



**Sun
City
Analytical
Inc.**

**Asbestos Abatement at
ASARCO, Inc.
Cottrell Hoppers
El Paso, Texas**

PLAINTIFF'S EXHIBIT

ASA-1414

ADDENDUM NO. 1: December 30, 1997

TO: ALL PRIME CONTRACTOR BIDDERS OF RECORD

General:

1. The following revisions, additions, and clarifications shall be incorporated in the contract documents for this project dated December 02, 1997. All other provisions of the contract documents shall remain unchanged. This addendum shall be signed and submitted with bid proposal to acknowledge receipt of. Failure to do so may subject bidder to disqualification.

DRAWINGS

- A. There are no Changes of Record.

PROJECT SPECIFICATION

- A. The bid date has been extended to Tuesday January 20, 1997 at 2:30 p.m. (MST).
- B. The project start date shall be Monday February 09, 1997 at 8:00 a.m. (M.S.T.).
- C. The project shall be complete by April 07, 1997 at 3:00 p.m. (M.S.T.)
- D. The respirator to be used during the entire project shall be a PAPR with dual filter of HEPA and Acid Gas similar to 3M Belt Mounted PAPR GVP-100 with GVP-442 filters.
- E. In SECTION 01010 Summary of Work page 25 Section 1.03(A)(2) is DELETED from the scope of work and the BASE BID on the BID FORM. Enclosed please find the new BID FORM.
- F. In SECTION 01010 Summary of Work page 25 Section 1.03 ADD (A)(2) to READ:
Remove and disposal of 185 sf of ACM tank insulation, and approximately 65 lf of associated 8 inch pipe insulation located at the Power House De-Aerator.
- G. Attached are the comments and questions during the pre-bid walk through held on December 19, 1997.

Bidder's Signature of Acknowledgement

Date

**ADDENDUM 1
December 30, 1997
Corporate Offices
1409 Montana Avenue
El Paso, Texas 79902
(915) 533-8840
Fax (915) 533-8843
E-Mail scai@flash.net**

**516 Chama N.E. Suite D
Albuquerque, New Mexico 87108
(505) 255-4673
Fax (505) 255-0989**

**ASARCO, Cottrell Hoppers
SHEET OF
2817 John Ben Shepard Pkwy
Building A, Suite 201
Odessa, Texas 79762
(915) 362-9887
Fax (915) 367-6904**

ASARCO ELP 0011147

Questions Concerning the Cottrell Hoppers

- Q. What type of respiratory protection is required?
A. The respiratory protection shall follow Addendum 1 item D. in Project Specification Section changes.
- Q. Do we have to remove the fiberglass off the hoppers or just the ACM Tar mastic.
A. The Contractor is responsible to remove and properly package all ACM and fiberglass insulation. Asarco, Inc shall be responsible for the disposal of this material.
- Q. Do we have to clean the dust on the deck next to the elevated tank.
A. Yes, that is part of the pre-cleaning that has to be done prior to setting up containment.
- Q. Do we have to protect the transformers and electric panels below the elevated tank.
A. Yes, that shall be protected to prevent any water damage.

SET 1
December 02, 1997

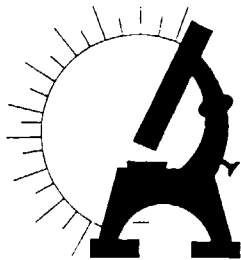
*Abatement Plan for the Removal
of Asbestos at
Cottrell Hoppers
ASARCO, Inc.*

FOR:

ASARCO, Inc.
Peggy Munsell, Industrial Hygienist
P.O. Box 1111
El Paso, Texas 79999



PREPARED BY:



SUN
CITY
ANALYTICAL
INC.

ENVIRONMENTAL SERVICES

1409 Montana Avenue
El Paso, Texas 79902
(915) 533-8840

NOTE: This project manual was designed for work directed herein and is designed to be used with Sun City Analytical, Inc. air monitoring SOP's and manuals. This booklet may not be used for any other purpose. SUN CITY ANALYTICAL, INC. assumes no responsibility for any other use or misuse of this project manual.
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ATTACHMENTS

- I. Material Safety Data Sheet for Converter Cottrell Dust
- II. Material Safety Data Sheet for Sulfur Dioxide / Sulfurous Acid

December 02, 1997

ABATEMENT PLAN

Design For:
Asbestos Abatement
at
ASARCO, Inc.
Cottrell Hoppers

FOR

ASARCO, Inc.
Peggy Munsell, Industrial Hygienist
P.O. Box 1111
El Paso, Texas 79999

LICENSED ASBESTOS CONSULTANT AGENCY:



TEXAS LICENSE #10-0011
SUN CITY ANALYTICAL, INC.
1409 MONTANA AVENUE
EL PASO, TEXAS 79902

LICENSED INDIVIDUAL ASBESTOS CONSULTANT:

Manuel Morales
TEXAS LICENSE #10-5038
SUN CITY ANALYTICAL, INC.
1409 MONTANA AVENUE
EL PASO, TEXAS 79902

(Date)

**ADVERTISEMENT FOR PROPOSALS
FOR**

**ASBESTOS ABATEMENT AT
ASARCO Cottrell Hoopers
2301 W. Paisano
El Paso, Texas 79922**

Notice is hereby given that sealed proposals will be accepted **only from invited contractors** for asbestos abatement of the above location. The proposal shall be in accordance with Plans and Specifications designed by:

**SUN CITY ANALYTICAL, INC.
1409 Montana
El Paso, Texas 79902
(915) 533-8840**

The Proposal will be accepted until 2:30 P.M.(MST), Tuesday, January 07, 1997 at:

**SUN CITY ANALYTICAL, INC.
1409 Montana
El Paso, Texas 79902
(915) 533-8840**

where they will be privately opened by Owner and Consultant.

Bid proposal when submitted indicates the offer will furnish all insurance called for in the provisions. The offer also certifies that each project will be completed on or before the specified date.

Successful offer shall complete project in accordance with dates set forth in Project Schedule included in this project manual. If bidder fails to finish project in said dates, he is liable to ASARCO, Inc. or have deducted from funds owed, as liquidated damages the sum of five-hundred (\$500.00) dollars per day plus Consultant and/or Air monitoring costs per day for each calendar day of delay until the project is substantially completed.

There will be a pre-bid walk-thru of the project on December 19, 1997, at 10:00 A.M. (MST). All invited offers are required to attend. Prospective contractors should arrive no later than 10:00 A.M. (MST) on December 19, 1996 at ASARCO Main Gate at 2301 W. Paisano, El Paso, Texas. In order to tour the work site the contractor shall have a hard hat (meets OSHA requirements) steel toe boots, eye protection, hearing protection and respiratory protection (HEPA with Acid Mist filter).

Owner reserves the right to refuse any and all offers for any reason that serves the best interest of the Owner or building Occupants. Owner reserves the right to waive any technicality or irregularity in this plan or any offer.

Conflicts and questions arising during the bid phase and throughout any asbestos abatement activities will be resolved on a basis of whether an asbestos or non-asbestos related activity is involved. Any asbestos related conflicts and questions will be governed by the appropriate project manual sections. Otherwise, the Owner's supplementary and/or up-front "boiler plate" documents and any other non-asbestos related sections of the project manual will be applicable.

Conflicts and questions which the selected Contractor fails to bring to the attention of Owner and/or Consultant prior to being awarded the contract will be resolved at no additional cost to Owner and/or the Consultant.

Contractors desiring Plans and Specifications may obtain Bid Documents from SUN CITY ANALYTICAL, INC., at the walk through. A thirty dollar (\$30.00) non-refundable deposit is required per set of plans and specifications.

Asarco Construction or Repairs
Contract Form PD-19
Under \$100,000.00
Revised 6/95

CONTRACT FOR

at ASARCO Incorporated's EL PASO facility

at EL PASO, TEXAS

THIS AGREEMENT made the ____ day of _____, 19__, by and between _____, whose address is _____ (hereinafter called the "Contractor") and ASARCO Incorporated, a corporation of the State of New Jersey, whose address is 180 Maiden Lane, New York, New York 10038 and P. O. BOX 1111, EL PASO, TEXAS (hereinafter called the "Owner").

Whenever used in this agreement, the terms "Owner" and "Contractor" shall include their respective directors, officers, employees, servants, affiliates, subsidiaries and/or agents. The term "Contractor" shall also include any and all subcontractors and their officers, employees, servants, affiliates, subsidiaries and/or agents, suppliers and any other parties under Contractor's direction or control in connection with the Work.

WITNESSETH:

The Contractor and the Owner agree as follows:

Article 1. Scope of the Work

The Contractor shall furnish all shop drawings, field engineering, labor, tools, equipment, transportation, materials and other facilities, except such items as are hereinafter listed as being furnished or furnished and installed by the Owner, for _____ (hereinafter called the "work") at the EL PASO Plant of the Owner at EL PASO, TEXAS, in accordance with the drawings and specifications listed below, all of which are incorporated herein by reference and made a part hereof:

(List Specifications and Drawings)

EQUAL OPPORTUNITY STATEMENT
ADDENDUM "A"
SAFETY AND HEALTH ADDENDUM
WASTE CONTAINER LABELING MEMO DATED APRIL 29, 1996
CONTRACTOR OSHA COMPLIANCE LETTER DATED MARCH 22, 1996

Article 2. Time of Completion

The work shall be commenced _____ and shall be completed _____.

Article 3. Payment (to be deleted if progress payments are to be made)

The Owner shall pay the Contractor for the performance of this Contract, the sum of _____ dollars (\$ _____), lawful money of the United States of America within THIRTY days after satisfactory completion of the work and submission by the Contractor of evidence (including, if requested, complete releases of all liens arising out of or in connection with the work by all persons, firms or corporations on whose behalf such liens could be or were filed) satisfactory to the Owner that all charges for labor and material incorporated in the work and all other indebtedness connected with the work for which liens could be filed have been paid and that the work is free of all liens and encumbrances.

Article 3. Payments (to be deleted if progress payments are not to be made)

The Owner shall pay the Contractor for the performance of this Contract, the sum of _____ dollars (\$ _____), lawful money of the United States of America, as follows:

On or about the _____ day of each calendar month, commencing _____, 19____, the Owner shall pay the Contractor _____ percent (____%) based on the contract prices, of the labor and materials incorporated in the work and of materials suitably stored at the site thereof up to the end of the next preceding calendar month, as estimated by the Owner, less the aggregate of previous payments; and upon completion of the entire work, a sum sufficient to increase the total payments to _____ percent (____%) of the contract price. Final payment of the remaining _____ percent (____%) of the contract price shall be due _____ days after completion of the work.

Before each such payment is due, the Contractor shall submit evidence satisfactory to the Owner (including, if requested, partial waivers, or in the case of final payment, complete releases, of all liens arising out of or in connection with the work by all persons, firms or corporations on whose behalf such liens could be or were filed) that all charges for labor and material incorporated in the work and all other indebtedness (except, in the case of payments other than final payment, indebtedness not then due) connected with the work for which liens could be filed have been paid and that the work is free of all liens and encumbrances.

Article 4. Payments Withheld

The Owner may withhold all or part of any payment to the extent necessary to protect the Owner from loss or damage on account of (a) damaged or defective work not remedied, (b) claims filed or reasonable evidence indicating probable filing of claims by other parties against the Contractor or the Owner, (c) failure of the Contractor to make payments properly to Subcontractors or for material or labor, (d) a reasonable doubt that this contract can be completed for the balance then unpaid, (e) damage to the Owner's property or the work of another contractor, (f) failure of Contractor to remove any equipment, appliances, tools, materials, supplies or wastes from Owner's property, or (g) Contractor's violation of any applicable laws, ordinances, rules, regulations, standards and/or other governmental requirements.

Article 5. Liens

If any lien remains unsatisfied after payment of the full contract price has been made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such lien, including all costs, expenses and a reasonable attorney's fee.

Article 6. Guaranty Bonds

If the Owner has so requested prior to the signing of this Contract, the Contractor, at the option of the Owner, agrees to furnish or permit the Owner to secure bonds in the full amount of the contract written by a surety company designated by, or otherwise satisfactory to, the Owner, guaranteeing and conditioned for the full, complete and faithful performance of this contract by the Contractor and for the payment of claims for labor performed or materials furnished in connection herewith, all in accordance with the terms of the bonds. The premium for the bonds will be paid by the Owner and must not be included by the Contractor in the contract price. In the event the Owner elects to secure such bonds, the Contractor agrees to sign the required application, to furnish necessary financial statements and financial guarantees, and to otherwise cooperate with the Owner, in securing the bonds. If any change in work is authorized pursuant to the terms of this Contract, Contractor shall cooperate with Owner so as to ensure Owner's ability to secure and maintain bonds for the same.

Article 7. Title to the Work

Title to all work completed or in the course of construction shall be in the Owner and title to all machinery, equipment and materials to be incorporated in the work shall be in the Owner as soon as they are delivered on the site of the job.

Article 8. Inspection and Repair

The Contractor shall provide safe and proper facilities at all times for the inspection of the work by the Owner, and shall as soon as practicable after written notice from the Owner, at the Contractor's sole expense, replace and repair any materials or portions of the work which the Owner, in its sole discretion, shall deem defective or otherwise not in compliance with the specifications, design or performance requirements set forth in this contract and make good all work damaged or destroyed thereby, whether or not there shall be a dispute with respect to any of the foregoing. Any such dispute shall be settled by arbitration.

Article 9. Protection by Contractor

The Contractor at all times shall maintain adequate protection of the work from damage and shall protect the Owner's property and all persons thereon from injury, damage or loss by reason of any act or omission of the Contractor or any Subcontractor. Where such damage includes damage to the work it shall be repaired at the expense of the Contractor.

The Contractor shall use its best judgment and skill in dealing with labor matters, and take all reasonable steps to avoid labor dispute. In the event of any strike or threat of strike, slowdowns, featherbedding, or other like practices, the Contractor shall apprise the Owner of all relevant facts and implications of the particular labor problem involved, and shall consult in good faith with the Owner in an endeavor to reach a mutually satisfactory solution to such labor problem and, so far as reasonably possible, to protect the Owner against delays affecting the work or damage or losses to its other operations.

Article 10. Contractor's Insurance

The Contractor shall, for the mutual protection and benefit of both Owner and Contractor, procure, pay for and maintain in full force and effect, at all times during the performance of the work and until final acceptance of the work, policies of insurance issued by a responsible carrier or carriers acceptable to Owner which afford the following coverages:

- | | |
|-----------------------|---------------------------|
| Workers' Compensation | - Statutory |
| Employers' Liability | - Not less than \$500,000 |

Comprehensive General Liability including Independent Contractors' Broad Form Contractual, Broad Form Property Damage, Personal Injury, Completed Operations and Products coverages (such Completed Operations and Products coverages shall be provided for a period of two (2) years after final completion of the work and final acceptance by the Owner), and deletion of any exclusion pertaining to explosion, collapse, underground property damage, radiation and pollution hazards. - Not less than \$2,000,000 combined single limit for both bodily injury and property damage

Comprehensive Automobile Liability including Owned, Non-Owned, and Hired Car coverages. - Not less than \$2,000,000 combined single limit for both bodily injury and property damage

All policies, with the exception of Workers' Compensation and Contractor's Professional Liability, shall name Owner, its subsidiaries, directors, officers, agents and employees as additional insureds, and shall expressly provide that the interest of same therein shall not be affected by any breach by Contractor of any policy provision. All policies shall expressly provide that no less than thirty (30) days prior written notice shall be given to Owner in the event of material alteration to or cancellation of the coverages evidenced by such policies. Further, the Workers' Compensation policy shall contain an endorsement waiving the insurers' right of subrogation against Owner, its subsidiaries, agents and affiliated companies, and their directors, officers, agents and employees.

Prior to any equipment or personnel being brought onto Owner's premises in accordance with the terms of this Agreement, Contractor shall deliver to Owner a Certificate of Insurance for each policy obtained pursuant to this Agreement evidencing each of the provisions specified in this Article along with the signed Agreement.

Upon renewal of each policy, Contractor shall provide to Owner a certificate of insurance evidencing all of the provisions specified in this Article.

Contractor will maintain the original of all policies, endorsements and certificates, and provide Owner with copies of same upon request of Owner.

Article 11. Indemnity by Contractor

Contractor agrees to defend at its own cost and to INDEMNIFY and HOLD HARMLESS the Owner and its agents and employees from any and all liability, damages, losses, claims and expenses howsoever caused resulting directly or indirectly from or connected with the performance of this agreement.

Contractor's duty to indemnify Owner shall not apply to liability from damages arising out of bodily injury to persons or damages to the property caused by or resulting from the sole negligence of Owner, or Owner's agent or employees.

Contractor's duty to indemnify Owner for liability for damages arising out of bodily injury to persons or damages to property caused by or resulting from the concurrent negligence of Owner or Owner's agents or employees shall apply only to the extent of negligence of Contractor or Contractor's agents, employees, and sub-tier subcontractors and suppliers.

Contractor's indemnifications shall survive termination of the Contract.

Article 12. Owner's Responsibility for Certain Casualties

The Owner shall be responsible for all damage to the work, including all materials and equipment owned by Owner on or about the premises intended for permanent use in the project or incidental to the construction thereof and included in the total cost of the work.

The Owner may during the process of the work, maintain and pay for property insurance to cover the work during construction with such deductible as it may at its sole discretion choose or Owner may at its sole option completely self-insure same.

If the Contractor desires any other insurance, beyond that provide by Owner, to protect Contractor's temporary structures, materials, hand tools, machinery and equipment, he may obtain and pay for same.

Article 13. Status and Responsibility of Contractor and its Personnel

It is understood and agreed that the status of the Contractor hereunder is that of an independent contractor, that the personnel of the Contractor performing services or work hereunder shall under no circumstances be deemed to be employees of the Owner, and that any Workers' Compensation Insurance coverage and all training required by law (including but not limited to applicable training requirements related to health and safety, and the environment) for such personnel will be the sole responsibility of the Contractor. Notwithstanding the aforesaid understanding, the general instructions of the Owner in connection with accomplishing the work to be done hereunder shall be followed by the personnel of the Contractor.

During tenure of Contract, Owner shall have prerogative to request changes in personnel of Contractor's employees assigned to this work when in the opinion of the Owner their work is not conducive to required scope of work.

Article 14. Compliance with Laws and Ordinances

This Contract shall be performed in compliance with all applicable laws, ordinances, rules, regulations, standards and/or other governmental requirements including, but not limited to those of the federal Occupational Safety and Health Administration, the Mine Safety and Health Administration, the Environmental Protection Agency, the Department of Transportation, the Department of Labor, and all state, municipal and local governmental agencies. If the Contractor performs any work contrary to such laws, ordinances, rules, regulations, standards and/or other governmental requirements, Contractor shall bear all costs and expenses arising therefrom, including all penalties, fines, awards, settlements and losses, including attorneys fees.

If for any reason the Contractor's or any of its subcontractor's employees or agents acquire a status imposing liability on the Owner for employers' contributions or taxes under the Federal Insurance Contribution Act, the Federal Unemployment Tax Act, any State Unemployment Tax or Wage Protection Act, or any other Act, Statute or Regulation thereunder, the Contractor shall be exclusively liable for, and shall indemnify the Owner against, the same and agrees to comply with all such laws and regulations so as to relieve the Owner from any and all liability therefor and from the responsibility of making reports or keeping records with respect thereto.

Article 15. Equal Employment

To the extent applicable to the contracting and/or subcontracting of services or work hereunder, the following provisions are incorporated by reference and Contractor represents that it will comply with them provided such services are utilized by Owner to fulfill obligations pursuant to a contract with the Federal Government or any Agency thereof: Equal Employment Opportunity: E.O. 11246 and 41 CFR Sec. 60-1.4 and 60.1-7; Employment of Veterans: 41 CFR Sec. 60-250 and Employment of Handicapped: 41 CFR Sec. 741-4, and all rules and regulations issued pursuant to the foregoing.

Article 16. General Safety Provisions

a. Contractor shall designate a job site representative to be its safety supervisor and that person shall be responsible for promoting safety and accident prevention, interest and compliance with applicable safety laws, rules and regulations among its employees and coordinating such activities with Owner and any subcontractors and suppliers of Contractor.

b. Contractor shall convey in writing and orally to its employees that they must notify Contractor immediately of any safety concerns or problems they may have at the project regardless of whether such concerns or problems relate to any job site policy, law, rule, regulation or

any physical condition of the project premises or any circumstances, or any actions or inactions of Owner or Contractor. Upon receipt of such notice involving any entity, Owner must be notified within twenty-four (24) hours, in writing, of the stated concern or problem and what corrective action has been taken and/or remains to be taken.

c. Contractor shall comply with all laws, ordinances, codes, rules, regulations, standards and any safety policies instituted by Owner relative to the Project, relative to safety and the prevention of accidents. Contractor acknowledges that it has been provided with Owner's safety rules and training materials and agrees to institute and follow such rules and apply the training materials to the work performed under this Contract.

d. Contractor shall take all reasonable precautions to ensure the safety and health of all persons working at the project and all persons who may in any way be affected by the Contract work.

e. Contractor shall take all reasonable precautions to assure that it discovers, is made aware of and corrects any unsafe conditions, circumstances, actions or inactions that arise at the project and that directly or indirectly effect any of Contractor's personnel or the personnel of any other contractor or the Owner at the site.

f. Contractor agrees to observe, comply with and enforce any and all provisions and requirements of the Occupational Safety and Health Act, and the Mine Safety and Health Act, including any and all amendments and supplements to and all standards, rules and regulations issued under these Acts, or similar or more stringent federal, state or local requirements, as are applicable to the performance of the Contract. Contractor shall promptly advise Owner of any investigation or inspection by any federal, state or local governmental agency representative of Contractor's workplace, provide copies of inspection reports, notices of violations, and inform Owner of the outcome of any such inspection or investigation in writing.

g. Contractor shall immediately notify Owner (and provide a detailed written report) of every accident involving injury to personnel occurring in connection with the contract work and agrees to assist Owner with any accident investigation in which Contractor has any involvement, including access to and preservation of the work area and production of any and all of its documents and records and any employees who may have witnessed the accident.

h.1) Contractor acknowledges and agrees that any training, safety equipment or monitoring that may be provided or performed by Owner for the Contractor or the Contractor's employees is strictly voluntary and done to enhance safety and health in the workplace. Any such actions by the Owner shall not change or diminish the Contractor's responsibilities in these areas.

and

h.2) Contractor agrees to provide Owner with its written safety program and certify annually that all required training has been completed in a timely manner pursuant to the applicable federal and state laws and regulations.

Article 17. General Environmental Provisions

a. Contractor is responsible for proper management, storage and disposal of all supplies and materials utilized in the work and waste materials generated in course of performance of the Contract pursuant to Owner's rules, and all applicable laws, ordinances, rules, regulations, standards and/or other governmental requirements including but not limited to those of the Occupational Safety and Health Administration, the Mine Safety and Health Administration, the Environmental Protection Agency, the Department of Transportation and all state, municipal and local governmental agencies, and the applicable fire codes, including but not limited to appropriate containers, labels, warnings and placards, and secondary containment for materials containing hazardous substances or petroleum.

b. Contractor may store supplies, materials, and wastes only in areas designated by Owner. Contractor may not store any wastes on Owner's property in excess of ninety (90) days. If Contractor utilizes any materials designated by federal, state or local law as a hazardous substance or a hazardous waste, such materials must be stored in appropriate containers and spill control equipment must be available in the storage areas.

c. In the event of a fire, or a spill or release of hazardous materials or wastes on Owner's property, Contractor will take actions necessary to prevent harm to the environment and human health, and immediately notify Owner's Environmental Department, Safety Department and the Security Office.

d. Contractor is responsible for removing all supplies and materials utilized in the work and waste materials generated in the course of the performance of the Contract from Owner's property in accordance with all applicable laws, ordinances, rules, regulations, standards and/or other governmental requirements. Contractor is responsible for all costs associated with off-site disposal of all hazardous and non-hazardous wastes. Contractor must inform the Owner's Environmental Department at least seven (7) days before any waste material is transported off-site for recycling or disposal.

e. In the event that Contractor leaves any materials, supplies or wastes on Owner's property after completion of the work, said materials, supplies or wastes will be disposed of by Owner at Contractor's expense.

f. Prior to commencement of the work, Contractor will provide Owner with a Material Safety Data Sheet for all materials and supplies to be utilized on Owner's property in the course of performance of the Contract. At Owner's discretion, Owner may require that Contractor utilize a substitute product that is less hazardous.

g. Contractor is responsible for making all such Material Safety Data Sheets available to its own employees and those of its subcontractors pursuant to the Occupational Safety and Health Act.

h. Contractor may not bring any materials on to Owner's property nor utilize any products that contain the following substances: asbestos, chlorofluorocarbons (CFCs), chlorinated solvents, polychlorinated biphenyls (PCBs).

Article 18. Patents

The Contractor shall indemnify and save harmless the Owner against and from any and all claims, losses, costs, damages, expenses, actions or other proceedings, growing out of or resulting from infringement of any patent by the Contractor or any Subcontractor in the performance of this Contract, except that this provision shall not apply to patented articles or processes specified in drawings or specifications furnished by the Owner provided any such claim is not attributable to Contractor's negligence in the use of such patented articles or processes. This indemnity shall survive termination of the Contract.

Article 19. Changes in the Work

The Owner, without invalidating this Contract, may at any time order extra work or make changes by altering, adding to or deducting from the work. Such order may be made by the Owner on its own behalf or at the request of the Contractor, upon discovery by the Contractor of any discrepancy between the plans and the physical conditions encountered. If such extra work or changes involve a change in cost, the contract price shall be increased or decreased by the fair value thereof. The Owner will itemize the changes to be made and upon receipt of written notice of same, the Contractor agrees to submit promptly to the Owner, in triplicate, an itemized statement of his calculations of the adjustment in the contract price resulting from the changes or extra work. This must be done before work on the change is begun unless the Owner gives written order to proceed immediately. No work or change shall be made, except by written order of the Owner and no claim for an addition to the contract price shall be valid unless the additional work was so ordered. Any dispute under this Article shall be subject to arbitration.

Article 20. Owner's Right to Terminate Contract

If any proceeding is instituted by or against Contractor seeking to adjudicate it a bankrupt or insolvent, or seeking liquidation, winding up, reorganization, arrangement, adjustment, protection, relief or composition of it or its debts under any law relating to bankruptcy, insolvency or reorganization or relief of debtors or seeking the entry of an order of relief or the appointment of a receiver, trustee or other similar official for it or any substantial part of its property, or if Contractor shall admit its inability or fails to pay its debts generally, or shall make a general assignment for the benefit of its creditors, or if the Contractor at any time should fail, refuse or neglect to supply enough properly skilled workmen or proper materials, or if he should fail to make prompt payments to Subcontractors or for material or labor, or disregard laws, ordinances or the instructions of the Owner, or otherwise be guilty of a substantial violation of any provision of this Contract which Contractor shall have failed to correct promptly after service of written notice thereof by the Owner, then the Owner may, without prejudice to any other right or remedy, terminate the employment of the

Contractor for the Contractor's default and take possession of the premises and of all materials, tools and appliances thereon and finish the work by whatever method the Owner may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price shall exceed all the general damages of the Owner caused by the Contractor's default, including but not limited to any financial losses or expenses incurred or suffered by Owner as a result of a delay in the completion of the work and the expense of finishing the work and compensation of the Owner for the Owner's managerial and administrative services, such excess shall be paid to the Contractor.

If such damages shall exceed such unpaid balance, the Contractor shall pay the difference promptly to the Owner.

Article 21. Owner's Right to Terminate Contract without Cause

Owner may at any time terminate Contractor's services under the Contract for any reason whatsoever by giving Contractor not less than fifteen (15) days written notice of termination setting forth the effective date of termination. In the event of such termination, Owner shall pay to Contractor (a) its reimbursable costs for services performed prior to the effective date of such termination, less payments previously paid by Owner on account thereof, (b) all other reimbursable costs and expenses which Contractor may incur as a result of such termination, including relocation of Contractor's field personnel and such other costs and expenses as may be approved by the Owner, and (c) an equitable portion of the profit based upon the actual work performed at the time of termination less any payment on account of profit which had been previously made. Except as may be otherwise expressly provided herein, Contractor shall not be entitled to demand any damages, compensation or indemnity of any kind as a consequence of such termination.

Article 22. Correction of Work after Payment

Neither payment nor any provision in this Contract shall relieve the Contractor of responsibility for faulty materials or workmanship and the Contractor shall remedy any defects due thereto and pay for any damage to other work resulting therefrom which shall appear within one (1) year from the date of completion of the Contractor's work hereunder. The Owner shall give notice of observed defects with reasonable promptness. Any dispute under this Article shall be subject to arbitration.

Article 23. Arbitration

If any controversy, claim, dispute or question shall arise between the parties in respect of the construction, meaning or effect of this Contract or anything contained in it, or the rights and liabilities of the parties hereunder or otherwise in relation to this Contract, then every such controversy, claim, dispute or question shall be decided by arbitration in accordance with the rules of the American Arbitration Association. This agreement so to arbitrate will be specifically enforceable under the prevailing law of any court having jurisdiction. Notice of demand for arbitration will be

filed in writing with the other party and with the American Arbitration Association. The demand for arbitration will be made within a reasonable time after the controversy, claim, dispute or question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such controversy, claim, dispute or question would be barred by the applicable statute of limitations. An award rendered pursuant to arbitration will be final and judgment may be entered in any court having jurisdiction thereof.

Article 24. Subcontractors and Suppliers

The Contractor will not employ any subcontractor without the prior written approval of Owner and the Contractor agrees to be responsible for any failure by the subcontractor to comply with the terms and conditions of this Contract which are in any way applicable to such subcontractor. Nothing herein shall be deemed to create a contractual relationship between any such subcontractor and the Owner.

All of Contractor's subcontractors and suppliers shall be apprised of the terms and conditions of this Contract and shall be held liable, accountable for and subject to these terms and conditions in their own subcontract work and supply contracts to the same extent and degree that the Contractor is or would be liable, accountable for and subject to these terms and conditions in its contract work. It shall be the Contractor's duty to ensure that its subcontractors and suppliers accept and comply with the terms and conditions of this Contract and Contractor shall supply to the Owner evidence of such compliance in a form acceptable to Owner.

Article 25. Assignment

The Contractor shall not assign nor subcontract this Contract in whole or in part, nor shall the Contractor assign any monies due or to become due Contractor hereunder without the prior written consent of the Owner.

Article 26. Coordination of Work

The Contractor shall conduct the work hereunder so as to cause a minimum of interference with the Owner's operation. Where interference with the Owner's operations becomes absolutely necessary, permission shall be requested by the Contractor not less than seventy-two (72) hours in advance.

Article 27. Undertakings by the Owner

The Owner agrees to obtain and pay for any permits, licenses and easements required for permanent structures or changes, and, to the extent practicable without interference with operations, to furnish the Contractor, free of charge, for its use during the construction, electricity, water, steam and compressed air required for construction purposes, at the voltage and pressure currently available at

Neither party shall be considered in default in the performance of its obligations hereunder to the extent that performance of such obligations is delayed, hindered, or prevented by force majeure. Force majeure shall be any cause beyond the control of the parties hereto which they cannot reasonably have foreseen and guarded against. Force majeure includes but is not limited to, acts of God, labor disputes, financial crisis, fires, riots, civil commotions or civil unrest, incendiarism, interference by civil or governmental authorities, and acts of war (declared or undeclared).

Article 31. Entirety Clause

This Contract constitutes the entire agreement between the parties, and except as may be specifically set forth herein no changes can be made herein except by an agreement in writing duly executed by the parties or their duly authorized agents.

Article 32. Additional Provisions

(Add such additional provisions, if any, as the particular job requires.)

IN WITNESS WHEREOF, the parties have executed this Contract the day and year first above written.

Contractor

By _____

Title _____

ASARCO Incorporated
Owner

By _____

Title _____

Owner's said plant, to a point adjacent to or within 100 feet of the site, but the Contractor will be required to make the necessary connections, provide approved shut-off and safety devices and furnish and install all temporary lines required to bring them to the point of use.

Article 28. Applicable Law

This contract shall be construed and enforced in accordance with the laws of the state where the work hereunder is to be performed.

Article 29. Technical Information

The term "technical information" as used in this Contract includes but is not limited to technical data, reports, models, drawings, specifications, operating manuals, designs, computations, formulas, apparatus, processes, patentable or unpatentable inventions and other engineering data. Contractor agrees to accept Owner's decisions as to whether any particular information is technical information or is technical information which has been made or conceived under this Contract.

It is understood that in the course of Contractor's performance hereunder Contractor may learn or have access to technical information of Owner. Contractor agrees that it and its personnel will keep in confidence all such technical information of Owner and that it and its personnel will not use or disclose the same without Owner's written consent, either during the term of this Contract or at any time thereafter.

Contractor agrees to disclose to Owner all technical information made or conceived by it or its personnel in performance, or resulting from performance, under this Contract. Contractor agrees that all such technical information made or conceived by it or its personnel shall become and remain the free and unrestricted property of Owner and that Contractor shall assign or cause the same to be assigned to Owner. Contractor agrees that it and its personnel will keep in confidence all such technical information made or conceived by Contractor or its personnel and that Contractor and its personnel will not use or disclose the same without Owner's written consent, either during the term of this Contract or at any time thereafter.

Contractor agrees, upon the request and at the expense of Owner, to make or cause its personnel to make applications for Letters Patent in such countries as Owner may designate on those of the aforesaid assigned inventions which Owner believes to be patentable; and to assign all such applications to Owner or its order; and to give Owner, its attorneys and solicitors all reasonable assistance in preparing such applications, and in prosecuting such applications in the patent office or offices involved and in defending and enforcing any patent that may be issued upon any such application; and to execute all papers that may be reasonably required in the prosecution of such applications or to vest in Owner or its assigns said inventions, applications and Letters Patent.

Article 30. Force Majeure

SUPPLEMENTARY CONDITIONS TO THE CONTRACT

- 1.01 All protective equipment required for all employees and Owner's representative the IH and any authorized visitors shall be provided by the Contractor.
- 1.02 Contractor shall submit construction, proposed completion, and proposed work schedule to the IH at the pre-construction meeting.
- 1.03 Contractor shall post competent person at entrance to regulated area at all times during working hours. After working hours and when regulated area has been established Contractor shall post security guard at entrance to regulated area. The primary duty of person at entrance to regulated area is to prevent anyone from entering regulated area without wearing proper protective equipment and otherwise complying with all applicable requirements in this Project Manual.
- 1.04 Contractor hereby agrees to indemnify and hold Sun City Analytical and City of El Paso free and harmless from any obligations, costs, claims, judgments, attorneys' fees, and attachments arising from or growing out of this any damage to property or injury or death to persons (including any damage or injury caused to property or person of any party including any employee of Contractor and/or associated with companies and/or any third party) arising from or growing out of the performance of these services under this Contract, except when the same are caused by the willful misconduct or negligence of the Consultant.
- 1.05 Conflicts and questions arising throughout any asbestos abatement activities will be resolved on a basis of whether an asbestos or non-asbestos related activity is involved. Any asbestos related conflicts and questions will be governed by the appropriate project manual sections. Otherwise, the Owner's supplementary and/or up-front "boiler plate" documents and any other non-asbestos related sections of the project manual will be applicable.
- 1.06 As the representative of the Owner the IH shall perform air monitoring of all areas of work to insure compliance with this Project Manual and all applicable asbestos laws. This air monitoring does not relieve the contractor from monitoring required for compliance with all applicable asbestos laws. IH has the right to take action or direct Contractor to take whatever means deemed necessary to protect the environment, persons in the work area, and the general public when his air monitoring results indicate non compliance airborne concentrations of Asbestos fiber levels established by this Project Manual or applicable asbestos laws. IH shall retain at site daily air monitoring results for Contractor, Contractor employees, on regulatory agency to view at their discretion. In the event of any job-related injury, requirements of first aid or accident the IH shall be notified and Contractor shall take appropriate action.

- 1.07 When Contractor Crew consist of personnel whose predominant language is not English Contractor shall insure:
- A. All training respiratory, supervisor, worker, etc., is conducted in predominant language. Contractor shall submit proof of all documents and proof that workers passed appropriate test.
 - B. All instructions and safety procedures and emergency instructions shall be posted in both English and Spanish. Contractor shall have an interpreter fluent in English and dominant language for communications between IH and workers.
 - C. All workers shall be under direct supervision of fluent interpreters especially in the regulated area.
- 1.08 The following airborne fiber levels have been established for IH to use as grounds for stoppage of abatement work or and/or ordering immediate clean up of all area
- A. When air samples reveal 0.20 F/CC in containment IH may warn Contractor of high levels and may stop work if he continues to exceed 0.20 F/CC in containment.
 - B. When air samples reveal 0.01 F/CI inside clean room or during load-out IH shall stop work and insure proper clean-up procedures are used.
 - C. Any time air samples reveal air levels of greater than 0.01 F/CC outside regulated area, work must stop until corrective action is taken.
- 1.09 Contractor shall complete project in accordance with dates set forth in Project Schedule included in this project manual. If bidder fails to finish project in said dates, he is liable to ASARCO, Inc. or have deducted from funds owed, as liquidated damages the sum of four-hundred seventy five (\$475.00) dollars per day for Consultant and/or Air monitoring costs per day for each calendar day of delay until the project is substantially completed.

END OF SECTION

BID FORM

(Company Name)

Submits following proposal for asbestos removal at:

ASARCO Cottrell Hoppers
2301 W. Paisano
El Paso, Texas

Submittal of this form by the undersigned, hereafter referred to as bidder, is a representation that the bidder has visited the site, became familiar with conditions affecting the work. Successful bidder agrees to furnish all labor, materials, equipment, and pay any expenses incurred (travel, per diem, taxes, etc.) to complete work in total compliance with Contract Documents such as but not limited to, Plans, Specifications, Invitation to bidders, Instructions to bidders, and any addendum's issued thereto.

The successful bidder agrees to complete project with conditions set forth in contract documents, Plans and Specifications and time schedule set forth in the Project Schedule in this specification, furthermore successful bidder understands that five hundred dollars (\$500.00) per day plus Industrial Hygienist and/or air monitoring costs will be the measure of liquidated damages assessed for each calendar day in excess thereof required to complete the work under this contract.

Bidder agrees to execute a Formal Contract on AIA Document A101-1987 (Standard Form of Agreement between Owner and Contractor) within three (3) working days.

Bidder agrees to furnish within five (5) working days all required insurance policies covering public and property damage, asbestos occurrence liability, and workman's compensation in the amounts specified in the supplementary conditions of the project.

Bidder represents that he understands the exact scope of the project and that he is willing to perform any increase or decrease in the work in accordance with set provisions of these contract documents. Bidder further guarantees he has become familiar with local conditions, local laws and ordinances, local permits, and rules that may in any manner affect cost, progress or performance of this contract.

Owner reserves the right to disqualify any and all bids. **Bidder understands that to be considered a successful bidder, he must include with the Bid Proposal all submittals required below. Failure to submit required documents and submittals shall be basis to disqualify bidder at bid opening. Disqualified bidder shall be considered non-responsive and his bid shall not be recorded.**

- A. Proof of Asbestos Abatement experience:
- B. Proof of personnel qualifications, training and experience:
 - 1. Submit Texas State Contractor License to be able to do asbestos abatement work in Texas.
 - 2. Submit name of supervisor and his TDH license.

PHASE I: Remove and dispose of approximately 5,000 sf of ACM mud type on the converter cottrell
hoppers.

_____ Dollars \$_____

PHASE II: Remove and dispose of approximately 6,200 sf of ACM mud type ACM on the flue.

_____ Dollars \$_____

ALTERNATE BID: Re-Insulate approximately 5,100 sf of converter cottrell hoppers.

_____ Dollars \$_____

Bidder must submit unit prices. These unit prices shall be used to calculate any additions or deletions to
this contract.

ACM Mud \$_____ per SF _____ Dollars per SF
to include
scaffold set up and containment.

Re-Insulate Hopper per sf. \$_____ per SF _____ Dollars per SF

Respectfully submitted:

(Firm Name)

By

(Authorized Signature)

(Title)

Firm's Address: _____

Seal

Phone (____) _____

END OF SECTION

PROJECT SCHEDULE **ASARCO Hoopers**

ACTIVITY	DATE AND TIME	LOCATION
Bid Advertisement	By invitation only	By ASARCO
Pre-bid walk-thru	Dec. 19, 1997 10:00 A.M. (MST)	ASARCO 2301 Paisano El Paso, Texas
Bids Due	Dec 19, 1997 10:00 A.M. (MST)	Sun City Analytical, Inc. 1409 Montana El Paso, Texas
Bids Open	Dec 19, 1997 10:00 A.M. (MST)	Sun City Analytical 1409 Montana El Paso, Texas
Contract Award	TBA	
Pre-Construction	TBA	
Begin Project Phase I	Jan 22, 1998 0800 Hours	ASARCO 2301 Paisano El Paso, Texas
Complete Removal and Clearance of Phase I.	Feb 20, 1998 2:00 P.M. (MST)	ASARCO El Paso, Texas
Begin Project Phase II	Mar 02, 1998 8:00 A.M. (MST)	ASARCO 2301 Paisano El Paso, Texas
Complete Removal and Clearance of Phase II.	March 20, 1998 2:00 P.M. (MST)	ASARCO El Paso, Texas
Final Acceptance	March 20, 1998 4:00 P.M. (MST)	ASARCO El Paso, Texas

SECTION 01010 SUMMARY OF WORK

PART I - GENERAL

- 1.01 Statement of Work: The work consists of furnishing all labor, plant, and materials and performing all work in strict accordance with this plan. Work shall include but not be limited to: preparation, removal of ACM hopper insulation, Transite panels, and all OSHA, EPA air monitoring, and air sampling.
- 1.02 Project Objectives:
- A. Remove All asbestos containing mud type material from areas described in the Scope of Work, Drawings, and this Project Manual and any addendum.
 - B. No individual shall be exposed to asbestos fibers in excess of levels shown in these specifications.
 - C. The Contractor shall ensure that no asbestos contamination occurs outside any containment erected.
 - D. The Contractor shall ensure that all asbestos waste is disposed of in accordance to these specification and all applicable laws. All construction waste contaminated with asbestos containing waste from this project shall be disposed of in an EPA approved landfill.
 - E. The Contractor shall document all activities pertaining to this project in accordance with these specifications and all applicable laws. At the conclusion of the project, contractor shall submit this documentation to the Owner after it has been reviewed by the Industrial Hygienist (IH).
 - F. Contractor shall ensure that all special precautions, as stated in these documents, have been taken to protect from water damage and contamination into adjacent areas to the work area.
- 1.03 Scope of Work:
- A. Remove all Asbestos Containing Materials from the Cottrell Hoppers and the Power House as indicated by the Owner and/or his representative in the initial walk through. The estimated amounts are:
 - 1. Location I: Remove and disposal of all mud type material on the converter cottrell hoppers as indicated by the Owner and/or his representative in the initial walk through. The estimated amounts are:
 - a. Remove and dispose of approximately 4,300sf of ACM mud type material on the converter cottrell hoppers using full containment method described in this manual.
 - b. Set up necessary barriers for traffic control of vehicles and pedestrians.
 - c. Set up scaffolds to access ACM
 - 2. Location II: Remove and dispose of approximately 260 s.f. of insulation on the POWER HOUSE DE-AERATOR and associated 8" piping of approximately 85 l.f.

- B. UNIT PRICES: Additive/Deductive Unit Prices for Work described on the plans and in the specifications for Asbestos Abatement at ASARCO Zinc Plant Hoppers in El Paso, Texas. Bidder shall submit unit prices. These unit prices shall be used to calculate any additions or deletions to this contract. Bidder is informed that these prices shall be used to deduct or add any additional ACM material from the BASE BID PRICE. Any bidder failing to submit unit prices shall be regarded as non-responsive.

END OF THIS SECTION

SECTION 01030 SPECIAL PROCEDURES OR CONDITIONS

1.01 ASARCO Cottrell Hoppers

- A. Before beginning abatement the Contractor shall do the following:
 - 1. Ensure that no high voltage exists in the containment.
 - 2. Ensure all necessary permits are obtained.
 - 3. Ensure that all parties involved in the project are notified of start date.
 - 4. Ensure that all personnel working in the area are in respiratory protection, hearing protection, and other safety requirements of ASARCO safety plan.

1.02 Schedule of abatement

- A. The Contractor shall schedule all work to be done during daytime hours otherwise as approved by the Owner. The normal working hours of this project are from 7 a.m to 4 p.m. Contractor shall be liable for monetary compensation to the Industrial Hygienist/owners representative for working during non-normal working hours.
- B. Contractor is advised that the work in this area is to be done in phases or sections. Only said hopper can be stripped of the ACM at any given time. When the asbestos has been removed from the hopper, ASARCO personnel will need to re-insulate the hoppers prior to any removal of ACM from additional sections. The estimated time needed to re-insulate shall be available at the walk through.
- C. Power House aeroator shall be done when the cottrell hoppers have been completed.

1.03 Site Security

- A. The Contractor shall provide a qualified site security during all the abatement phase. The intent of this precaution is to guard against unauthorized entry into the regulated areas as well as a fire watch.
 - 1. Site Security shall have EPA certification to enter the containment
 - 2. Site Security shall have an OSHA physical.
 - 3. Site Security shall have communication equipment to notify the IH, contractor, fire and or police if the need arises.
- B. Site security personnel shall ensure that air filtration equipment is operational at all times, shall restrict unauthorized entry into the regulated area and ensure that the containment is intact at all times. Site security personnel shall keep a daily log of all events.

1.04 Emergency Repairs

- A. The Contractor shall immediately notify the IH of any damages, repair any pipe leaks, or electrical failures that might occur during abatement.
- B. All personnel on job site shall know where a telephone is located and what the emergency phone number are.
- C. Emergency phone numbers shall not be limited to but shall include the Industrial Hygienist (IH), Project Manager, Contractor, Etc). All emergency phone numbers shall be posted at the control center.

- B. All personnel on job site shall know where a telephone is located and what the emergency phone number are.
- C. Emergency phone numbers shall not be limited to but shall include the Industrial Hygienist (IH), Project Manager, Contractor, Etc). All emergency phone numbers shall be posted at the control center.

1.05 Medical Emergencies

- A. The Contractor shall provide at least one person on site who is qualified in First Aid and Cardiac Pulmonary Resuscitation (CPR). The contractor shall submit this persons name and qualification to the IH at the pre-construction meeting.

1.06 Rental Equipment

- A. The Contractor shall obtain written permission for any rental equipment (includes rental trucks or vehicles) to be used on the asbestos project. The rental company shall be notified of the intended use of equipment and shall submit notice to the Industrial Hygienist (IH) that the equipment may be used on this asbestos abatement project. The Industrial Hygienist (IH) has the right to reject any rental equipment that does not confirm with said letter of understanding. The Contractor assumes all liability for failure to disclose the use of rental equipment for an asbestos abatement project.

1.07 Patented Products

- A. The Contractor shall submit a license or equivalent, or written permission to use any patented product and/or procedure in connection with this project. In the event that no patented product and/or procedure is used, the contractor shall submit a notarized statement acknowledging that he is not using patented products or procedures on this project. The contractor assumes all liabilities for failure to disclose the use of a patented product and/or procedure.

1.08 Electrical Work

All electrical work shall be coordinated with ASARCO safety personnel and/or ASARCO electricians.

- A. All of the electrical work shall be performed by either a licensed electrician or a licensed apprentice electrician under direct supervision of a licensed electrician. All electrical work shall meet electrical code requirements.
- B. Any electrical work performed in the regulated area shall be done by a licensed electrician who has met the requirements of OSHA 1910.1001, AHERA 40 CFR 763 (32 hour worker Course), OSHA medical exam, respirator fit test.

1.09 Scaffolds

- A. During this project the Contractor will need to erect scaffolding to gain access to the duct. Contractor shall comply with OSHA 1910 subparts D walking-Working surfaces.
- B. When powered work platforms are used the Contractor shall comply with OSHA 1910 Subpart F. Powered Platforms, Manlifts, and Vehicle-Mounted work platforms.

END OF SECTION

SECTION 01043 PROJECT COORDINATION

1.01 Work Requirements:

- A. RESERVED
- B. Before starting work at any location the Contractor shall inform the Industrial Hygienist (IH) or his authorized representative of the intent to start such work. Strict adherence with NESHAPS 10 day notice is required.
- C. The contractor shall maintain the area clean of any and all debris that results from the performance of this project.
- D. The contractor shall ensure safe working conditions and abide by all applicable OSHA safety regulations during the performance of the contract.
- E. The Industrial Hygienist (IH) on site does not have the authority to approve any additional work or change the scope of work set forth in these documents. Contractor shall not be paid for any unauthorized work. For any additional work or change of scope of work the Contractor shall follow the directions for additional work set forth in these documents.

1.02 Personnel Qualifications:

- A. All Contractor personnel involved with this project must be trained and have EPA approved certification showing they are fully qualified to do asbestos removal. Contractor shall ensure every worker is thoroughly familiar with the standard operating procedure of the Contractor for abatement work and with all Applicable Laws. All personnel shall have current OSHA (1910.1001) medical examinations and be trained in the use and care of respirators. Anyone without the proper qualifications listed herein shall not be allowed to work in the abatement area at any time. **ALL PERSONNEL ARE REQUIRED TO ATTEND THE ASARCO SAFETY ORIENTATION PRIOR TO ENTERING THE PLANT. THIS CLASS SHALL BE SCHEDULED WITH ASARCO PRIOR TO PERFORMING ANY WORK.**
- B. Supervisor Qualifications are as follows:
 - 1. Meet requirements of OSHA competent person.
 - 2. Shall have knowledge of methods and procedures of the removal, treatment, handling, and disposal of asbestos and asbestos containing materials and subsequent cleaning of affected environment.
 - 3. This person shall be knowledgeable of Federal, State and Local regulations pertaining to the handling of asbestos.
 - 4. This person shall remain on the job site during working hours at all times. In the event the supervisor leaves the job site, the Industrial Hygienist (IH) has an obligation to stop work until the supervisor returns to the site. Any and all extra cost arising from said event shall be the responsibility of the Contractor.
 - 5. Persons shall have all current OSHA Medical & EPA approved Supervisors Certificates.
 - 6. Shall have proof of attending an OSHA safety course on the hazards of working with lead, arsenic, cadmium, Sulfuric Acid (H_2SO_4), hydrogen sulfide (H_2S), and sulfur dioxide (SO_2).
 - 7. Biological monitoring is required for personnel working in the locations where As, Cd, Pb contaminants are present.

C. Worker Requirements:

1. Meet requirements of OSHA (1910.1001).
2. Must have knowledge of methods and procedures of the removal, treatment, handling, and disposal of asbestos and asbestos containing materials and subsequent cleaning of affected environment.
3. This person shall be knowledgeable of Federal, State and Local regulations pertaining to the handling of friable asbestos.
4. Workers shall have all current OSHA Medical & EPA approved 32 hour Abatement Worker Certificates.
5. Shall have proof of attending an OSHA safety course on the hazards of working with lead, arsenic, cadmium, Sulfuric Acid (H_2SO_4), hydrogen sulfide (H_2S), and sulfur dioxide (SO_2).

1.03 Permits:

- A. The Contractor shall obtain all necessary permits from the City Building Inspection Department, Police, Fire Department and any other Agencies having jurisdiction prior to commencement of work. Some permits required are, but not limited to:
1. Electrical Permits where new or reinstalled electrical devices are performed.
 2. Building Permits where any structure of the building is disturbed. This includes removal of asbestos pipe insulation.
 3. EPA NESHAPS 10 day notice
 4. Texas State Health Department Notice
 5. Local permits such as fire, police etc.

END OF THIS SECTION

SECTION 01091 DEFINITIONS AND STANDARDS

1.01 Applicable Publications:

- A. The regulations listed below form a part of this specification to the extent referenced. The regulations are referred to in the text by basic designation only. The following regulations shall be on site during all operations of this project.
- B. OSHA Regulations:
 - 1. 29 CFR 1910.20 Access to Employee Exposure and Medical Records
 - 2. 29 CFR 1910.134 Respiratory Protection
 - 3. 29 CFR 1910.1001 OSHA - Asbestos Industry Standard.
 - 4. 29 CFR 1926.1101 Asbestos, Tremolite, Anthophyllite, and Actinolite Construction Standard.
 - 5. 29 CFR Parts 1910 and 1926 Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite: Final Rule; Amendment
 - 6. 29 CFR 1910.1200 Hazard Communications
 - 7. 29 CFR 1910 Occupational Safety and Health Standards
 - 8. 29 CFR 1926.55 Gases, Vapors, Fumes, Dusts and Mists
 - 9. 29 CFR 1926.57 Ventilation
 - 10. 29 CFR 1018 Arsenic
 - 11. 29 CFR 1025 Lead
 - 12. 29 CFR 1027 Cadmium
 - 13. 29 CFR 1910.95 Occupational Noise Exposure
 - 14. All applicable OSHA regulations such as but not limited to Heat Stress, Noise, Electrical Standards (Lockout and Tagout) Scaffolding, Ladders, OSHA 200, Slips, Trips, and Falls, and Fire Safety-Contingency Plans.
- C. Environmental Protection Agency
 - 1. 40 CFR 61 Subparts A & M (Revised Subpart B) National Emission Standards for Hazardous Air Pollutants.
 - 2. 40 CFR Part 763, Subpart E Asbestos Containing Material in Schools; Final Rule and Notice.
 - 3. 40 CFR Part 763, Subpart G Asbestos Abatement Projects: Worker Protection; Final Rule.

4. Environmental Protection Agency (EPA) Publication, Guidance for Controlling Friable Asbestos-Containing Materials in Buildings, June 1985.
- D. Department of Transportation (DOT):
1. 49 CFR Part 173, Subpart J.
 2. 49 CFR 172 Hazardous Materials Tables & Communications Regulations
 3. 49 CFR 178 Shipping Container Specification
- E. American National Standards Institute, Inc., (ANSI), Standards:
1. ANSI Z88.2-1980 Practices for Respiratory Protection
 2. ANSI Z9.2-1979 Fundamentals Governing Design & Operation of Local Exhaust Systems
- F. Testing Standards
1. NIOSH Method 7082 Lead (AA)
 2. NIOSH Method 7300 Arsenic, Cadmium, and Lead (ICP)
 3. NIOSH Method 7400 Fiber Analysis of Asbestos using PCM
 4. NIOSH Method 7402 Fiber Analysis of Asbestos using TEM

1.02 Definitions:

- A. Abatement - Means all activities associated with the control of Asbestos containing materials for Buildings during removal.
- B. ACGIH - American Conference of Governmental Industrial Hygienists 6500 Glenway Avenue Building D-5 Cincinnati, Ohio 45211
- C. AIHA - American Industrial Hygiene Association, 345 White Pond Dr. Akron, Ohio 44320
- D. Aggressive Air Sampling - Means using extreme efforts to simulate actual building conditions. Occupancy characteristics by causing air circulation patterns with equipment such as fans or leaf blowers.
- E. Airlock - A system for permitting ingress and egress with minimum air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways separated by a distance of at least 3 feet such that one passes through one doorway into the airlock, allowing the doorway sheeting to overlap and close off the opening before proceeding through the second doorway, thereby preventing flow through contamination.
- F. Air Monitoring - Means the process of collecting air samples on a fiber membrane cassette and then having them analyzed to determine the number of fibers present. Analytical results are expressed in terms of fibers per cubic centimeter of air.
- G. Air Monitoring Professional - A specially trained individual, who has successfully completed a NIOSH 582 Training Course, employed by the Owner, who is qualified by education and/or experience to obtain and test air samples in and around the work areas to determine airborne concentrations of asbestos fibers.

- H. Amended Water - Water to which surfactant has been added. Surfactant should be 50% polyoxyethylene ester and 50% polyethylene ether according to EPA recommendations.
- I. A.N.S.I. - American National Standards Institute, 1430 Broadway, New York, New York 10018.
- J. Asbestos - means a mineral that readily separates into long flexible fibers suitable for use as a noncombustible, nonconducting or chemically resistant material. Asbestiforms include chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.
- K. Asbestos Containing Material (ACM) - Material composed of asbestos of any type and in an amount greater than 1% by weight, either alone or mixed with other fibrous or non-fibrous materials.
- L. Asbestos Containing Waste Material - Asbestos containing material or asbestos contaminated objects requiring disposal.
- M. Asbestos Fibers - Means asbestos fibers longer than 5 micrometers.
- N. Asbestos Project Manager - An individual designated as the Owner's representative and responsible for overseeing the asbestos abatement project.
- O. Asbestos Worker - Means employee who meet all the requirements outlined in OSHA Regulations 29 CFR 1910.1001.
- P. ASTM - American Society For Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.
- Q. Authorized Visitor - The Building Owner (and any designated representatives) and any representative of a regulatory or other agency having jurisdiction over the project.
- R. Bidder - Each prospective Contractor who bids on the work specified herein, and has been pre-qualified by Sun City Analytical, Inc.
- S. Building Owner - Owner of the building or his representative.
- T. Bulk Sample - The collection of any building material section suspected of containing asbestos. A small portion of suspected material is removed from sample area and placed in a plastic bag or air tight container.
- U. CIH- An Industrial Hygienist who by virtue of their education and passing the American Board of Industrial Hygiene Core Examination in either the Comprehensive Practice or an Aspect Examination has been given the right to use CIH by AIHA.
- V. Clean Room - An uncontaminated area or room which is a part of the worker decontamination enclosure system with provisions for storage of worker's street clothes and clean protective equipment.
- W. Clean Air Sample - Means air sample collected immediately following the completion of corrected action. These samples are routinely collected to determine the effectiveness of the corrected action and establish the contractual requirements of acceptable fiber concentrations levels prior to breaking down of abatement control area.
- X. Containment - When used in this specifications means the same as regulated area, shrouding, bubble, temporary enclosure, or controlled area. The means of using plastic to establish work areas and using air

filtration pressure to prevent fiber contamination of building and occupants.

- Y. Contractor - Means the Asbestos Abatement Contractor performing the abatement.
- Z. Control Center - Means the area in close proximity of the entrance to the regulated area where the supervisor or outside man is stationed. This center should be where all documentation required by specifications are, along with emergency numbers and first-aid kits, are available.
- AA. CSP - A Safety Professional who by virtue of their education and passing the Board of Certified Safety Professionals Core Examination has been given the right to use CSP by BCSP.
- AB. Curtained Doorway - Means a device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms, typically constructed by placing two overlapping sheets of plastic over an existing or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one sheet along one vertical side of the door and along the opposite vertical side of the doorway. Other effective designs are permissible.
- AC. Designated Decontamination Area - Means an area designated by the Industrial Hygienist (IH). The area is used for the purpose of decontaminating asbestos contaminated objects and shall be located adjacent to the work area and meet Industrial Hygienist (IH) approval.
- AD. Designated Clean Area - Means an area designated by Industrial Hygienist (IH). The area is within site of the work area free of any asbestos for the purpose of storing decontaminated objects.
- AE. Designated Holding Area - Means an enclosed area designated by Industrial Hygienist (IH). The enclosure is used for the storing of sealed containers of asbestos containing materials and asbestos contaminated waste.
- AF. Decontaminate - Means to remove all visible asbestos dust from the surface to be decontaminated by the means of damp cleaning and/or vacuuming with HEPA filtration equipment.
- AG. Encapsulant - A liquid material which can be applied to asbestos containing material which controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant).
- AH. Enclosure - The construction of an air-tight, impermeable, permanent barrier around asbestos containing material to control the release of asbestos fibers into the air.
- AI. EPA - U.S. Environmental Protection Agency 401 M Street S.W., Washington, D.C. 20460
- AJ. Equipment Decontamination Enclosure System - Means that a portion of a decontamination enclosure system designed for controlled transfer of materials and equipment into or out of the work area, typically consisting of a washroom and holding area.
- AK. Equipment Room - A contaminated area or room which is part of the worker decontamination enclosure system with provisions for storage of contaminated clothing and equipment.
- AL. Filtered Exhaust System - A portable exhaust system equipped with HEPA filtration and capable of maintaining a constant low velocity air flow through contaminated areas from adjacent uncontaminated areas and maintaining a lower pressure in the containment area as compared to the adjacent uncontaminated areas.

- AM. Fixed Object - A piece of equipment or furniture in the work area which cannot be removed from the work area.
- AN. Friable Asbestos - Asbestos containing material which can be crumbled to dust, when dry, under hand pressure.
- AO. HEPA Filter - Means High Efficiency Particulate Air Filter that is capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micro meters in diameter or larger.
- AP. HEPA Vacuum - Means a special type of vacuum cleaner used in the abatement project that must be equipped with a HEPA filter.
- AQ. Glovebag - Means a special purpose custom containment bag with protective gloves and arm sleeves, tool pouch and side port for the use of separating or removing pipe insulation.
- AR. HVAC - Means heating, ventilation and air conditioning system.
- AS. Industrial Hygiene - Is that science and art devoted to the recognition, evaluation, and control of those environmental factors or stresses arising in or from the work place, which may cause sickness, impaired health and well-being, or significant discomfort and inefficiency among workers or among the citizens of the community.
- AT. Industrial Hygienists (IH) - An individual who by education or experience has gained competence in the field of industrial hygiene. In this manual the IH is the owners representative and/or the air monitoring professional.
- AU. Movable Object - A piece of equipment or furniture in the work area which can be removed from the work area.
- AV. Air Filtration System - A portable exhaust system equipped with HEPA filtration and capable of maintaining a constant low velocity air flow into contaminated areas from adjacent uncontaminated areas.
- AW. NESHAPS - The National Emission Standards for Hazardous Air Pollutants.
- AX. NIOSH - The National Institute for Occupational Safety and Health. CDC -NIOSH Building J N.E. Room 3007 Atlanta, GA 30333
- AY. OSHA - The Occupational Safety and Health Administration, 200 Constitution Avenue, Washington, D.C. 20210. For work in New Mexico the regional office the Environmental Improvement Division (505) 827-2452. In Texas the Regional OSHA office is 1-800-692-4202.
- AZ. Regulated Area - The demarcated areas in which asbestos train personnel activity takes place. This includes any area roped off by the contractor or owner with asbestos warning signs and/or tape.
- BA. Shower Room - A room between the clean room and the equipment room in the worker decontamination enclosure with hot and cold or warm running water controlled at the tap and suitably arranged for complete showering during decontamination.
- BB. Shrouding (Full) - Means the process of covering all the interior surfaces (floor, walls, doorways, windows, ceiling) of a room with polyethylene sheeting.

- BC. Semi-Shrouding - Means the process of covering a portion of the interior surfaces (floor, walls doorways, windows, ceiling, etc.) of a room with polyethylene sheeting.
- BD. Surfactant - A chemical wetting agent added to water to improve penetration.
- BE. Tunneling - Means the forming of connected enclosed corridors with plastic sheeting for passageways between shrouded and/or semi-shrouded enclosures.
- BF. Visible Emissions - Any emissions containing particulate asbestos material that are visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.
- BG. Waste Transfer Airlock - A decontamination system utilized for transferring containerized waste from inside to outside of the work area.
- BH. Wet Cleaning - The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils which have been dampened with water and afterwards thoroughly decontaminated or disposed of as asbestos contaminated waste.
- BI. Work Area - Means the portion of a building (or structure) comprised of the room(s) and connecting passageway(s) (such as other rooms, hallway, corridors, etc.) required to gain access to the designated material(s) to be removed.
- BJ. Work day - Means any day between the project start and the completion date, with the exception of weekends. Weekends may become work days if authorized by the Owner.

END OF THIS SECTION

SECTION 01300 SUBMITTALS

1.01 Submittals required following issuance of Notice to Proceed:

- A. Proof of Asbestos Abatement experience:
- B. Proof of personnel qualifications, training and experience:
 - 1. Submit Texas State Contractor License to be able to do asbestos abatement work in Texas.
 - 2. Submit name of supervisor and his TDH license.

1.02 Submittals required at Pre-Abatement Meeting:

- A. Prior to starting project Contractor shall submit to the Industrial Hygienist the following data on all materials, fixtures or equipment intended for use on this project. All material, equipment, and fixtures shall be approved by the Industrial Hygienist. Each item not meeting standard shall be repaired or replaced by Contractor at no added expense to Owner. Each item on the list submitted by the Contractor shall be clearly identified as to proposed location with appropriate reference to drawings and/or specifications. Catalogs, drawing and similar literature shall be clearly marked to identify the items as noted on the lists submitted, and shall be cross-reference therewith. Approval of such items will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor shall be responsible for the dimensions and design of adequate connections, details and satisfactory construction of all work. Contractor shall submit complete narrative, pictorial or manufactures' specifications and technical data brochure(s) to describe:
 - 1. All enclosures, shrouding complete with detailed layout of decontamination facilities, air filtration system units, emergency exit waste load out and control center.
- B. Air filtration system machines shall have the following:
 - 1. HEPA filter set, along with primary and secondary filter.
 - 2. Time meter and filter pressure drop gauge.
 - 3. All accessories of air filtration system as: automatic shut-down if HEPA ruptures or air discharge is blocked, lockout to prevent usage without HEPA filter.
 - 4. Air Filtration System pressure recorder, water gauge or equivalent for use to verify pressure differential.
 - 5. Warning devices in accordance with SECTION 01513 AIR FILTRATION SYSTEM.
- C. Work force to be used, supply number and work schedule for completion of project. Show back up personnel capabilities in the event Contractor falls behind schedule.
- D. Supervisor OSHA medical, and his EPA approved supervisor training certificate to work as a supervisor.
- E. Workers OSHA medical, and his EPA approved worker training certificate to work as a worker.
- F. Work force to be used, supply number and work schedule for completion of project. Show back up personnel capabilities in the event Contractor falls behind schedule. Submit all Texas State license and current training certifications.
- G. Truck or vehicle to be used to transport ACM waste to the HOLDING AREA. Show load capabilities and condition of vehicle.

- H. RESERVED
- I. Decontamination center to be used. (To be used as a back up if needed)
1. Pre-fab or portable showers to be used have Hot and Cold water taps, and made of non-porous materials.
 2. Waste water filtration system to be used shall have a 20 micron primary filter and 5 micron secondary filter. Also submit data on replacement filters.
- J. All respiratory protection equipment brochures describing:
1. Air purifying respirator with HEPA filters and NIOSH approval number. (Only to be used during with written approval of Industrial Hygienist).
 2. Powered Air Purifying respirators with full-facepiece, HEPA filters and NIOSH number.
 3. Type C Supplied air complete with full face piece, pressure demand regulator, NIOSH approval number, back up egress system. Panel board complete with compressor failure alarm, high temperature alarm, carbon monoxide alarm, in line filtration to assure Grade D air, low pressure compressor, and proper CO alarm calibration procedure.
- K. Samples of the following:
1. Plastic sheeting.
 2. Duct tape.
 3. Plastic bags.
 4. Glovebag.
 5. Warning signs, labels and barrier tape.
 6. Disposable clothing.
- L. Brochures for other equipment and supplies:
1. Wetting agent (surfactant).
 2. Encapsulants.
 3. Plastic lined drum.
 4. Vacuum equipment along with HEPA filter to be used.
 5. Air sampling apparatus.
 6. Ground fault interpreters.
 7. Communication system between regulated area and control area.
- M. Submit company Standard Operating Procedures for asbestos abatement projects.
- N. Submit company fire and emergency procedures and spill response plan.
- O. Proof that they meet the ASARCO Fire and Emergency Procedures and Spill Response Plan, Safety Plan and any other required plans. (Contractor shall be instructed prior to entering the Plant of all safety and related issues).
- P. Respiratory Program.
- R. Hazard Communication Program.

1.03 Submittals required Daily during Abatement:

- A. Daily, during the project the following items shall be maintained by the contractor and may be verified by the IH.
- B. Air monitoring results from previous day of sampling. The results shall be hard copy from the approved lab. All air sample results must be posted within twenty four (24) hours.
- C. Daily narrative log of work progress, to include delays, potential change orders, stoppage of work and results of visitors' inspections.
- D. Documentation of inspection of all areas and equipment. Contractor shall note corrections or planned actions for correction.
- E. Notification of any accident or emergency requiring a doctor's treatment or evacuation of any employee.
- F. Documentation of all personnel entering and leaving regulated area.
- G. Within 24 hours submit the documentation of any ACM waste that has been taken to landfill.
- H. Updated construction schedule and abatement plan.
- I. Documentation of filter changes on respirators, HEPA vacuums, filtered Air Filtration System, and other engineering controls.
- J. When Grade D air is required Contractor shall provide compliance with OSHA 1910.134 and document that CO monitor is calibrated on daily basis.
- K. Site Security daily logs submitted to the IH.

- 1.04
- A. Submit within five (5) days of final ACM dumping the Texas waste manifest documenting landfill used and total amount of ACM that was buried.
 - B. All air sample results from testing lab that were not previously submitted.
 - C. A complete log book of all documentation acquired during the project. Contractor shall insure that minutes of final walk-thru with IH, and Owner are incorporated into final project documents along with corrective action taken by Contractor.
 - D. Complete written reports on proper OSHA forms of any accident, emergency or other safety and/or health incident.
 - E. Summary of corrective actions taken of punch list, if any, drawn up by Owner and IH.

1.05 Disapproved Submittals:

- A. Submittal which have been disapproved, the Contractor shall re-submit within 5 days of receipt of the disapproved submittals.

END OF THIS SECTION

SECTION 01410 TESTING LABORATORY SERVICES

1.01 Personnel Air Monitoring and Sampling:

- A. General Requirements: Air monitoring and sampling shall be in accordance with standards and methods required by all applicable regulations.
- B. The Contractor shall obtain the services of an Industrial Hygienist or Professional Air Monitor specialized with the OSHA medical, and his EPA approved air monitoring technician and supervisor training certificates.
- C. The Contractor shall retain a list of qualifications and experience of the individuals who shall be responsible for air monitoring and sampling.
- D. Throughout the removal and subsequent cleaning operations, AMBIENT (AREA) MONITORING will be conducted by the Owner's representative to ensure compliance with all regulations and is conducting the work in a manner which minimizes airborne asbestos levels as well as minimizes the contamination of other areas of the building. Analytical results will be available at the Control Center.
- E. For each set of air samples submitted to the laboratory by the Contractor for analysis, the Contractor shall submit blank cassettes for analysis (minimum of 10%). Each blank cassette shall be submitted as a part of the Contractor's quality control program.
- F. The Industrial Hygienist (IH) may request to QC sample taken by the Contractor. The Industrial Hygienist (IH) will randomly ask for wedge of cassette filter or read a percentage of the Contractor's samples.
- G. Air monitoring results shall include as a minimum for each sample the following: sample ID, laboratory ID, date sample taken, flow (liters/minutes), time (minutes), blank count (fibers/field), fibers/cc, detection limit (fibers/cc), location, employee's name, type of activity and the name of the analyst and the date the sample was analyzed.
- H. All personnel samples for asbestos shall be in accordance with 29 CFR 1910.1001 and as specified in this manual. The Contractor shall sample employees who are anticipated to have the greatest risk of exposure as determined by the industrial hygienist. At least 25% of the work crew or a minimum of two employees, whichever is greater, during a work shift shall be sampled.
- I. Contractor shall also be responsible for monitoring for arsenic following 29 CFR 1910.1018, lead following 1910.1025, cadmium following 29 CFR 1910.1027, and occupational noise exposure following 1910.95. All sampling shall be posted on site during the entire project.

1.02 Third-party Air Monitoring:

- A. General Requirements: Third party area monitoring and project clearance for airborne concentrations of asbestos fibers during an abatement project shall be performed by a project monitor under contract to the building owner to collect samples by and for the owner of the facility being abated.
- B. Project monitors observe abatement activities performed by contractors and generally serve as a building owner's representative to ensure that abatement work is completed according to specification and in compliance with all relevant statutes and regulations.

- C. Project monitors perform the vital role of air monitoring for purpose of determining final clearance.
- D. Project monitor is required to comply with ASHARA, have EPA 5-day supervisor course, NIOSH 582 or 3-day Air Monitoring course and the OSHA medical.
- E. Schedule of Air Samples:
- Baseline: The owner's representative will secure the following air samples to establish a baseline before start of work.

The samples will be taken in accordance with the following schedule:

LOCATION	SAMPLES	VOLUME	RATE
Inside work area	3	1,250 liters	< 10 LPM
Outside work area	2	1,250 liters	< 10 LPM

Baseline will be an action level expressed in fibers per cubic centimeter (f/cc) which is the larger of the following:

- Average of PCM samples collected in work areas.
 - 0.01 fibers per cubic centimeter.
- Daily: From start of work through the end of the project, the owner's representative shall take the following samples on a daily basis. The samples should be taken in accordance with the following schedule:

LOCATION	VOLUME	RATE
Inside containment	1,250 liters	< 10 LPM
Outside containment but inside the building	1,250 liters	< 10 LPM
At negative air unit discharge	1,250 liters	< 10 LPM
Immediately outside the entrance to the decontamination facility	1,250 liters	< 10 LPM
Outside the bag out facility (during gag out activities)	1,250 liters	< 10 LPM

- Additional samples may be taken at the owner's representative's discretion. If airborne fiber counts exceed allowed limits, additional samples may be taken as necessary to monitor fiber levels.

1.03 Methods of Analysis:

- A. Air samples shall be analyzed by Phase Contrast Microscopy method using the NIOSH 7400 method.
- B. Air samples shall be analyzed by an analytical laboratory who possess the following:
 - 1. Lab shall use the NIOSH 7400 method for analysis according to 29 CFR 1910.1001, Appendices A or B which describes the OSHA ORM method and which utilizes the acetone/triacetin sample preparation or equal.
 - 2. Lab to used shall be independent of the Contractor and shall be approved by the Industrial Hygienist.
 - 3. Lab shall have technicians who have their NIOSH 582 Class. Certificate must be submitted to Industrial Hygienist (IH) upon request.
 - 4. Lab shall be a successful participate in the Proficiency Analytical Testing Program (PAT) for the last 4 rounds and have National Institute of Standards and Technology (NIST) certification.
 - 5. Lab shall be capable of delivering results within 24 hours of sampling to the client so the can be posted on the job site.
 - 6. Lab shall have current Texas State License.

1.04 Clearance Samples

- A. Transmission Electron Microscopy - is not required on this contract. If the contractor requests such testing, then he shall bear all costs associated with TEM sampling and analysis.
 - 1. Any TEM analysis shall follow 40 CFR 763 AHERA regulations sampling and analysis protocols.
- B. On this project Phase Contrast Microscopy with NIOSH 7400 method in accordance with SECTION 01714 WORK AREA CLEARANCE, shall be the method used for clearance testing. Clearance samples shall be done in the normal work shift of the contract and shall be noted in the contractors construction schedule and abatement plan. The clearance level has been established as <.005 f/cc.

END OF THIS SECTION

SECTION 01500 TEMPORARY FACILITIES AND CONTROLS

1.01 Temporary Buildings

- A. Provide first aid facilities at control center and in waste disposal vehicle.

1.02 Water for Construction

- A. The Owner will furnish water used during construction so long as the required amounts are within the capacity of the existing building systems. Contractor shall provide piping, valves, and other items required to properly transport the water to the location where it is needed.

1.03 Electricity for Construction

- A. The Owner will provide electrical energy from existing panels as required to operate power tools and equipment and to provide temporary light so long as the required amounts are within the capacity of the existing building systems. Contractor shall provide temporary wiring and outlets as required and temporary lighting if necessary.

1.04 Employee Conduct

- A. The Contractor shall be responsible for ensuring that all employees comply with all Applicable Laws and perform work in a safe manner. Any employees entering the work area under the influence of alcohol or drugs shall be immediately removed by the Contractor from the job site.
- B. The Contractor shall instruct all his employees to refrain from talking with anyone about this project. Any interviews or discussions about the asbestos project shall be done only by written consent from the building owner or his representative.

1.05 Barricades

- A. The Contractor shall provide sufficient barricades, walkways to protect all personnel from injury or exposure to asbestos. All work areas shall be barricaded with proper signs.

1.06 Advertising

- A. At no time will any kind of advertisement be displayed, published, or reported to news media without the expressed written consent of the Owner and IH.

1.08 Security

- A. Site security shall be provided by Contractor at Contractor's expense. See Section 01030.

1.09 Toilets

- A. Contractor may use the ASARCO facilities but shall insure that his employees follow all ASARCO procedures. The bathhouse is not close to this facility, therefore the contractor may need to provide transportation to the bathhouse or provide chemical toilets on site.

1.10 Confined Space Entry

- A. The space above the ceilings are identified by OSHA as confined spaces and are subject to 29 CFR 1910.146. The contractor shall inspect and test all work areas to insure the space is not a permitted confined space area. The contractor shall issue entry permit for his workers if required.
- B. Contractor shall insure that all applicable sections of 1910.146 and 1910.120 are met.

1.11 Scaffolds / Platforms

- A. During this project the Contractor shall erect scaffolding to reach high work areas. Contractor shall comply with OSHA 1910 subparts D walking-Working surfaces.
- B. When powered work platforms are used the Contractor shall comply with OSHA 1910 Subpart F. Powered Platforms, Manlifts, and Vehicle-Mounted work platforms.
- C. Contractors work involves work to be performed above the ceiling. Contractor shall insure the safety of all employees entering in this area. Walking planks or platforms (secured properly)shall be provide by the contractor above the ceiling. Any damage to the ceiling shall be the financial responsibility of the contractor.

END OF THIS SECTION

SECTION 01513 AIR FILTRATION SYSTEM

1.01 Air filtration system may not be required in all areas, but must be used by the contractor in other areas. For these areas, the following shall apply:

- A. Air Filtration must be established in the work area by means of a local exhaust system. The equipment shall exhaust through a three-(or more) stage HEPA filtration system to outside of the building. The equipment shall be in operation for 24 hours per day until final air clearance is achieved.
- B. The system shall have the following characteristics:
 - 1. Filtration equipment in compliance with ANSI Z9.2, Local Exhaust Ventilation.
 - 2. Capable of maintaining a minimum pressure differential of minus 0.02 inches of water gauge in the work area relative to adjacent areas.
 - 3. Air filtration system pressure system units shall be employed in sufficient quantity to provide four (4) air changes per hour in the work place. Use the formula to determine total air flow requirement.

$$\text{Total CFM} = \text{Volume of work area} / 15 \text{ min}$$
$$\text{Number of units} = \text{Total CFM} / 80\% \text{ capacity of unit}$$
 - 4. The hose used to duct the exhaust shall be either new temporary plastic tubing or new wire reinforced ducts.
 - 5. The HEPA filtered ventilation machine shall be equipped with some type of warning sound or horn if:
 - a. any restriction is found in the intake or exhaust, or
 - b. any rupture occurs in the HEPA filter, or
 - c. any loss of electrical power occurs.
- C. Provide a chart recording measuring device or equivalent for use to verify the pressure differential. This data shall be submitted to the IH at the end of the work shift.
- D. Contractor shall install on the containment one fully operational (including filters) backup ventilation machine.
- E. Units shall be placed to provide maximum air flow and prevent short circuiting air flow.
- F. Pre-filter shall be changed as needed as conditions warrant.
- G. The HEPA filters will be checked by the Industrial Hygienist (IH) for integrity and usage, and shall be changed by Contractor if damaged or overloaded.

END OF SECTION

SECTION 01527 WORK AREA PROTECTION

1.01 Preparation of Work Areas

- A. Post warning signs meeting the specifications of OSHA 29 CFR 1910.1001 at any location and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from the work area to permit an employee to read the sign and take the necessary protective measures to avoid exposure. Additional signs may need to be posted following construction of workplace enclosure barriers. Contractor shall post warning signs in both English and Spanish.
- B. All electrical power to all work areas shall have GFI hookups. Ensure safe installation (including ground faulting) to temporary power sources and equipment by compliance with all applicable electrical code requirements and OSHA requirements for temporary electrical systems.
- C. Abatement workers pick up and dispose of any loose ACM debris. Any damaged asbestos material shall be encapsulated prior to any work being done.
- D. Welder shall cut away all chicken wire to allow asbestos workers to access ACM.
- E. Install wind breaker (black poly) containment around all Cottrell outlet distribution flue. This ACM is friable material and should be handled wet during removal.
- F. Install 3 feet plastic barrier around work area to catch any debris falling during the removal process, make provisions to capture water used to wet material also.
- G. The Contractor shall provide a 4A/60BC chemical extinguisher for every 1000 square feet, or fraction, of containment area (LAW Texas Department of Health regulations 295.60 (m)(1). All Workers shall be within a maximum of 100 feet travel distance of a fire extinguisher.
- H. Cleanroom and/or Decontamination Unit:
 - 1. A smoke and/or heat detector shall be located in the cleanroom area.
 - 2. 4A/60BC chemical extinguisher shall be located at either end of the decontamination unit.

1.02 Preparation of Work Areas on Scaffolds

- A. Post warning signs meeting the specifications of OSHA 29 CFR 1910.1001 at any location and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from the work area to permit an employee to read the sign and take the necessary protective measures to avoid exposure. Additional signs may need to be posted following construction of workplace enclosure barriers. Contractor shall post warning signs in both English and Spanish.
- B. All electrical power to the scaffolds shall have GFI hookups. Ensure safe installation (including ground faulting) to temporary power sources and equipment by compliance with all applicable electrical code requirements and OSHA requirements for temporary electrical systems.

- C. Install one layer of plastic liner around all scaffolds walls to be used as a wind breaker (black poly) containment. This ACM is friable material and should be handled wet during removal.
- G The Contractor shall provide a 4A/60BC chemical extinguisher on the working surface of the scaffold or lift. An additional 4A/60BC chemical extinguisher shall be located at floor level of the scaffold or control center.

END OF THIS SECTION

SECTION 01528 ENTRY INTO CONTROLLED AREAS

1.01 Entry and Exit of Work Area if work is done by ASARCO Employees:

- A. General Requirements: Unless otherwise indicated (such as contract drawing, emergency evaluation, and these specifications) entry and exiting of the work area shall be through the "Worker and Equipment Enclosure" or an "Airlock".
- B. Entry and Exit through "Worker and Equipment Enclosure":
- C. Entering the Work Area: Each worker and/or authorized visitor shall enter the clean room, remove street cloths, put on a clean approved respirator and two sets of protective clothing. From this point, workers and/or visitors shall not eat, drink, smoke, chew gum or tobacco while in the work area. Respirator shall be tested for proper fit and operation.
- D. To exit the work area the workers shall dust them selves off and then use the buddy system to vacuum each other off in the dry-decon. Remove one suit and dispose of it in a provided 6 mill bag inside the containment.
- E. With one suit and your respirator on proceed to the ASARCO bathhouse.
- F. FOLLOW ALL ASARCO DECONTAMINATION PROCEDURES WHEN USING THE BATHHOUSE.

1.02 Entry and Exit of Work Area if work is done by NON-ASARCO Employees:

- A. General Requirements: Unless otherwise indicated (such as contract drawing, emergency evaluation, and these specifications) entry and exiting of the work area shall be through the "Worker and Equipment Enclosure" or an "Airlock".
- B. Entry and Exit through "Worker and Equipment Enclosure":
- C. Entering the Work Area: Each worker and/or authorized visitor shall enter the clean room, remove street cloths, put on a clean approved respirator and two sets of protective clothing. From this point, workers and/or visitors shall not eat, drink, smoke, chew gum or tobacco while in the work area. Respirator shall be tested for proper fit and operation.
- D. To exit the work area the workers shall dust them selves off and then use the buddy system to remove any excess asbestos in the work area. Proceed to the dirty/equipment room.
- E. In the dirty/equipment room remove contaminated tyvek suit and dispose of it in an asbestos disposal bag. Non-disposable footwear shall be removed and stored. Still wearing respirator, proceed naked to showers.
- G. Still wearing respirator, while showering wash and soak filters; remove respirator and continue to wash respirator with soap and water. Then proceed to wash body and hair with soap and shampoo. Then drying off and proceed to clean room.
- G. In the clean room, worker and/or visitor shall proceed to dress in street their clothes or clean coveralls. Coveralls worn outside the clean room of the enclosure shall be of a different color or marked for easy identification from those worn in the work area.

- H. Before re-entering the work area from the clean room, each worker and/or authorized visitor shall put on a clean respirator and dress in clean protective clothing and follow the above procedures.
- I. In the vestibule airlock remove protective clothing while still wearing the respirator and place into a disposable bag. The exterior of the respirator shall then be wiped with a damp rag or disposable towel which is placed in the disposable bag. While still wearing the respirator, exit the airlock after the disposable bag is sealed and left in vestibule.
- J. Once outside the airlock, the respirator shall be removed, respirator cartridges removed and disposed as asbestos contaminated waste. The respirator shall then be washed, new cartridges installed and placed in a the appropriate storage container.

END OF THIS SECTION

SECTION 01560 RESPIRATORY PROTECTION

1.01 Respiratory Protection

- A. Respiratory protection shall be provided to workers in conjunction with a Respiratory Protection Program which shall meet the requirements of 29 CFR 1910.134 and 1910.1001. This program shall be posted at the work site. Respirators shall be personally issued, fitted and marked. All workers shall be familiar with the contents of the respiratory program.
- B. The Contractor shall provide documentary evidence that all personnel required to wear respiratory protection have been trained in accordance with 40 CFR Part 763, 29 CFR 1910.134, 1910.1001 and 1926.1101.
- C. The Contractor shall provide the workers with clean and properly maintained respiratory equipment approved by NIOSH/MSHA during all work phases in this project.
- D. Positive air purifying respirators (PAPR) with high efficiency particulate (HEPA) filters shall be the minimum respirator used on this project. This PAPR shall be used even when prep work is preformed, bagging out and demobilization provided that ambient air monitoring allows it.
- E. Type C supplied air shall be the initial respirator worn when beginning any asbestos abatement on this project because due to all the other contaminants such as lead, cadmium, arsenic and asbestos. Contractor shall have on site all historic data for all other contaminants and documentation in accordance with OSHA 1926.1101 when any other respirator is used. Type C supplied air or SCBA with full face piece operated in a pressure demand mode shall be used inside any containment utilizing pressure differential to maintain inward air flow. The Type C air supply must also have an auxiliary self-contained SCBA operating in a pressure demand mode, or high efficiency particulate (HEPA) filter which provides a 15 minute escape time in the event of compressor failure or malfunction. See Section 01030 for respiratory protection specified.
- G. When Type C respirators are employed, the air supply system shall provide grade "D" or better breathing air in accordance with OSHA 29 CFR 1910.34 and ANSI Z86.1 Commodity Specification for Air.
- H. The air shall be tested by the Contractor to verify that certain criteria established by the Compressed Gas Association, Inc., has been met or exceeded. The Contractor must provide a written copy of the analytical test results prior to using system. The Contractor shall be responsible for all fees associated with these tests. All tests will be performed at the job site and in the presence of the Owners representative.
- I. For bottled air filled with compressed air, or manufactured air Contractor shall follow the same test as above. For bottled air the Contractor must provide a certificate from the supplier stating the air is grade "D" or better.
- J. It is the Contractor's responsibility to provide adequate respiratory protection for any foreseeable contingency.
- K. Anytime the compressor or the Grade D Panel is moved, the Contractor shall perform a new Grade D air Test as stated in G and H. above.
- L. The Carbon Monoxide (CO) calibration of the panel shall be done and recorded in the log book daily.

END OF THIS SECTION

SECTION 01562 PERSONNEL PROTECTION

1.01 Personnel Protection:

- A. **General Requirements:** The Contractor shall provide all personnel training, equipment, materials, services and liability insurance required to perform the work in accordance with applicable Federal, State and Local regulations and this specification.
- B. Prior to commencement of work, workers shall be instructed, and be knowledgeable of the specific Asbestos Removal Procedures to be used in this project. In addition to the instructions, on-site training in the use of equipment and facilities unique to the job site shall be performed, to include emergency procedures, such as equipment power failures, fires, evacuations, etc.

1.02 Worker and Visitor Protection

- A. Provide workers with sufficient sets of protective full-body clothing. Such clothing shall consist of full-body coveralls and respirator. Provide eye protection and hard hats as required by applicable safety regulations. Non-disposable type protective clothing and footwear shall be left in the contaminated equipment room until the end of the abatement work, at which time such items shall be disposed of as asbestos waste, or shall be thoroughly cleaned of all asbestos containing waste. Disposable type clothing, and footwear may be used and shall be disposed of as asbestos waste. Bare feet will not be permitted.
- B. Provide authorized visitors with suitable protective clothing, respirator, headgear, eye protection and footwear, as described in paragraph A. above, whenever they are required to enter the work area.
- C. Each worker shall, upon entering the job site: Remove street clothes in the clean change room, put on a respirator and clean protective clothing before entering the equipment room or work area, the exception shall be that workers intending to reuse contaminated protective shall enter equipment room wearing respirators.
- D. Each time the worker leaves the work area: the worker shall remove gross contamination from clothing before leaving the work area; proceed to the equipment room and remove all clothing except respirators; Still wearing the respirator, proceed to the shower; clean the outside of the respirator with soap and water while showering; remove the respirator; thoroughly shampoo and wash themselves, remove filters (where required) and place them in the container provided for the purpose; and wash and rinse the inside of respirator.
 - 1. Contractor is responsible for providing soap, shampoo, clean and dry towels daily to employees and visitors.
- E. After showering, each worker shall proceed directly to the clean change room and dress in clean clothes at the end of each day's work, or before eating, smoking or drinking. Before re-entering the work area from the clean change room, each worker and authorized visitor shall put on a clean respirator with filters (where required) and shall dress in clean protective clothing, the exception shall be that workers intending to reuse contaminated protective clothing stored in the equipment room shall enter the equipment room wearing respirators.
- F. Asbestos contaminated footwear shall be stored in the equipment room when not in use in the work area. Upon completion of abatement, dispose of footwear as asbestos contaminated waste or clean thoroughly inside and out using soap and water before removing from work area or from equipment and access area.

Store asbestos contaminated protective clothing in the equipment room for reuse or place in receptacles for disposal with other asbestos contaminated materials.

- G. Workers shall not eat, drink, smoke or chew gum or tobacco, or utilize sanitary toilet facilities at the worksite except in established locations outside the work and containment areas, and enclosures.
- H. Workers shall be fully protected with respirators and protective clothing immediately prior to the first disturbances of asbestos-containing or asbestos contaminated waste materials and until final clean-up is completed. This includes removal of fixtures, ceilings, or anything else which may disturb the ACM.
- I. Provide and post, in the Equipment Room and Clean Room, the decontamination and work procedures to be followed by workers.

END OF THIS SECTION

SECTION 01563 DECONTAMINATION UNITS

1.01 Enclosures: (Used as a Backup System)

- A. General Requirements: Several types of enclosures are used, one for the workers and equipment entry and exit of the work area, a second as a holding area for waste storage and load-out area, and a third as a separation between the work area and the non-work area. Enclosure types required for this project shall be governed by special instructions on this specification.
- B. Enclosures can be portable pre-fabricated units or site fabricated units. Contractor shall submit for approval the type of enclosures to be used for this project. The submittal shall be submitted in conjunction with Section 1300 of this specification and included, but not be limited to the following:
 - 1. Floor Plan layout with dimensions showing all components.
 - 2. Material list with sizes and thickness.
 - 3. Plumbing layout showing shower(s), piping, drains, filtration systems(s) and water heater (if used).
 - 4. Electrical (if used) a layout showing lighting and/or outlets.
 - 5. Photographs may be submitted in conjunction with the above items.
- C. The minimum width of any way of exit access shall in no case be less than 28 inches. Where a single way of exit access leads to an exit, its capacity in terms of width shall be at least equal to the required capacity of the exit to which it leads. Where more than one way of exit access leads to an exit, each shall have a width adequate for the number of persons it must accommodate.
- D. Worker and Equipment Enclosure: Shall consist of 3 (three) compartments: clean room, shower room and equipment room separated by airlocks. The envelope of the enclosure shall be leak free.
- E. Clean Room: This room shall be provided with a locker or container for each worker's street clothing, respirators, respirator cartridges, clean work clothing, towels, and personnel supplies. Joint use of this space for other functions, such as office, storage of equipment, materials or tools, shall be prohibited.
- F. Shower Room: This room shall have an adequate number of showers, soap, shampoo and containers (plastic bags) for respirator cartridges. Shower(s) shall be piped with hot and cold or warm water. The room is to be free of any leaks. Under no circumstance shall the shower room be used for cleaning equipment.
- G. Equipment Room: This room shall be used for storage of equipment such as ladders, vacuums, scraping tools, non-disposable footwear, hardhats, goggles and any additional asbestos contaminated work items. This room shall be provided with receptacles, such as plastic bags or approved containers, for the use of disposable coveralls (if used) and asbestos contaminated waste before exiting to the shower. The room may also be provided with a wash area for equipment.
- H. This area shall be cleaned daily (several times a day is recommended) to prevent asbestos debris from being tracked into the shower area.
- I. Airlocks: Airlock curtain (door) shall be formed by two (2) overlapping sheets of plastic (4 mil, minimum) the full height and width of the passageway, each sheet being attached to the ceiling and one side. Each sheet is to be attached on opposite sides of the passageway. The sets of curtains (overlapping sheets) are required, one at each end of a space forming a vestibule, dead space. The space (vestibule) shall be two (2) feet in length by the width of passageway for enclosures and four (4) to six (6) feet in length by width of passageway for other location requiring airlocks.

- J. Filtration System: The shower drain and equipment room drain (if any) shall be connected to a filtration system before being discharged to the sanitary sewer. Filters shall be arranged in parallel banks with a 100 micron pre-filters feeding into a 1 micron final filters. Replaced filters shall be treated as asbestos contaminated waste and disposed of properly.
- K. Holding Area (Waste Storage and Load-Out): Shall consist of at least 1 (one) compartment with an air lock between the compartment and the intended disposal vehicle. The envelope of the compartment and air-lock shall be leak free. Passage between compartment and work area shall have two sheets of plastic overlapping each other.
- L. Separation(s) shall be constructed as follows:
1. Framing of suitable materials such as 2 x 4 wood or metal studs shall be erected between floor with a bottom plate and ceiling with a top plate for distance. Support as required.
 2. Cover both sides with double layer of plastic sheeting (4 mil) with joints staggered and sealed with tape.
 3. Seal all edges of separation at floor, walls and ceiling with caulking to be airtight.
- M. Maintenance of enclosure systems shall be performed by the Contractor.

END OF THIS SECTION

SECTION 01632 PRODUCTS

1.01 Materials:

- A. General Requirements: Materials shall conform to the following:
1. All material shall be delivered to the job site in the original packages, containers, or bundles bearing the name of the manufacturer and the brand name.
 2. Store all materials subject to damage off the ground, away from wet or damp surfaces, under cover sufficient to prevent damage or contamination.
 3. Damaged or deteriorating materials shall not be used and shall be removed from the premises and properly disposed of.
 4. All material not in original containers will be reviewed by Industrial Hygienist (IH).
- B. Plastic (polyethylene) sheets, of four (4) mil thickness or greater as specified in scope of work of this document, in sizes to minimize the frequency of joints. Submit a sample of each thickness intended to be used.
- C. Tape: Capable of sealing joints of adjacent sheets of plastic sheets and for attachment of plastic sheet to finished or unfinished surfaces or dissimilar materials and capable of adhering under both dry and wet conditions, including use of amended water. Submit a sample of each type to be used.
- D. Surfactant (Wetting Agent): Shall consist of 50 percent polyoxyethylene ether and 50 percent of polyoxyethylene polyglycol ether, or equivalent, and shall be mixed with water to provide a concentration of one ounce surfactant to five (5) gallons of water.
- E. Impermeable Containers shall be suitable to receive and retain any asbestos-containing or contaminated materials until disposed of. The containers must be both airtight and watertight. The containers shall be labeled in accordance with OSHA Regulations 29 CFR 1910.1001. The container shall be of six (6) mil plastic bag (submit sample), or plastic lined drum (submit brochure), etc. Submittal required for each type intended to be used in this delivery order.
- F. The Glovebag shall consist of a 6-12 mil bag equipped with long-sleeve gloves, a tool pouch, and side port opening used for water and vacuum application. The glovebag with a zipper arrangement is preferable but not mandatory.
- G. Warning Labels: Container shall have the following notation in accordance with Applicable Laws 29 CFR 1926.158.
- DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE
HAZARD
- H. Encapsulant: A sealant specifically designed to be used after the removal of asbestos to capture any fibers which may be left on surfaces in accordance with requirements of the U.S. Environmental Protection Agency (EPA).

- I. Warning Signs: Signs shall have the following notation in accordance with Applied Laws:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE
HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

- J. Other Materials - provide all other materials as specified in drawings; also, other materials such as lumber, nails, and hardware, which may be required to construct and dismantle the decontamination area and the barriers that isolate the work area.

1.02 Equipment:

- A. Local exhaust ventilation systems shall be designed, constructed, installed, and maintained in accordance with the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI 29.2-79. See Section 01513. This equipment:
1. Shall be portable and equipped with a high efficiency particulate absolute (HEPA) Filtration systems in compliance with ANSI 29.2-79.
 2. Deliver its rated volume of air with a clean first stage filter, an intermediate filter and a primary HEPA filter in place.
 3. The HEPA filter shall be certified capable of removing particles to 0.3 microns at a minimum efficiency of 99.97 percent.
 4. Shall be able to deliver no less than 70 percent rated capacity when the HEPA filter is installed or measure 2.5 inches of static pressure differential on a magnehelic gage.
 5. Shall provide manometer-type negative pressure differential monitor with minor scale division of 0.02 inch of water and accuracy within plus or minus 1.0%.
 6. Shall have an electric mechanism which automatically shuts the machine off in the event of a filter breach or absence of a filter.
 7. Shall have an audible horn which sounds an alarm when the machine has shut itself off.
 8. Shall have an automatic safety mechanism which prevents a workman from improperly inserting the main HEPA filter.
- B. Vacuum equipment: Shall be portable and equipped with High Efficiency Particulate Absolute (HEPA) filters.
- C. Respirator Equipment:
1. Respirators shall be selected from among those approved by the Bureau of Mines, Department of the Interior, or the National Institute for Occupational Safety and Health Department, of Health, Education and Welfare, under the provisions of 30 CFR Part II and shall be used in accordance with Applied Laws 29 CFR 1910.1001.

END OF THIS SECTION

SECTION 01712 CLEANING AND DECONTAMINATION PROCEDURES

1.01 Clean-up Procedures:

NOTE: The clean up procedures can be started by the Contractor whenever his supervisor and the Industrial Hygienist inspect and approve the asbestos abatement areas. The encapsulation shall not be done until the contractor is given approval by the Industrial Hygienist on site.

- A. Remove and containerize all visible accumulations of asbestos containing material and asbestos contaminated debris. Do not use metal shovels to pick up or move accumulated waste. Special care shall be taken to minimize damage to floor sheeting. All equipment not required on the project shall be decontaminated and removed from the area. All ACM disposal bags shall be removed from the containment prior to receiving approval for encapsulation or lockdown.
- B. Wet clean all surfaces in the work area using rags, mops and sponges as appropriate. (Note: Some HEPA vacuums may not be wet-dry vacuums. To pick up excess water and gross wet debris, a wet-dry shop vacuum may be used. This will be contaminated and require cleaning prior to removal from the work area).
- C. Visually inspect all areas where asbestos removal has taken place. Any dust, debris or residue in the containment area shall be considered to be contaminated and shall be treated as asbestos. The area inspection shall be accomplished using good Industrial Hygiene practices and ASTM E-1368-90, AHERA 40 CFR 763 and all applicable asbestos regulations concerning clearance and testing.
- D. The Contractor shall provide the Industrial Hygienist with all proper lighting, ladders, or scaffolding and any necessary tools to perform the clearance inspection.
- E. The Industrial Hygienist (IH) shall ensure that a thorough job of removal and clean up has been conducted. The IH has the right to terminate his inspection and re-direct further cleanup of the whole area if upon discovery of incomplete removal or discovery of debris.
- F. Upon written approval by the Industrial Hygienist in the Contractors logbook, encapsulation or lockdown shall be done on all surfaces including all poly. If the inspection fails, Contractor shall re-clean using all the above mentioned steps.
- G. When encapsulation or lockdown has been applied the Contractor shall wait for a drying period of not less than six (6) hours or at the discretion of the on-site Industrial Hygienist.
- H. When encapsulation has dried, the Contractor shall remove all poly and properly dispose of it.
- I. Following the satisfactory removal of all poly, another inspection shall be performed by the on-site Industrial Hygienist (IH). If any debris is found, the IH shall instruct the Contractor to re-clean the entire area. If the area is clean the IH shall begin with his first step of pre-clearance testing. (See section 01714) Clearance Testing).
- L. Upon achieving the clearance criteria for final clearance the Contractor can begin to remove all critical barriers, air filtration machines and begin his demobilization process.

END OF THIS SECTION

SECTION 01714 WORK AREA CLEARANCE

1.01 Clearance Air Monitoring:

- A. Following the completion of clean-up operations, the Contractor shall notify the Building Owner that work areas are ready for clearance air monitoring.
- B. The Owner shall then arrange for an Industrial Hygienist to sample the air in the work area for airborne fiber concentrations.
- C. The air sampling shall otherwise be conducted using sampling pumps calibrated at a flow rate of at not more than 10 liters per minute using collection media and procedures in accordance with 40 CFR Part 763 and the AHERA regulations. Air volumes shall be sufficient to provide reliable results down to a concentration of 0.005 fibers per cubic centimeter of air (f/cc) or lower. (Volume requirements for transmission electron microscope methods should be in accordance to 40 CFR 763 AHERA and the analytical laboratory).
- D. The number of samples that are required and the specific locations where they shall be taken should be established by the Industrial Hygienist.
- E. All samples at all locations shall indicate concentrations of airborne fibers less than 0.005 f/cc for release of the work area.
- F. When Contractor fails to achieve clean air in any of the above said clearance sampling methods, contractor shall reclean area till samples achieve standards set forth above. Any and all cost arising from this failure to attain clearance levels and the additional cleaning shall be the responsibility of the Contractor. Any penalties due to lost time or additional clearance sampling will be deducted from the final contract payment.
- G. At the discretion of ASARCO and/or Industrial Hygienist the contractor may be required to pass a soil sample test below the work area. These samples shall be required if any leaks or debris is found on the floor.

END OF THIS SECTION

SECTION 01716 DISPOSAL PROCEDURES

1.01 Disposal Procedures

- A. The Contractor shall not be responsible for final disposal of all the asbestos waste contaminated with lead, arsenic, and cadmium. All cost associated with disposal of asbestos waste shall not be part of this contract. The final disposal shall be the responsibility of ASARCO. However, the contractor shall be responsible for proper packaging and labeling. Contractor shall abide by all regulations and policies for handling regulated waste set forth by all regulatory agencies. ASARCO shall provide the lined waste container (roll off) as close to the site as possible.
- B. On a daily basis or at the discretion of the Industrial Hygienist (IH) contractor shall remove ACM waste from containment. Contractor shall not allow excess debris to accumulate on the floor of the containment. Industrial Hygienist (IH) has the right to stop work and direct clean-up.
- C. The Contractor shall coordinate transportation of waste to the ASARCO roll off with the owners representative on site.
- D. The Contractor shall fill out and sign the Waste Manifest prior to disposal in the roll off.
- E. All manifests shall be turned over to the ASARCO Industrial Hygienist or owners representative.
- F. Whenever the waste container is not contiguous with the containment then the ACM waste shall be transported in an enclosed compartment vehicle. The truck driver shall be knowledgeable of ACM spill plan carried in the vehicle. The Contractor shall be responsible for developing a spill plan in accordance with current city, state, federal regulations.
- G. All double bagged ACM shall be placed inside approved safety containers prior to being removed from site. Approved safety containers shall be:
 - 1. DOT approved steel drums.
 - 2. Cardboard type drums with sealable tops.
- H. Approved containers shall be moved by use of buddy system, hand trucks, or carts.
- I. Proper labeling of all waste, waste container (roll off) and vehicle in accordance with applicable laws shall be the responsibility of the contractor. Warning signs in accordance with 40 CFR part 61 NESHAPS regulations shall be placed on the vehicle when loading and unloading vehicle.
- J. Personnel loading asbestos containing waste shall be protected by disposable clothing including head, body and foot protection and at a minimum, half-facepiece, air-purifying, dual cartridge respirators equipped with high efficiency filters.
- K. Loading of any vehicle shall be closely monitored to avoid overloading vehicle capacity. Contractor shall ensure proper load bearing distribution of ACM waste.
- L. The disposal Contractor shall have a spill plan in effect for spills that may occur in transportation or handling. Any bag found to be broken shall be re-bagged and area of contamination shall be cleaned up immediately.

- M. Personnel unloading containers at the Storage Site shall wear protective equipment consisting of disposable head, body and foot protection and, at a minimum, half-facepiece, air-purifying, dual cartridge respirators equipped with high efficiency filters.
- N. Upon completion of un-loading vehicle the poly used to protect the vehicle shall be discarded as ACM waste. Any spillage discovered shall be cleaned and area decontaminated immediately by the disposal contractor.

END OF THIS SECTION

SECTION 02081 GENERAL REMOVAL PROCEDURES

1.01 Removal Procedures

NOTE: No asbestos removal shall be done without the Industrial Hygienist (IH) being on site. Prior to starting any work the contractor shall insure that all personnel are trained in the hazards of working with lead, arsenic, cadmium, working with Sulfurous Acid, working with Converter Cottrell Dust and in high nose areas. Attachments to this manual contain material safety data sheets for Sulfurous Acid and Converter Cottrell Dust to aid in training asbestos personnel.

- A. See Section 01560 and Section 01563 for minimum personnel protection. Industrial Hygienist (IH) shall authorize commencement of removal procedures. Clean and isolate the work area in accordance with Section 01527. Containers or drum shall mean containers that meet DOT 49 CFR 178.
- B. Spray all asbestos containing material with amended water solution, removal encapsulant, or chemical remover using spray equipment capable of delivering a low pressure mist to reduce the release of asbestos fibers. Adequately wet the ACM to the substrate and spray the ACM continuously during the removal practices to maintain adequate wet conditions and minimize fiber release and dispersion. Follow all manufacturers recommended procedures if a manufactured product is used for removal processes.
- C. Saturated asbestos containing material shall be removed in manageable sections. As ACM is removed, material will be placed in a suitable 6 mil polyethylene bags or drum. Material shall not be allowed to dry out prior to containerizing. Surrounding areas shall be periodically sprayed and maintained in a wet condition until visible material is cleaned up.
- D. All material removed shall not be thrown or dropped to the floor. Removal of intact and manageable sections is highly recommended as it will reduce fiber dispersion. All ACM containerized shall be carefully lowered to the ground floor by asbestos personnel.
- E. Containers (6-mil polyethylene bags or drums) shall be sealed when full. All ACM containerized shall be double lined. Bags shall not be overfilled as wet material is heavier than dry material. All containerized material shall be sealed with suitable duct tape, do not use wire or cord as it may break the container. All containerized material shall be decontaminated on the exterior surfaces before leaving the work area.
- F. Large components removed intact shall be wrapped in 2 layers of 6-mil polyethylene sheeting secured with tape for transport to the landfill.
- G. Asbestos containing waste with sharp-edged components (e.g. nails, screws, metal lath, tin sheeting) will tear the polyethylene bags and should be placed into drums for disposal.
- H. After completion of all stripping work, surfaces from which asbestos containing materials have been removed shall be wet brushed and sponged or cleaned by some equivalent method to remove all visible residue.
- I. Clean-up shall proceed in accordance with Section 01712.
- J. After the work area has been rendered free of visible residues, and the Industrial Hygienist (IH) has inspected and approved the area, a thin coat of a satisfactory encapsulating agent shall be applied to all surfaces in the work area including structural members, building components and plastic sheeting on walls, floors and covering non-removable items, to seal in non-visible residue. (Note: 1) High temperature components such as boilers and pipes may not permit the application of some encapsulants. 2) If insulation

or acoustical materials are to be reapplied to the abated area, be certain that the encapsulant selected will permit good adhesion to the substrate. A small area should be tested before application).

- K. Special circumstances (e.g. live electrical equipment, high amosite content of material, materials previously coated with an encapsulant or paint) may prohibit the adequate use of wet methods to reduce fiber concentrations. For these situations, a dry removal method may be required. The contractor will have to acquire special permits, different from those mentioned herein from the NESHAP enforcement agency.

END OF THIS SECTION

SECTION 02089 REMOVAL OF ACM FROM COTTRELL HOPPERS

1.01 Procedures

- A. Lock out all electrical power where actual asbestos removal will occur.
- B. Asbestos removal of asbestos containing mud type material shall be performed using all personal protective equipment to include Type C Respirator. A decontamination station shall be erected, as specified, in its respective section on all areas of abatement.
- C. Prior to starting any work the contractor shall insure that all personnel are trained in the hazards of working with lead, arsenic, cadmium, working with Sulfurous Acid, and in high nose areas. Attachments to this manual contain material safety data sheets for Sulfurous Acid to aid in training asbestos personnel.

1.02 Removal of ACM from Cottrell Hoppers

- A. Set up barrier tape, warning signs, and control center.
- B. Minimum respirator shall be a PAPR with HEPA cartridges and acid gases. Asbestos workers shall use gloves, rubber boots and tyvek suits (or equivalent). This area has the potential of accumulating acid gases, the contractor shall insure adequate personal protective equipment is used in this area throughout the project.
- C. Removal shall be accomplished using a two man team. One man shall be equipped with water sprayer (amended water) while the other man removes the material.
 - 1. Spray amended water/or encapsulation on areas around where asbestos rested on.
 - 2. Hepa vacuum all hoppers (where feasible) that is accessible.
- D. REMOVAL OF THE HOPPERS SHALL BE DONE IN ROWS or SECTIONS. WHEN ONE HOPPER SECTION IS COMPLETELY REMOVED THEN THE ASARCO PERSONNEL SHALL HAVE ACCESS TO THE HOPPER IN ORDER TO RE-INSULATE THE HOPPER PRIOR TO ANY ADDITIONAL REMOVAL OF ACM FROM THE OTHER HOPPERS IS BEGUN. SCHEMATICALLY ROWS 7, 6, 5 ARE SCHEDULED FOR REMOVAL FIRST.
- E. All ACM material and debris shall be double bagged and disposal procedures in SECTION 01716 of this Manual shall be followed.
- F. Section 01712 Cleaning and Decontamination Procedures shall be followed when the facility IH approves abatement of the hoppers. When ACM has been removed, the remaining hopper shall be HEPA vacuumed
- G. When directed by the facility IH proceed with SECTION 01714 Clearance Testing procedures.

END OF THIS SECTION

Row 7	181 sq ft	155 sq ft	non-asbestos	non-asbestos	223 sq ft
Row 6	151 sq ft	155 sq ft	non-asbestos	non-asbestos	223 sq ft
Row 5	151 sq ft	155 sq ft	non-asbestos	non-asbestos	223 sq ft
Row 4	151 sq ft	155 sq ft	non-asbestos	non-asbestos	223 sq ft
Row 3	151 sq ft	155 sq ft	non-asbestos	non-asbestos	223 sq ft
Row 2	151 sq ft	155 sq ft	non-asbestos	non-asbestos	223 sq ft
Row 1	151 sq ft	155 sq ft	non-asbestos	non-asbestos	223 sq ft

----- Old Slag Road -----

COTTRELL HOPPERS
NOT TO SCALE



Sun City
Analytical Inc.
Environmental Services
1409 Montague Ave.
El Paso, Texas 79902
(915) 533-8640 Fax (915) 533-8643

WPA DESCRIPTION
ASBESTOS ABATEMENT

PROJECT NUMBER
97276

ACAD TITLE
RG\CONV-COT

DRAWN BY
RG

INSPECTOR
LMA

DATE
11/97

LEGEND

ASARCO ELP 0011214

ATTACHMENT I

ASARCO

EP CONVERT COTTRELL DUST

MATERIAL SAFETY
DATA SHEET

92902

PRODUCT/COMPANY IDENTIFICATION

TRADE NAME (COMMON NAME OR SYNONYM) Converter Cottrell Dust		ASARCO PRODUCT CODE# 6140215	
CHEMICAL NAME Complex Mixture	FORMULA Complex Mixture	MOLECULAR WEIGHT Not Applicable	
ADDRESS (No., STREET, CITY, STATE AND ZIP CODE) ASARCO Incorporated 180 Maiden Lane New York, New York 10038 Phone: 212-510-2000			
CONTACT General Information - Department of Environmental Sciences DAY 801-262-2459 NIGHT 801-561-3044 First Aid Information - (Medical Dept.) 415-457-0383 Transportation Emergencies - CHEMTREC 800-424-9300		PHONE NUMBER	ISSUED DATE 2/04/86
			REVISED DATE 11/1/93

B. COMPOSITION/INFORMATION ON INGREDIENTS

MATERIAL OR COMPONENT	C.A.S. #	WT. %	PERMISSIBLE AIR CONC.(mg/cu.m.)	
			OSHA	ACGIH
Lead	7439-92-1	30-40	0.05	0.15
Zinc	7440-66-6	3	None Published	None Published
Cadmium	7440-43-9	2-5	0.005 as Cd	Cd & its cmpds 0.01 total/0.002 re
Copper	7440-50-8	1	1.0 as dust	1.0 as dust
Arsenic	7440-38-2	10	0.01	0.2
Antimony	7440-36-0	1-2	0.5	0.5

C. HAZARDS IDENTIFICATION

PRIMARY ROUTES OF ENTRY INGESTION ☐ INHALATION ☒ SKIN ☐	CARCINOGENICITY IARC and NTP classify cadmium and certain cadmium compounds as Group 2A carcinogens (probably carcinogenic to humans). IARC classifies lead, lead compounds and antimony trioxide as Group 2B carcinogens (possibly carcinogenic to humans). IARC, NTP and OSHA classify arsenic and compounds as Group 1 carcinogens (carcinogenic to humans)
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ACUTE OVEREXPOSURE (SYMPTOMS AND EFFECTS)

Extremely high doses of lead may cause encephalopathy, a brain condition that can result in seizures, coma and death. It should be recognized, however, that exposures of this magnitude in an industrial environment are extremely unlikely.

Arsenic and antimony compounds may cause irritation of the respiratory system, skin and eyes, and gastrointestinal disturbances.

Inhalation of dust or fume from cadmium compounds may cause irritation of the nose and throat. Inhalation of high concentrations of freshly-formed fume may cause a delayed reaction of pulmonary edema with symptoms of coughing, chest pain, chills, shortness of breath and weakness. Metal fume fever with symptoms of fever, chills, metallic taste, chest tightness or nausea may result from inhalation of zinc oxide fume or dust.

Soluble copper salts can cause respiratory irritation, and irritation and/or burns to the skin and eyes.

CHRONIC OVEREXPOSURE (SYMPTOMS AND EFFECTS)

Chronic overexposure to lead may cause diseases of the blood-forming organs, kidneys and liver, damage to the reproductive systems, a decrease in fertility in men and women, damage to the fetus of a pregnant woman, anemia, muscular weakness and kidney dysfunction. Symptoms include: tiredness, uneasy stomach, irritability, poor appetite, metallic taste and loss of sleep. Prolonged overexposure to arsenic compounds may cause liver and kidney abnormalities, peripheral neuritis of the hands and feet and an increased risk of lung cancer. Symptoms include weight loss, nausea, diarrhea, weaknesses, loss of appetite and skin lesions. Long term overexposure to cadmium may cause lung injury (emphysema), lung cancer, and kidney dysfunction (proteinuria). Bone lesions characterized by pain in the back and extremities have been reported.

ADDITIONAL CONDITIONS POSSIBLY AGGRAVATED

Diseases of the blood and blood-forming organs, hypertension, kidneys, nervous and possibly reproductive systems.

ASARCO ELP 0011216

D. FIRST AID MEASURES

Inhalation: Remove from exposure; place individual under care of a physician.

Ingestion: Induce vomiting in conscious individual and call a physician.

Skin or Eyes: Flush with plenty of water. If symptoms develop, consult a physician.

E. FIRE FIGHTING MEASURES

FLASH POINT Not Applicable	AUTO IGNITION TEMPERATURE Not Applicable	FLAMMABLE LIMITS IN AIR (% BY VOL) Not Applicable
UNUSUAL FIRE AND EXPLOSION HAZARDS Not Applicable	FIRE EXTINGUISHING AGENTS RECOMMENDED No specific agents recommended	FIRE EXTINGUISHING AGENTS TO AVOID No specific agents

SPECIAL FIRE FIGHTING PRECAUTIONS

Use NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing if involved in fire.

F. RELEASE MEASURES

SPILLS OR LEAKS

Any method which keeps dust to a minimum is acceptable. Vacuuming is preferred for dust. Use approved respiratory protection if possibility of dust or fume exists. Do not use compressed air for cleaning.

G. HANDLING AND STORAGE

NORMAL HANDLING

Use of approved respirators is required for applications where adequate ventilation cannot be provided. Activities which generate dust or fume should be avoided. When melted, the temperature should be kept as low as possible.

STORAGE

General storage procedures acceptable.

H. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS

Local exhaust ventilation is recommended for dust and/or fume generating operations where airborne exposures may exceed permissible air concentrations.

PERSONAL HYGIENE

Avoid inhalation or ingestion. Practice good housekeeping and personal hygiene procedures. No tobacco or food in work area. Wash thoroughly before eating or smoking. Shower and change clothes at end of work shift. Do not wear contaminated clothing home. Do not blow dust off clothing with compressed air.

SPECIAL PRECAUTIONS/PROCEDURES/LABEL INSTRUCTIONS

Where airborne exposures may exceed the OSHA action level and or PEL, refer to the OSHA Lead Standard 29CFR1910.1025, OSHA Arsenic Standard 1910.1018, or the OSHA Cadmium Standard 1910.1027
LABEL SIGNAL WORD: WARNING

RESPIRATORY PROTECTION

Where airborne exposures may exceed OSHA/ACGIH permissible air concentrations, the minimum respiratory protection recommended is a negative pressure air purifying respirator with cartridges that are NIOSH/MSHA approved against dust, fumes and mists having a TWA less than 0.05 mg/cu.m.

EYES AND FACE

Safety glasses recommended where the possibility of getting particles in eyes exists.

OTHER CLOTHING AND EQUIPMENT

Full protective clothing is recommended for exposures that exceed permissible air concentrations. All contaminated clothing should be removed before leaving plant premises.

I. PHYSICAL/CHEMICAL PROPERTIES

MATERIAL IS (AT NORMAL CONDITIONS) Solid		APPEARANCE AND ODOR Gray Powder, odorless	
MELTING POINT (DEGREES C) Not Available	BOILING POINT (DEGREES C) Not Available	SPECIFIC GRAVITY (H ₂ O = 1) Not Available	VAPOR DENSITY (AIR = 1) Not Applicable
SOLUBILITY IN WATER (% BY WT.) Not Available	pH Not Available	VAPOR PRESSURE (mm Hg) Not Applicable	EVAPORATION RATE Not Applicable

J. STABILITY AND REACTIVITY

STABILITY Stable	CONDITIONS TO AVOID Not Applicable	
1. COMPATIBILITY (MATERIALS TO AVOID) None known		HAZARDOUS DECOMPOSITION PRODUCTS At temperatures above the melting point, metal oxide fumes may be evolved.
HAZARDOUS POLYMERIZATION Will not occur	CONDITIONS TO AVOID Not Applicable	

K. TOXICOLOGICAL INFORMATION

LD50(SPECIES, ROUTE) Arsenic: 763 mg/kg(rat, oral) Lead oxide: 630mg/kg(rat, intraperitoneal) Cadmium: 225 mg/kg(rat, oral) Antimony Oxide: 700 mg/kg(rat, oral)	LC50(SPECIES) Cadmium: 25mg/cu.m./30min.(rat)	MUTAGENICITY Lead, cadmium and antimony tested positive as mutagens in the Ames test. Rats given 580ug/kg of arsenic orally showed developmental abnormalities.
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L. ECOLOGICAL

ECOTOXICITY LC50s are given for the following materials and species: Lead: 3600 ug/mL - daphnia magna Cadmium: 50 ug/mL - daphnia magna Copper: 20 ug/mL - daphnia magna	ENVIRONMENTAL FATE Lead and cadmium are bioaccumulative in most aquatic life and mammals. Lead is highly mobile as dust or fume, yet forms complexes with organic material which limits its mobility. Arsenic is found as As ⁵⁺ in water, making it mobile in aqueous solution. Copper and Antimony are not bioaccumulative.
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M. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE, AND LOCAL DISPOSAL OR DISCHARGE LAWS) If hazardous under 40 CFR 261, Subparts B and C, material must be treated or disposed in a facility meeting the requirements of 40 CFR 264 or 265. If non-hazardous, material should be disposed in a facility meeting the requirements of 40 CFR 257. EPA Hazardous Waste Numbers: Lead - D008, Arsenic - D004, Cadmium - D006	RCRA STATUS OF UNUSED MATERIAL If discarded in unaltered form, material should be tested to determine if it must be classified as a hazardous waste for disposal purposes. Under specific circumstances, application can be made to the EPA Administrator to have a particular waste designated non-hazardous.	40 CFR 261
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N. TRANSPORT

DOT REGULATION AND ID (OR PIN) NUMBER This material is regulated by the DOT as a Class 9, PG III and has an ID no. of UN3077.
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O. REGULATORY INFORMATION

WHMIS CLASSIFICATION, SARA REGULATION AND OTHER INFORMATION WHMIS classifies this material as a Class D-2A poison. TSCA Status.....: On TSCA Inventory Regulated under SARA Title III: Sect. 302.....: None Sect. 311/312.....: Immediate and Delayed Sect. 313 Chemicals.....: Arsenic, Lead, Zinc, Cadmium, Copper, Antimony CERCLA Reportable Quantity.....: Arsenic cmpds = 1#

WARNING: the state of California has listed lead and cadmium as chemicals known to cause cancer, birth defects or other reproductive harm.
and has listed arsenic as a chemical known to cause cancer.

P. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES OSHA regulations for airborne contaminants 29 CFR 1910.1000 and 1018: ACGIH Threshold Limit Values for Chemical Substances
--

P. REFERENCES (Continued)

HAZARD INFORMATION REFERENCES

Documentation of the Threshold Limit Values, 6th Ed., ACGIH
Patty's Industrial Hygiene and Toxicology, Vol. 2A, 3rd Rev. Ed., 1981
NFPA Fire Protection Guide on Hazardous Materials, 10th Ed., 1991
Handbook of Toxic and Hazardous Chemicals; Sittig, Marshall; 1981
TOMES Plus Database; Micromedex, Inc., Vol. 17, 1993
DATATOX Database; Spectrum Research, Inc., Version 2.0, 1992

GENERAL

Handbook of Chemistry and Physics, 57th Ed., 1976-77. Weast, R.C., Editor, CRC Inc.

Q. ADDITIONAL INFORMATION

INFORMATION (HAZARDS, FIRST AID, ETC.) IS ABBREVIATED. MORE INFORMATION IS CONTAINED IN REFERENCES FOUND IN SECTION P.

OSHA Biological Limit for Blood-Lead level is a 3-sample/6-month average of 50 mcg per 100 g of blood and/or two consecutive samples of 60 mcg per 100 g.

The ASARCO recommended airborne exposure for antimony trioxide is 0.2 mg/cu.m. measured as antimony.

THIS MATERIAL SAFETY DATA SHEET IS OFFERED SOLELY FOR YOUR INFORMATION, CONSIDERATION, AND INVESTIGATION. ASARCO INCORPORATED PROVIDES NO WARRANTIES, EITHER EXPRESS OR IMPLIED, AND ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE DATA CONTAINED HEREIN.

ATTACHMENT II

MSDS: #172 -SULFUR DIOXIDE

Revised: Tuesday, May 30, 1995

Formula: SO ₂	Part Number: NOT GIVEN
Specification: 12-R-1	Keyword: Gas
Synonyms: SULFUROUS ACID ANHYDRIDESULFUROUS ANHYDRIDESULFUROUS OXIDE	
Stock Items: NOT GIVEN	

Manufacturer	
RHONE-POULENC BASIC CHEMICALS CO.	Phone Number: 203-925-3300
1 CORPORATE DRIVE. BOX 881	Emergency Phone: 800-424-9300
SHELTON CT 06484-	
Supplier	
RHONE-POULENC BASIC CHEMICALS CO.	Phone Number: 203-925-3300
1 CORPORATE DRIVE. BOX 881	Emergency Phone: 800-424-9300
SHELTON CT 06484-	

Physical Chemical Characteristics	
Boiling Point:	EQ 14 F -10°C @ 760 MMHG.
Melting Point:	NG
Freezing Point:	EQ -104 F -75.5°C.
Pour Point:	NG
Softening Point:	NG
Specific Gravity:	EQ 1.36 @ 25°C(77°F).
Vapor Pressure:	EQ 2475.68 MMHG. 20°C.47.8PSIG.
Vapor Density:	EQ 2.26 @ 20°C.
Percent Volatiles:	NG
Evaporation Rate:	NG
pH:	NG
Molecular Weight:	EQ 64.07
Viscosity:	NG
Solubility in Water	11G/100G WATER.
Odor/Apperance/Other Characteristic:	COLORLESS GAS OR LIQUID, SUFFOCATING, PUNGENT ODOR / ODOR THRESHOLD: 0.5 PPM.

Fire and Explosion Data	
Closed Cup Flash Pt.:	N* NOT COMBUSTIBLE.
Open Cup Flash Pt.:	N* NOT COMBUSTIBLE.
Fire Point:	NG
Auto Ignition:	NO NONE.
Lower Explosion Limit:	NO NONE.
Upper Explosion Limit:	NO NONE.

Shipping Regulations

UN/NA Number:	UN UN 1079
DOT Hazard Class:	2.3
Shipping Label:	POISON GAS
Shipping Name:	SULFUR DIOXIDE, LIQUEFIED

Prepared

Preparer's Name & Title:	NOT GIVEN
Preparation Date:	Tuesday, January 04, 1994

Components

SULFUR DIOXIDE	
OSHA Pel:	NG ppm . 5 mg/m3
ACGIH TLV:	NG ppm . 5.2 mg/m3
STEL:	NG ppm . NG mg/m3
Percent of Product:	EQ 100 % CAS No.: 7446095
Note: PEL & TLV 2 PPM.	

Text Sections

IDENTIFICATION

SEE DATA PAGES FOR ADDITIONAL INFORMATION.
PRODUCT NAME(S): SULFUR DIOXIDE
CHEMICAL NAME OF PRIMARY COMPONENT(S): Sulfur dioxide
SYNONYMS: Sulfurous acid anhydride; sulfurous anhydride; sulfurous oxide.
CAS # AND NAME: 7556-09-5 Sulfur dioxide
SUPERCEDES: MAY 7, 1993
TELEPHONE: (203) 925-3300
24-HOUR EMERGENCY TELEPHONE: CHEMTREC 1-800-424-9300
MANUFACTURER'S NAME AND ADDRESS:
RHONE-POULENC BASIC CHEMICALS CO.
1 CORPORATE DRIVE
BOX 881
SHELTON, CT 06484
(203) 925-3300

INGREDIENTS/SUMMARY OF HAZARDS

SEE COMPONENT PAGE(S) FOR ADDITIONAL INFORMATION.
OSHA HAZARDOUS (H)/
INGREDIENT(S) NON-HAZARDOUS (NH)
(1) Sulfur dioxide H
WARNING STATEMENTS: WARNING! HARMFUL IF INHALED. LIQUID CAUSES BURNS.
EXTREMELY IRRITATING GAS AND LIQUID UNDER PRESSURE. MAY CAUSE ALLERGIC
RESPIRATORY REACTION
Avoid breathing gas. Use with adequate ventilation. Do not get in eyes, on skin or on clothing. Keep container closed. Wash thoroughly after handling.

Wear goggles and face shield, NIOSH-approved respirator, rubber gloves and protective clothing when handling.
(See HEALTH HAZARD DATA/FIRST AID PROCEDURES Section for complete Health Hazard Data)

NATIONAL FIRE PROTECTION ASSOCIATION RATING/HAZARDOUS MATERIALS

IDENTIFICATION SYSTEM:

NFPA HMIS 4: Extreme/Severe

3: High/Serious

HEALTH 3 3 2: Moderate

FIRE 0 0 1: Slight

REACTIVITY 0 0 0: Minimum

SARA TITLE III HAZARD CLASSIFICATION:

IMMEDIATE (ACUTE) HEALTH: YES

DELAYED (CHRONIC) HEALTH: NO

FIRE: NO

SUDDEN RELEASE OF PRESSURE: YES

REACTIVE: NO

PHYSICAL DATA

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

(For additional technical information call 1-800-642-4200)

FIRE AND EXPLOSION HAZARD DATA

SEE DATA PAGES FOR ADDITIONAL INFORMATION.

EXTINGUISHING MEDIA: Not combustible. Use appropriate extinguishing media for material that is supplying fuel.

SPECIAL FIRE FIGHTING PROCEDURES: Wear a NIOSH/MSHA approved self-contained

breathing apparatus and full protective clothing. Evacuate residents who are downwind of fire. Prevent unauthorized entry to fire area. Dike area to prevent runoff and contamination of water sources.

Persons who may have been exposed to contaminated smoke should be immediately relieved from duty and checked for symptoms of poisoning. These should not be mistaken for heat exhaustion or smoke inhalation. See HEALTH HAZARD DATA/FIRST AID PROCEDURES Section, for symptoms of poisoning, first aid procedures and notes to physician.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Keep fire-exposed containers cool with water spray. A fire may warm the contents causing a rise in vapor pressure and possible container rupture. Do not apply water directly to sulfur dioxide leaks. Contain spilled material to prevent entry to streams or sewers.

REACTIVITY DATA

STABILITY: Stable under normal and fire conditions.

CONDITIONS TO AVOID: Elevated temperatures can cause containers to burst.

MATERIALS TO AVOID: As a liquid, reacts violently with alkali, oxidizing agents, powdered potassium and sodium metals. Reacts with water and steam to form corrosive sulfuric acid. Reacts with chlorates to form unstable chlorine dioxide. Moist gas corrodes most metals.

HAZARDOUS DECOMPOSITION PRODUCTS: None.

HAZARDOUS POLYMERIZATION: Will not occur.

HEALTH HAZARD DATA/FIRST AID PROCEDURES

EXPOSURE LIMITS:

CHEMICAL NAME(S) ACGIH (TLV) OSHA (TWA)

Sulfur dioxide 2 ppm, 5.2 mg/m³ (TWA) 2 ppm, 5 mg/m³

TOXICOLOGY DATA:

ORAL LD50 (RATS): No information available

DERMAL LD50 (RABBIT): No information available

INHALATION LC50 (RAT - 1 HR EXPOSURE): 2520 ppm (1)

SKIN EFFECTS (RABBIT): No information available

EYE EFFECTS (RABBIT): Mild (6 ppm/4H/32D)

CARCINOGENICITY: While there have been suggested associations between sulfur dioxide and lung cancer in an epidemiology study and animal experiments, other studies do not support this hypothesis. (4) Sulfur dioxide is not designated as a carcinogen by IARC, NTP, ACGIH or OSHA.

SIGNS OF POISONING: Acute poisoning from sulfur dioxide is rare because the gas is easily detected. It is so irritating that contact cannot be tolerated.

Symptoms include coughing, hoarseness, sneezing, tearing, and breathing difficulty. However, workers who cannot escape high accidental exposure may suffer severe pulmonary damage which can be fatal.

EFFECTS OF SINGLE OVEREXPOSURE:

SWALLOWING: Swallowing liquid sulfur dioxide will burn the mouth, esophagus, and stomach due to the freezing effect of the liquid. Ingestion is not likely to occur.

INHALATION: Breathing sulfur dioxide gas will irritate the eyes, throat and upper respiratory system. Concentrations of 5-10 ppm cause irritation of the nose and throat. Higher concentrations cause irritant coughing. Concentrations of 50-100 are considered dangerous. Exposures to 400-500 ppm are life-threatening. A small percentage of persons with asthma may suffer severe asthma-like reactions of following exposure to relatively low levels of sulfur dioxide.

SKIN CONTACT: Contact with liquid sulfur dioxide causes burns (frostbite).

EYE CONTACT: Liquid causes corneal burns. Concentrations of gas above 20 ppm causes lacrimation (tears) and irritation of eyes.

EFFECTS OF REPEATED OVEREXPOSURE: Repeated exposure of animals to sulfur dioxide can produce a thickening of the mucous layer in the trachea and an increase in goblet cells and mucous glands similar to changes observed in human chronic bronchitis. (2)

Epidemiology studies indicate that chronic exposure at levels above 2 ppm can cause respiratory disease and reduced pulmonary function. (2) Chronic effects include inflammation of the lining of the nose, dry throat and cough. (3)

OTHER EFFECTS OF OVEREXPOSURE: No other effects known.

EXISTING MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE:

Skin irritation

may be aggravated in individuals with existing skin lesions. Breathing of gas may aggravate acute or chronic asthma and chronic pulmonary disease such as emphysema and bronchitis.

EMERGENCY AND FIRST AID PROCEDURES: Remove the patient from immediate source

of exposure and assure that the individual is breathing. If not breathing, use artificial respiration. **GET MEDICAL ATTENTION.**

SWALLOWING: If victim is conscious and alert, give two or more glasses of water or milk to drink. **DO NOT INDUCE VOMITING!** If vomiting occurs, give fluids again. Do not give anything by mouth to an unconscious or convulsing person. **GET IMMEDIATE MEDICAL ATTENTION.**

SKIN: Wash all affected areas with plenty of soap and water while under a safety shower for at least 15 minutes, while removing contaminated clothing and shoes. Do not attempt to neutralize with chemical agents. Seek medical attention immediately. Discard any contamination clothing and shoes.

INHALATION: Remove victim to fresh air. If breathing has stopped, administer artificial respiration. If heart beat is absent, start CPR (cardiopulmonary resuscitation). **GET IMMEDIATE MEDICAL ATTENTION.**

EYES: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes using an eyewash fountain, if available. Lift upper and lower lids and rinse well under them. **GET IMMEDIATE MEDICAL ATTENTION.**

NOTES TO PHYSICIAN: No specific antidote is available. All treatments should be based on observed signs and symptoms of distress in the patient.

Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Personnel involved in

cleaning up a spill or stopping a leak should wear gas masks and/or self-contained breathing apparatus and impervious protective clothing. Small leaks may be readily located by spraying the potential leak area with ammonium hydroxide solution. A dense, white fume will form if sulfur dioxide is present. Locate and control leakage by closing or capping valves. Spill must be contained and prevented from entering streams or sewers. **NEVER APPLY WATER TO A SULFUR DIOXIDE LEAK!** Water causes sulfur dioxide to be more corrosive. A leaking sulfur dioxide container should be shifted so that gaseous rather than liquid material will escape.

A small liquid spill or leak can be handled routinely by passing sulfur dioxide through an alkaline neutralizing solution. One pound of sulfur dioxide is equivalent to about two pounds of lime or one and one-half pounds of caustic soda.

Large spills should be handled according to a predetermined plan. For assistance in developing a plan, contact the Technical Service, 1-800-642-4200.

WASTE DISPOSAL METHOD: Absorbed sulfur dioxide solution must be oxidized to inert sulfate salts before disposal, then disposed of in accordance with Local, State and Federal regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Only trained personnel using

appropriate protective equipment should handle sulfur dioxide. Use NIOSH Analytical Method 7600 & 7024. Avoid breathing gas. Do not get in eyes, on

skin or on clothing. Store in a cool, dry place in properly designed pressure vessels, away from heat and protected from physical damage. Segregate from combustible materials.

SPECIAL PROTECTION INFORMATION

PROTECTIVE EQUIPMENT SHOULD BE USED DURING THE FOLLOWING PROCEDURES:

Manufacture or formulation of this product

Repair and maintenance of contaminated equipment

Clean up of leaks and spills

Any other activity that may result in hazardous exposures

RESPIRATORY PROTECTION: Use NIOSH/MSHA approved full-face respirator with acid gas cartridge. Use positive pressure self-contained breathing apparatus for emergency or other conditions requiring a higher level of protection.

VENTILATION: Use local exhaust as needed to maintain airborne exposure below exposure limits.

PROTECTIVE CLOTHING: Full-body protective clothing, chemical-resistant gloves and boots. Insulated gloves if liquid contact is anticipated.

EYE PROTECTION: Chemical Worker Goggles and full-face shield.

OTHER PROTECTIVE EQUIPMENT: Maintain a sink, safety shower and eyewash fountain in the work area. Have oxygen readily available.

REGULATORY STATUS

TSCA INVENTORY STATUS: This product is listed on the TSCA inventory.

TRANSPORTATION STATUS:

DOT: This material is poisonous by inhalation and has been assigned Special Provision #3 in 49 CFR 172.101

PROPER SHIPPING NAME: Sulfur Dioxide, Liquified

HAZARD CLASS: 2.3

ID #: UN 1079

LABEL: Poison Gas

PACKING GROUP: N/A

SARA TITLE III:

SECTION 302 EXTREMELY HAZARDOUS SUBSTANCE LIST: Sulfur dioxide, RQ=1 lb

SECTION 313 TOXIC CHEMICALS: Not listed

REPORTABLE QUANTITY (RQ) UNDER US EPA CERCLA: Not listed specifically, but RQ=100 lb as D002 waste

RCRA HAZARDOUS WASTE: D002 (corrosive)

STATE/INTERNATIONAL RIGHT-TO-KNOW REGULATIONS:

SULFUR DIOXIDE:

CALIFORNIA: Not listed

CONNECTICUT: Survey

FLORIDA: Toxic

ILLINOIS: Toxic, Chem

LOUISIANA: RTK

MASSACHUSETTS: RTK, EHS, Spill RQ=1 lb

NEW JERSEY: ID# 1759, RTK, TCPA list

NEW YORK: SPL, L, Air RQ=1 lb, L/W RQ=1 lb

PENNSYLVANIA: RTK

RHODE ISLAND: Hazard list, Note TF
CANADA: List, 1%, No. 1483; WHMIS A, D-1, E

REFERENCES

- (1) RTECS, 4/91
- (2) Documentation of TLVs and BEIs, ACGIH
- (3) Sittig, Handbook of Toxic and Hazardous Chemicals and Carcinogens, 2nd edition
- (4) Peacock, P. and Spence, J. "Incidence of Lung Tumors in Mice Exposed to (1) Free Radicals, (2) Sulfur Dioxide", British Journal of Cancer, 21: 606, 1967.

A in the right margin indicates an addition.

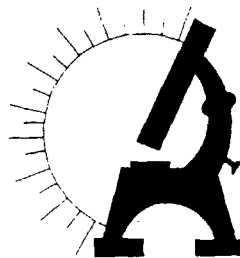
R in the right margin indicates a revision.

SPECIAL NOTES

The information herein is given in good faith but no warranty, expressed or implied, is made.

MSDS #: 03515-90.BSC

PSIS #: SUL.483.B



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