systems for ladles, pots and other moving containers of molten metal, slag, dross, and other materials.

   c. Alternate technologies for the production of

lead and its byproducts.

Where appropriate, this research may include specific demonstration projects in one or more plants or at Asarco's Central Research facility. Some such projects are noted in individual plant assessments. Asarco will provide the parties with a list of relevant research reports and of ongoing Asarco projects. This list will be updated on request. The parties will meet on request to review the progress of this research. The USWA and OSHA agree to protect the confidentiality of Asarco research involving trade secret processes or equipment.

II. FORMAT

All investigations undertaken by the company pursuant to this compliance plan will be the subject of written reports, provided to OSHA and the Union. Supporting studies and documentation will be made available to OSHA and the Union on request. If all the parties agree that a particular control is feasible, it will be installed and used at the earliest feasible time. For some items, deadlines are indicated below. For other, the parties will discuss and set appropriate deadlines based on existing circumstances.

III. COMPLETION DEADLINES

Deadlines for the installation of controls and the completion of studies undertaken pursuant to this compliance plan follow.

COMPLETION DATES

A. 1. Positive Pressure, Filtered Air System - See * Below
Water Spray System - April 1, 1984
Moisture and stabilization - Immediate
2. October 1, 1983
3. April 1, 1983
4. Paving - October 1, 1984
Sample Mill
(a) Has been done
(b) April 1, 1984
(c) April 1, 1984
(d) Has been done
(e) Install, if feasible - October 1, 1984
Remaining Items - April 1, 1983
5. October 1, 1983
6. Positive Pressure, Filtered Air System - See * Below
7. October 1, 1983

8. October 1, 1983
9. Identification of Material - Immediately
Boot Brushes - April 1, 1983
Lunchroom - See * Below

B. Reduction of Air Pressure - April 1, 1983
Identification of Material - Immediately
Discontinue use, when feasible - Immediately
Study of operations - October 1, 1984
Study of washdown and dust suppression - Jan. 1, 1985
Implementation, if feasible - October 1, 1985
Local Exhaust Ventilation Study and implementation - See * Below
Work Practices - July 1, 1984

C. 1. Positive Pressure, Filtered Air System - See * Below
2. Positive Pressure, Filtered Air System - See * Below
3. Positive Pressure, Filtered Air System - See * Below
4. Water Truck Activity - Immediately
Remaining - See * Below
5. Cleaning Facilities - April 1, 1983
Administrative - October 1, 1983
Move tool room if necessary - Jan. 1, 1984
6. Immediately
7. Sampling - October 1, 1983
Installation - See * Below
8. Installation, if feasible - See * Below
Maintain draft - Immediately
9. Work Practices - April 1, 1983
10. Mobile Equipment - July 1, 1984
Hydrolaser - Immediately

D. 1. (a) October 1, 1983
(b) Immediately
(c) Immediately
(d) April 1, 1983
(e) October 1, 1983
(f) Immediately
(g) Immediately
(h) Feasibility - April 1, 1984
Use, if feasible - July 1, 1984
(i) Study - July 1, 1984
Installation, if feasible, effective and necessary - July 1, 1985
2. Positive Pressure, Filtered Air System - See * Below
3. Clean Air Station - See * Below

E. 1. Positive Pressure, Filtered Air System - See * Below

Enclosure - July 1, 1984
Air volume, if existing baghouse capacity is adequate - Jan. 1, 1985
~~Air volume, if existing capacity is not~~ adequate - July 1, 1986
Evaluation of Glover system - Jan. 1, 1985
Installation, if feasible, effective, and necessary - July 1, 1986
Feasibility study of charge car wetting - April 1, 1984
Installation, if feasible - July 1, 1984
Ventilation when sinter plant is down, if necessary - Jan. 1, 1988

2. As soon as blast furnace is down for repair
3. Relocation - April 1, 1983
   Cleaning - Immediately
   Low Volume/High Velocity System - Immediately
4. Positive Pressure, Filtered Air System - See * Below
5. Ventilation System - April 1, 1984
   Remote Operation - See * Below
   Charge Level - Immediately
   Spray - Immediately
   Maintenance and clean-up - Immediately
   Thimbles - July 1, 1985
6. Maintenance - Immediately
   Clean Air Station - See * Below
7. October 1, 1983
8. Constant Air Volume - First furnace rebuild subsequent to April 1, 1984
   Ventilated pot covers - As soon as practicable, after a design proves effective and feasible
   Step furnaces evaluation - Jan. 1, 1988

F. Moving Switch - Immediately
Dross Reverb Furnace Ventilation - Jan. 1, 1985
Kettle Ventilation - Jan. 1, 1985
Crane Cab - See * Below
Submission of Preliminary Control Plan - Jan. 1, 1988

G. 1. See * Below
2. First quarter after start-up
3. Patching - Immediately after start-up
   Vacuuming - See * Below
   Upgrade Local Exhaust - First quarter after start-up
4. Positive Pressure, Filtered Air System - See * Below
5. Paving - October 1, 1984
   Water Truck Activity - Immediately
   Dust Suppressant - April 1, 1984

Kiln Collar - Immediately after start-up
6. Exhaust Ventilation - Immediately
Work Practice - Immediately after start-up
~~7. Evaluate Pulverizer - See * Below~~

H. Vacuum System - See * Below
Clean Air Stations - See * Below
Fan or Bypass - April 1, 1983
Work Practice - April 1, 1983
Leaks - Immediately
Computerized gas flow system - ongoing
#4 Roaster Hooding - April 1, 1984
Hooding on other roasters, if effective - July 1, 1985
Air inlet - October 1, 1984
Alternate dust handling methods study - July 1, 1985
Implementation of most effective, feasible system - See * Below
Tunnel Ventilation - Jan. 1, 1985

I. 1. Level sensors, if feasible - April 1, 1984
Maintain Seal - Immediately
Local Exhaust - See * Below
Removable Covers, if feasible - April 1, 1984
2. (a) Sides and flange - April 1, 1983
Air Volume Study - October 1, 1984
(b) Immediately
(c) April 1, 1983
(d) October 1, 1984
3. Larry car study - October 1, 1984
Vibrators - October 1, 1984
Vacuum Study - July 1, 1984
Implementation, if feasible and effective - Jan. 1, 1985

J. 1. Positive Pressure, Filtered Air System - See * Below
2. Upgrade Ventilation System - See * Below
3. April 1, 1984
4. Immediately

K. Control Plan Prepared - See * Below

L. October 1, 1983

M. 1. April 1, 1983
2. Has been ordered and received
3. Work Practice - April 1, 1983
Access Door - April 1, 1983
Local Exhaust Zig-Zag Blender - April 1, 1984
Clean Air Station - July 1, 1984
Maintenance - Immediately

Alternate Methods Study - July 1, 1985
Installation of most effective, feasible - method - See * Below

4. Sampling - October 1, 1983
Work Practice - April 1, 1983
Central Vacuum - See * Below

5. Sampling - October 1, 1983
Work Practice - October 1, 1983

6. Sweeping - Immediately
Boot Brushes - April 1, 1983

7. Paving - October 1, 1984
Others - See * Below

8. Flue Dust Handling - End of Agreement

9. Positive Pressure, Filtered Air System - See * Below

10. Water Truck Activity - Immediately
Repair Leaks - Immediately
Changeroom - October 1, 1983
Baghouse personnel clean area - Immediately

N. 1. Work Practice - April 1, 1983
Vacuum Cleaning - See * Below

2. Work Practice - April 1, 1983
Leaks - Immediately

3. Ventilation System - April 1, 1983
Fogging Nozzles - April 1, 1983
Clean Air Station - See * Below

4. Vacuum Clean-up - Immediately
Cottrell Maintenance - Immediately
Pugmill Housing, Ventilation - July 1, 1985
Alternate Dust Handling - End of Agreement
Transfer Point Maintenance - Immediately
Transfer Point Ventilation - July 1, 1985
Fogging Nozzles - July 1, 1984
Car, Socks, Enclosure - July 1, 1984
Shed, if necessary - End of Agreement

O. Hooding and Ventilation - July 1, 1984
Alternate Conveying - Jan. 1, 1985
Clean-air station, if necessary - Jan. 1, 1985

P. 1. Repair and upgrade packaging station - April 1, 1983
Pavement - October 1, 1984
Housekeeping - Immediately
Downdraft Booth - October 1, 1983
Alternative Technologies - Complete investigation by end of agreement
Remaining - See * Below

2. Positive Pressure, Filtered Air System - See * Below

3. Canopy Hood - October 1, 1985
Flue dust handling - Installation if feasible, End of Agreement

Q. 1. Portable Local Exhaust - Immediately
Work Practices - April 1, 1983
Decontamination - April 1, 1983
Local Exhaust - April 1, 1984
Portable vacuum cleaners - Immediately
2. Positive Pressure, Filtered Air System - See * Below

S. Isolate Furnace Room - Completed since the visit
Ventilation - Jan. 1, 1986

T. 1. Evaluation - July 1, 1984
Design, if necessary - October 1, 1984
2. Application - April 1, 1984
3. Initial list - July 1, 1984

The company has informed the Union and OSHA that, due to the current depressed state of the economy and the uncertainty of future economic conditions in the non-ferrous metals industry, it is unable to anticipate with precision, specific deadlines for the implementation of certain controls described in Section I. Instead, therefore, for those items with the notation "See * Below," Asarco will establish an initial completion schedule utilizing a priority system based on the number of workers exposed, the expected reduction in arsenic levels, and the cost for each control. Controls will be scheduled for the earliest possible completion in accord with this priority system, and all such controls shall be completed by the end of the agreement, unless the parties agree that a particular control is unnecessary, infeasible, or ineffective. The schedule along with the priority determination underlying it will be provided in writing to the Union and to OSHA no later than Jan. 1, 1985. Changes in the schedule with supporting rationale based on the priority considerations set forth above will be listed in the quarterly progress reports discussed in VI. A. below. The parties will meet to discuss the schedule or changes to it if such a meeting is requested by the Union or by OSHA.

IV. GENERAL COMMENTS

A. In the event that unforeseen circumstances render compliance with the deadlines impossible, or if the company believes a particular control is no longer necessary to achieve the PEL, Asarco will promptly notify the parties, who will meet to discuss the situation. If the parties agree, the compliance plan will be modified accordingly. In the event that a particular job title comes into compliance

with the then existing PEL, additional controls for that job title will not be required.

B. The parties are aware that new or different controls may be more feasible or more effective than existing controls. For example, such events might include new control devices coming on the market, experience with existing controls, or changes in operating procedures. If Asarco, the USWA, or OSHA believe this may be the case, the parties will meet to discuss the issue. If the parties agree, the compliance plan will be modified accordingly.

C. Asarco will promptly notify the parties in the event of significant changes in operations, the arsenic content of materials received, or any other circumstances which may significantly change arsenic or lead exposures in the smelter.

D. In the event that jobs previously believed to be below the PEL begin to exceed it, the parties may agree to modify the compliance plan to include feasible controls for those jobs.

E. Several items in the agreement require that steps be taken if the PEL is exceeded a "significant amount of time." For these items, the PEL will be considered exceeded if the arithmetic mean of all samples representative of current exposure conditions exceeds the PEL. However, all three parties may agree that controls are required, or not required, if the sampling data and characteristics of the operation so indicate. These principles should not serve as a precedent for other determinations of the necessity of controls.

V. GENERAL REQUIREMENTS

A. Asarco will continue to use all engineering and work practice controls currently in existence at the El Paso smelter which limit occupational exposure to arsenic and lead.

B. Asarco will provide adequate maintenance, housekeeping, and training programs in order to insure that engineering and work practice controls are as effective as possible.

C. Control devices and other equipment which affects exposure to arsenic or lead will be inspected and tested (i) on a regular schedule, which will be provided to the parties in writing, and (ii) if the local Union requests and certifies that a condition warrants such an inspection. A representative

designated by the local union will be permitted to participate in any inspection conducted pursuant to (ii).

D. Control devices and other equipment affecting arsenic and lead exposure in need of repair or cleaning will be repaired or cleaned promptly.

E. Crane and vehicle cabs and clean air stations will be cleaned no less than once each day they are used in regulated areas.

F. During the walk around, it was observed that some ventilation hoods and ducts were deteriorated, rubber conveyor skirting was removed or not adjusted properly and inspection or access doors were removed or left open. Therefore, by April 1, 1983, Asarco will develop and implement a written maintenance program to ensure that these deficiencies are corrected. Attention to these items would help in reducing exposures; therefore, they will be given a high priority for repair. In addition, Asarco will give special attention to those items identified at the time of the Safety and Health Committee's monthly inspection. However, the existence of a Safety and Health Committee does not reduce the need for periodic safety inspections as assigned by management.

G. Asarco will continue to investigate the feasibility and effectiveness of replacing air lancing with vibrators or aerators to unplug chutes and bins, and the use of fogging nozzles where appropriate.

H. If a particular situation arises in a specific plant area concerning compliance with this Agreement, that the local union in good faith believes warrants an inspection that cannot await the regular monthly safety inspection, such an inspection by the appropriate safety and health representative may be requested and will not be unreasonably denied by the company.

I. During visits to some Asarco plants, the authors noted that certain workers were required to wear respirators in areas which were below the PEL for lead, arsenic, and other air contaminants. This policy will be discontinued. Workers will not be required to wear respirators in areas below applicable PEL's except during process upsets, control equipment failures, or other conditions likely to raise exposures above the PEL.

J. Newly purchased vehicles and cranes, and other

vehicles not specifically mentioned above, which are routinely used in regulated areas, will be fitted with positive pressure, filtered air systems where it is feasible, effective and safe.

K. The OSHA lead standard requires quarterly ventilation measurements. Each quarter, Asarco will supply to the Safety and Health Committee, a list of the specific hoods, ducts, and equipment checked; the type of tests; the design parameters; and the results.

VI. PROGRESS REPORTS AND FUTURE VISITATIONS

A. Asarco will provide the parties with quarterly air sampling reports and progress reports.

B. Any party may request a tripartite visitation of the plant to monitor the progress of this compliance plan. Permission for such a visit will not be unreasonably withheld by Asarco. All three parties will be given the opportunity to participate.

The authors recommend that this agreement expire on July 1, 1988. We recommend that the parties revisit the plant before that date, and if possible, renew the agreement by revising the compliance plan as circumstances then warrant.

AGREEMENT

The attached "ENGINEERING ASSESSMENT AND PROPOSED COMPLIANCE PLAN for ASARCO's El Paso Plant, El Paso, Texas, dated January 30, 1984 was prepared through a cooperative assessment by Melvin E. Cassady, Occupational Safety and Health Administration, Michael O. Varner, ASARCO, Incorporated, and Michael J. Wright, United Steelworkers of America, working in cooperation with representatives of smelter management and USWA local 509. It sets forth feasible controls and practices to protect the smelter employees from inorganic arsenic and lead. It incorporates the relevant controls and practices specified in an earlier agreement signed November 19, 1982, which was limited to arsenic.

ASARCO, Incorporated agrees to install the controls, carry out the practices, and meet the other obligations specified in the Engineering Assessment and Proposed Compliance Plan. OSHA agrees the implementation of those controls, practices, and other items meets the requirements to install feasible engineering and work practice controls as set forth in 29 CFR 1910.1018(g)(1) and 29 CFR 1910.1025(e)(1); and the compliance plan requirements of 29 CFR 1910.1018(g)(2) and 29 CFR 1910.1025(e)(3)(ii)(A-E) with respect to the current jobs listed in the report. This agreement expires on July 1, 1988.

Signed January 30, 1984.

Thorne G. Auchter
Assistant Secretary of Labor
for Occupational Safety &
Health

Douglas H. Soutar
Senior Vice President for
Industrial Relations,
ASARCO, Incorporated

Edgar L. Ball
Director, USWA District 37

APPENDIX A

PROCESS DESCRIPTION

LEAD DEPARTMENT

ORE HANDLING

Except for a very few truck lots, all ore is received in railroad cars of many types.

UNLOADING, BEDDING AND RECLAIMING

Feed constituents for both the lead and copper smelting plants are unloaded and bedded simultaneously.

The unloading building is arranged into two sides, one each for lead and copper receipts. A standard gauge railroad track passes through the length of each side. The sides are separated by a partition above rail level. Car pullers bring in strings of up to five railroad cars to the divided lead and copper sides of the Unloading Building. Cars are unloaded one by one into the track hopper for bottom dump cars, or clam shell bucket hopper for solid bottom cars.

Each side has an overhead bridge crane equipped with an air conditioned cab.

Conveyor transfer points have water sprays for dust suppression.

The two sides of the unloading building are each ventilated through the south building railroad car opening by a jet pulse type baghouse. All copper and lead dust from this system is delivered to the lead bedding bins.

Two 35,000 acfm wall mounted air sweep fans introduce fresh outside air to ventilate the clean-up hopper area of each unloading building side.

Housekeeping in the Unloading Building is facilitated by a water wash down system. Washdown water is pumped to the water treatment plant where solids are recovered as a sludge.

The bedding building includes 14 parallel bedding bins and a reclaim aisle. Two shuttle conveyors transfer unloaded moistened material from delivery to tripper conveyors. Seven tripper conveyors are mounted between and distributed material to each pair of bins. Six bins (3 pairs) are designated for bedding lead plant receipts, 6 bins (3 pairs) are designated for bedding copper plant receipts, and the

center two bins can each be used for lead or copper bedding. The reclaim aisle contains 11 reclaim hoppers and maneuvering space for a Caterpillar 988B front-end loader. Transporting of bed mix to the reclaim hoppers is done with the front-end loader. Three reclaim hoppers are used for copper bed mix, five for lead bed mix and the remaining three for lead plant recyclable materials.

Continuous ventilation is provided for transfer points of the lead and copper delivery and shuttle conveyors and reclaim belt feeders. Each reclaim hopper is ventilated.

All bedding plant ventilation air passes through a dust dropout box and plenum, then is cleaned in two parallel baghouses and discharged through induced draft fans and 66-foot high steel stacks.

The recovered baghouse dust is slurried and transferred to the water treatment plant for solids recovery.

A water washdown system is employed to control dust on work surfaces. Washdown water is collected at the water treatment plant for solids recovery.

The major source of exposure is material handling.

SINTER PLANT

Raw feed from the bedding building is pulverized by a hammer-type impactor with crushed return sinter, and fed into a double shaft mixer. From the mixer the material is fed into a long pelletizing drum and then, by a system of belts, into the 2 hoppers feeding the sinter machine.

Raw charge is placed on the pallets via the first hopper and ignited by a gas or oil fired burner as the pallet moves over the downdraft box. The second hopper then places about 12-inches of raw charge on the top of the ignited layer as the pallets move on to the updraft boxes. All gases are captured in a stainless steel hood and recycled through the windboxes with the high SO2 gas being drawn off and routed through a plate and hot wire cottrell before going to the No. 2 Acid Plant.

Sinter from the machine is broken by a claw breaker and crushed by a set of spiked rolls before passing through a set of screening rolls which separates product sinter from return sinter.

Return sinter is crushed by a set of corrugated rolls and then again by a set of smooth rolls before being conveyed to the elevator to join the raw feed in making up the charge.

A water washdown system is routinely used to remove dust from work surfaces. Washdown system solids are recovered at the water treatment plant.

The sources of exposure are hood leakage, open inspection doors and handling of spillage.

BLAST FURNACES/DROSS REVERB

Product sinter and coke are automatically weighed and dumped into a furnace charge car. Direct smelt material is added to the same car by a skip hoist. An electric locomotive moves the charge car under the proper ventilated bins for loading and then to one of two hydraulic elevators which raise the charge car to the feed floor.

There are three thimble top blast furnaces. Two furnaces are in continuous operation with the third in reserve. All molten furnace products are tapped into a settler. All the lead siphons into 15 ton slag lined pots for transfer by rail to the drossing plant. Slag flows from the top of the settler into 150 cubic foot ladles mounted on transfer-cars, for transport to the fuming furnace. Local exhaust ventilation is provided at the furnace tap holes, launders, lead pots and slag ladles.

Lead from the blast furnace is poured into one of three 65 ton cast iron receiving kettles. Soda ash and petroleum coke are added as the kettles are being filled and the dross is removed before it becomes solid and charged directly to an adjacent dross reverberatory furnace. After rough drossing, the lead is bailed out by the overhead crane, using a cast steel five ton bucket and poured into a 130 ton cast iron kettle where a second drossing is done. Final drossing and de-copperizing with sulphur are done in a second 130 ton kettle. Bullion is cast into 10 ton pigs for shipment to the Omaha refinery.

Dross is smelted in the dross reverberatory furnace. Products of the furnace are soda matte, speiss and lead bullion. Matte is transferred molten to the copper converters. Speiss is granulated and shipped to the Asarco Hayden Copper Smelter. Lead is tapped directly into the drossing kettles.

Blast furnace and dross reverberatory furnace gases are mixed, cooled by water sprays to 160 degrees Fahrenheit and passed through a 12 chamber baghouse.

The sources of exposure are charging of blast furnaces, tuyere punching, settler hood and launder leakage, movement of slag ladles and lead pots, clean-up, emissions from receiving and refining kettles in the adjacent drossing area, and the general operation of the dross-reverberatory furnace.

ROASTING

Four 7-hearth gas-or oil-fired wedge roasters are used for roasting reverberatory charge material called calcine. Each roaster is capable of producing 400 tons of calcine per day. Calcine is hauled to the reverb in 7-ton larry cars.

Roaster gases pass through high velocity flues to a hot gas fan, then through a spray chamber and a plate and wire cottrell. From here the gases are passed to the 800 ton per day Monsanto double-contact Acid Plant. This acid plant also takes gases from the lead sinter plant.

The sources of exposure are back pressure from the flue system during roaster shutdown, cleanup, overfilling of bins from tripper belt, and general spillage.

SMELTING

The reverberatory furnace is gas- or oil-fired and has a sprung arch. The crucible is entirely jacketed with cast copper. Deep bath smelting is practiced with calcine charging to the reverb. Charging is accomplished through four retractable Wagstaff feed guns.

The molten bath in the reverb furnace is tapped from either side of the furnace into ladles. Matte ladles are conveyed by overhead crane to the copper converters.

Slag is periodically skimmed from the reverb into a gas- or oil-fired settling furnace where the slag is cleaned before transfer to the dump by Kress slag haulers.

The off-gases from the reverb pass through a waste heat boiler and then go to a hot gas fan through a spray chamber and a plate and wire cottrell to the 828 foot stack.

The sources of exposure are loading calcine into the larry cars, transporting calcine to the reverb furnace, and charging the reverb furnace with calcine. Fugitive emissions from the converter slag return launder, matte tapping, slag skimming, cleanup, and general lack of movement of contaminants out of converter building also contribute to exposure.

CONVERTING

Converting is done in three 13' x 30' Pierce-Smith converters, two of which are normally in operation. The reverberatory matte is charged to the copper converter. In the converter, air is blown into the molten bath to oxidize the sulfur and iron. The product from the converter is blister copper which

is transported by ladle to the Anode Furnaces for further refining.

Three 60 ton, 90' span overhead cranes service the converters as well as the anodes, the slag fuming furnace and the reverb furnace. Crane cabs have Lintern air conditioning and filtering systems.

Converter gases pass to a settling tower where coarse dust is collected. Two waste heat boilers are downstream from the converters.

The gases then pass to a hot gas fan, through a spray chamber and a plate and wire cottrell. From the cottrell the gases can go to a 500 ton-per-day double-contact acid plant. There is also the capability to send a portion of the converter gases to the 800 ton-per-day double-contact Acid Plant.

The sources for these exposures are cleanup of converter aisle, leakage from the primary hoods, charging and skimming converters, and general inability of the evacuation system to remove all contaminants from the converter building.

FIRE REFINING OF BLISTER COPPER

Blister copper is fire refined in one of two 160 ton tilting anode furnaces and cast into 720 pound anodes for shipment to the Asarco copper refinery in Amarillo.

The source of exposure in this area is encroachment of converter building air contaminants.

SLAG FUMING

The fuming furnace is completely water-jacked. Four or five 12-ton ladles of blast furnace slag make up a furnace charge. Blowing time averages 120 minutes. At the end of the blow, the slag is tapped into a gas- or oil-fired settling furnace where a matte, carrying 50% of the copper and 85% of the gold and silver in the original slag, separates and is transferred to the converters. From the settling furnace, the spent slag is taken hot to the dump via Kress slag haulers.

A water-jacketed flue connects the slag fuming furnace with a waste heat boiler. Two fans in parallel at the economizer exit force the dust-laden gases through two banks of U-tube coolers. Two more fans are located between the U-tubes and the baghouse.

The baghouse contains eight sections, six sections being used for fuming furnace gases and two for fume from the deleading kilns.

Continuously operating screw and drag conveyors carry dust from the boiler, flues, U-tubes and baghouse to the deleading plant,

where 1 1/2% to 3% crushed coal is added before charging to the kilns. In the kilns lead is reduced from 10% in the feed to about 1-2% in the product, which is shipped to the electrolytic plant at Corpus Christi.

The sources of exposure are charging and tapping the fuming and holding furnaces, cross-contamination from copper processes inside the converter building, baghouse maintenance, leakage from kiln exhaust hoods, unloading East Helena zinc oxide, dust spillage from screw conveyors, and cross-contamination from the Cottrell dust loading area.

ANTIMONY PLANT

Asarco's Antimony Plant was designed to recover pure (99+%) antimony metal from tetrahedrite concentrates. The concentrate is received, weighed, and blended with other components. After blending, the furnace charge is added to a small reverberatory furnace for smelting. Sodium salts are blended in the charge for a water-soluble sodium compound of antimony and sulfur. After smelting is completed, the matte formed in this process is granulated.

The granulated matte then goes to a circuit where the matte is leached, thickened, and filtered by drum filters. The underflow material, residue, is then transported to the copper circuit. The pregnant leach solution, containing the antimony, is prepared by electrowinning, cooling, filtering and adding caustic soda. The electrolyte then is pumped to the electrolytic cells for preferentially plating out the antimony on cathodes. The cathodes can then be further refined and cast into ingots or sold as cathode metal. This plant has never been formally released for production purposes. It was not operating during the Tripartite visit for arsenic.

CADMIUM PLANT

All cellar dust from the blast furnace baghouse that contains greater than 11% cadmium is roasted in a 25' Godfrey roaster. The roaster charge contains approximately 65% flue dust, 15% crushed limerock and 20% coal. The Godfrey roaster generates a fume that is 65% Cd, which is recovered in a baghouse, packaged in special impermeable bags, and shipped to the Globe Plant in Denver. Residue is returned to the Sinter Plant. The source of exposure is handling of the dust and the fact that trace quantities of arsenic are present in the feed stock.

ACID PLANTS

In December, 1972, Asarco in El Paso started its first acid plant designed to handle SO2 from the converters. This plant is a Lurgi-550 TPD double-absorption plant with a design volume of 58,500 SCFM, built by Davy Power Gas.

Hot converter gases are ducted by high velocity flues to a plate and wire cottrell. Converter gases leave the cottrell at 285 degrees F, and enter the venturi scrubber. The venturi scrubber cleans particulates from the gases and reduces the gas temperature to 105 degrees F.

Gases leave the venturi and the stream splits before entering the packed scrubbers. Here gases are cooled to 75 degrees F and heat is removed from the diluted solution by plate coolers.

The gases then enter the electrostatic precipitators at 75 degrees F, and moisture, as well as remaining particulates, is removed. All the blow down from these three systems is fed back to neutralizer tanks where acidity is neutralized with ammonia and particulates are removed with flocculents before the water is returned to the spray chambers for reuse.

After the precipitators, the gas streams rejoin to one stream before entering the 93% H_2SO_4 drying tower. The drying tower removes any moisture remaining in the gases.

The acid blowers compress the gases for the journey through the remainder of the acid plant.

The gases leave the compressors and must be re-heated by either heat exhangers or preheater. Once the gases are heated to 750 degrees F, they enter the first two catalyst beds for conversion.

Next, in the venturi absorber, gases enter the top with a counter-current flow of 98% sulfuric acid that is sprayed into the throat of the entrainment separator, which is a conventional packed tower. Particulates are removed before gases re-enter the heat exchangers. Gases are re-heated to the conversion temperature of the 3rd and 4th beds and returned to the final absorption tower for further absorption.

The final absorber is a conventional packed tower with a counter-current flow of 98% sulfuric acid. Gases leave the circulation area and mist pads remove droplets of acid before the gases ultimately leave the acid plant stack.

In October, 1978, Asarco in El Paso started its second double absorption acid plant. The 750 TPD Monsanto unit has a design volume of 90,000 SCFM. This plant accepts gas from three sources: the lead sintering circuit, copper roasters, and excess converter gases.

The sinter machine gases leave the hot cottrell at 470 degrees F and enter the venturi scrubber. Here particulates are removed and gases are cooled to 140 degrees F for the journey to the acid plant through a F.R.P. duct.

Gases from the roasters leave the cold cottrell at 210 degrees

F and enter the venturi scrubber. Gases are cooled and particulates are removed and gases leave at 140 degrees F where they join the sinter gases.

The combined gas stream from the sinter machine and roasters split to enter the bottom of the packed scrubbers.

Gases leave the scrubbers at 90 degrees F and are split again to enter the mist precipitators.

The mist precipitators are of Asarco design for the removal of acid mist and particulates. Gases leave the mist precipitators and form one stream again. At this point any excess converter gas enters from a by-pass duct to join the sinter and roaster gases.

Gases then enter the drying tower of the packed tower with 93% sulfuric acid flowing counter-current to the gas stream. The drying tower acid removes any moisture from the gas before entering the compressors. The gases are compressed and move into a mist eliminator for the removal of acid mist before the gas enters the heat exchanger or preheater. Gases are heated for the entry into the 1st bed for conversion. The converter is a 3-pass system with double absorption.

The interpass and final absorption towers are conventional packed towers with counter-current flow of 98% sulfuric acid. SO3 is absorbed in the towers and the gas passes through mist eliminators for droplet removal prior to dishcarge from the acid plant stack.

The plant has a decolorizer facility to treat 93% black sulfuric acid with hydrogen peroxide before storage. This system consists of peroxide storage tanks and a mixing tank where peroxide is added until clarity is obtained before acid is sent to 93% storage tanks. Workers assigned to the acid plants generally do not have exposures to lead or arsenic above the PEL.

APPENDIX B

EL PASO JOB TITLES HAVING
ARSENIC EXPOSURES ABOVE 10 UG/M3

Transportation

Loco Crane Operator
* Moisture Sampler
* Sampler
* Bucker
* Laborer
Cat Operator
* Payloader Operator
Overhead Crane Operator
Control Room Operator

Mill

Foreman
* Operator
* Assistant Operator
* Feeder
* Mill Tender
* Sample Train Tender

Yard

Front End Loader
* Power Sweeper Operator
Slag Hauler Operator
Heavy Equipment Operator
Truck Driver
Trackboss
* Forklift Operator
Tool Room Attendant
Back Hoe Operator
Boiler Cleanup
* Laborer
* Sweeper Operator
Motorman
Switchman

Sinter Plant

Supervisor
* Foreman
* Payloader Operator
Beltman
Laborer
Attendant
Assistant Attendant

Blast Furnace

Foreman
* Furnaceman
Front End Loader
Scaleman/Charge Car Loader
Bull Gang
Airgunman
Scrap Burner
* Feeder
Conveyorman

Dross Reverb

* Furnaceman
* Craneman
* Moulder

Zinc Fuming

Foreman
* Coal Mill Operator
* Furnaceman
* Furnaceman Helper
* Fume Loader
Baghouseman
Diesel Motor
* Kiln Operator
Control Room Operator
Airgunman
Pulverizer
Laborer
Switchman

Copper Roasters

Fireman
Repairman
Feeder
Flue Dust Puller
Tripperman
Cleanupman

Reverb Furnace

Foreman
Skimmer
Larry Car
Tapper
Hot Slagman
Charge Floor Cleanup
Airgunman

Converters

Foreman
* Skimmer
* Puncher
* Craneman
* Crane Chaser
* Laborer

Anodes

Moulder
Craneman
Sampler
Airgunman
Furnaceman
Casting Machine Helper

Acid Plant

Foreman
Laborer

Baghouse

* Foreman
* Helper
* Payloader Operator
* Power Sweeper
* Tender
* Dust Puller
Janitor
* Hot Cottrell Attendant
H2O Treatment Attendant
* Assistant Tender

Cottrell

Operator
* Conditioning Man
* Dust Puller
* Laborer

Antimony

Foreman
Electrowinning Man
Filtration Man
Furnace Man
Furnace Man Helper

Cadmium

* Craneman/Payloader

* Fireman
* Assistant Fireman

Mechanical/Maintenance

* Mechanic
  Blacksmith
  Pipefitter
  Carpenter
  Painter
  Mason
* Truck Driver
* Welder
* Apprentice
  Helper
  Boilermaker
  Craneman
  Tool Room Man
  Hammerman
  Slurryman
  Material Man
  Car Knocker
* Crane Car Operator
* Flame Cutter
  Grove Crane Operator
* Galion Crane Operator

Power House

  Electrician
  Instrument Technician

* Exposures above 100 ug/m3

EL PASO JOB TITLES HAVING
LEAD EXPOSURES ABOVE 50 UG/M3

Transportation Department

* Switchman
* Platemman
* Loco Crane Helper
  Moisture Sampler **
  Sampler **
  Bucker
  Laborer **
  Cat Operator
  Payloader Operator
  Overhead Crane Operator
  Control Room Operator

Mill

  Foreman
  Operator
  Assistant Operator
  Feeder **
  Mill Tender
  Sample Train Tender

Yard

* Foreman
  Front End Loader
  Power Sweeper Operator **
  Slag Hauler Operator
  Heavy Equipment Operator **
  Forklift Operator
  Back Hoe Operator
  Boiler Cleanup
  Laborer
  Sweeper Operator **
  Motorman
  Switchman
* Strawboss
* Grader Operator

Sinter Plant

  Supervisor
  Foreman **
  Payloader Operator **
  Beltman
  Laborer **
  Attendant
  Assistant Attendant **

Blast Furnace

* Supervisor
Foreman
Furnaceman **
Front End Loader
Scaleman/Charge Car Loader **
Bull Gang **
Airgunman **
Scrap Burner
Feeder **
Conveyorman

Dross Reverb

Furnaceman **
Craneman **
Moulder **

Zinc Fuming

Foreman
Coal Mill Operator
Furnaceman
Furnaceman Helper
Fume Loader **
Baghouseman
Diesel Motor
Kiln Operator **
Airgunman
Laborer

Copper Roasters

Repairman
Flue Dust Puller
* Beltman
Cleanupman

Reverb Furnace

Foreman
Skimmer
Larry Car **
Tapper
Hot Slagman
Charge Floor Cleanup
Airgunman

Converters

Foreman
Skimmer
Puncher

Craneman **
Crane Chaser **
Laborer **

Anodes

Craneman
Sampler
Airgunman
Furnaceman

Baghouse

Foreman
Helper **
Payloader Operator **
Power Sweeper **
Tender **
Dust Puller **
Janitor
Hot Cottrell Attendant **
Assistant Tender **

Cottrell

Operator
Conditioning Man
Dust Puller **
Laborer **

Cadmium

Craneman/Payloader
Fireman
Assistant Fireman **

Mechanical/Maintenance

Mechanic
Blacksmith
Pipefitter
Carpenter
Painter
Mason
Helper
Boilermaker
Slurryman
Material Man

Power House

* Power House Helper
  Electrician
* Electrician Helper **