

Kermit Licklider

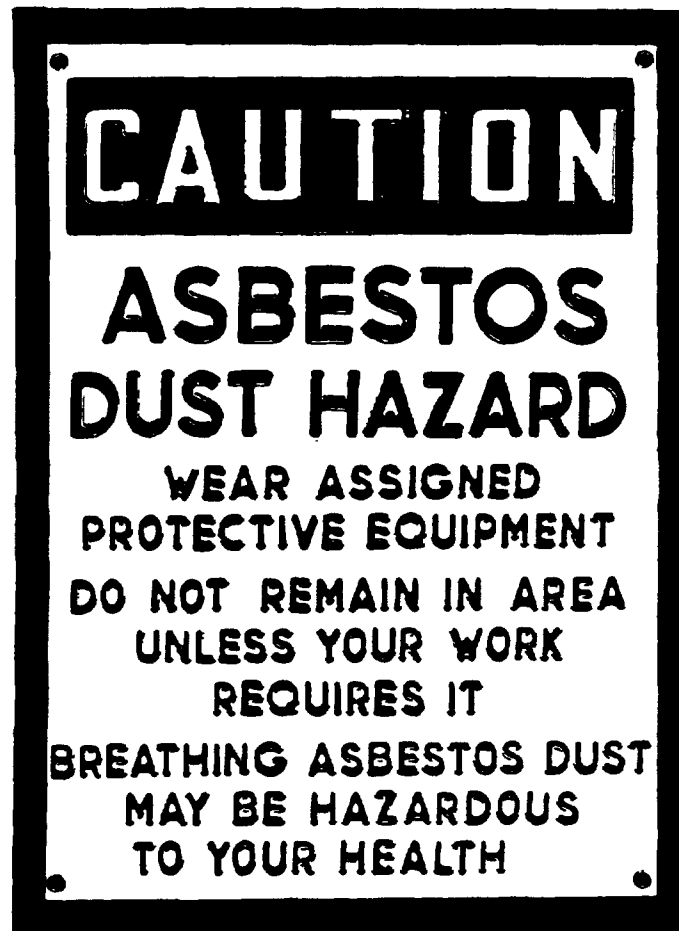


THE DOW CHEMICAL COMPANY

PLAINTIFF'S EXHIBIT

DOW-2125

***TEXAS OPERATIONS
ASBESTOS HANDBOOK***



ST04,22718

***REVISED,
APRIL, 1985***

ST0422718

THIS MANUAL IS AN UPDATED EDITION OF THE HANDBOOK PREPARED IN
1972 AND REVISED IN 1977 AND IN 1979. THIS EDITION WAS REVISED
BY THE ASBESTOS TASK FORCE DURING THE FIRST QUARTER OF 1985.

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HANDBOOK FOR HANDLING ASBESTOS MATERIALS

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SECTION I

PURPOSE

The purpose of this handbook is to define safe handling procedures for asbestos materials used in Texas Operations. The intent is to control the exposure of people to asbestos dust through the proper use of safe work procedures, protective equipment, and by the substitution of non-asbestos containing materials.

Asbestos has been widely used as insulation, structural wallboard, roofing material, etc. Asbestos fibers are used as a mechanical reinforcing matrix in insulation, roofing paper, certain piping systems, gaskets, brake linings, clutch plates, etc. Dow Engineering Specifications were revised in 1970 to exclude asbestos-containing insulation before the enactment of Federal regulations controlling the use and handling of asbestos. It is Dow's philosophy to eliminate all uses of asbestos where possible and as adequate substitutes can be found.

The OSHA standard (1910.1001) which became effective July 7, 1972, defines the precautions, procedures and controls required for asbestos handling. This standard also defines the allowable exposure levels and the manner of determining exposure levels. The National Emission Standard for Hazardous Air Pollutants (NESHAP) also established specific requirements for removal and disposal of asbestos-containing materials. Violations of these regulations may result in a citation or fine or both. Dow is committed to complying with or doing better than government regulations, as needed, to protect the health of people.

References:

Additional information can be found in Texas Operations Safety Standard No. 45 and in Texas Operations Environmental Standard ES-314.

SECTION II

SUMMARY

The health of those who breathe asbestos dust may be seriously affected. The injury, known as asbestosis, scars the lungs and reduces their normal function. This phenomena has been recorded since 1899. More recently (in the last several decades), overexposure to asbestos has also been associated with cancer of the lungs. Anyone handling asbestos on a regular basis is cautioned not to smoke due to the greatly increased cancer risk.

When working with materials containing asbestos fibers, care must be taken to minimize the dust exposures. Wetting of the material prior to handling, isolation of the work areas and use of respiratory protection are some of the measures that will help to protect people from overexposure. These procedures are particularly important in the removal of old, deteriorated insulation and during the sawing of transite.

Disposable protective coveralls provide the needed protection. Disposable clothing is to be disposed of in polyethylene bags properly labeled. In cases where regular coveralls are used, then a double changeroom with two lockers must be used to separate work clothes from street clothes. Asbestos contaminated clothing shall be placed in labeled polyethylene bags for special laundering. Do not wear home or take home for laundering asbestos contaminated clothing. Rubber boots must be worn and washed off before leaving the asbestos work area.

There are a number of dust respirators which have been approved for asbestos handling (see Appendix A). Special protective clothing, such as coveralls, head covering, and gloves may be required on some jobs. These requirements should be determined in the prejob planning prior to starting the work. (See Appendix A for advise on recommended equipment.)

All asbestos waste (old insulation, dust collector solids, disposable clothing, gaskets, packings, etc.) must be put in approved containers (polyethylene bags are available in Dow Stock) for disposal. The bags must be properly labeled to warn of the asbestos hazard.

The Safe Work Procedures outlined in this handbook are minimum guidelines for various type asbestos jobs. The project supervisor must provide specific procedures for each job that are based on the guidance from this handbook to assure the protection of people. The "Asbestos Safety Checklist" should be utilized for each asbestos handling job regardless of size.

SECTION III

ASBESTOS AWARENESS

SUBJECT: ASBESTOS DO'S AND DON'TS

This section is provided as general guidance when working with or near asbestos-containing materials.

DO'S

1. Get positive identification by sampling and analysis at Analytical Services, phone 1075.
2. Take sufficient samples. Some vessels, equipment, etc. may contain more than one type of insulation. Asbestos materials may be covered by refractory, siding, or insulation.
3. Remember that materials other than insulation, fireproofing, and transite siding may contain asbestos (shingles, Haveg piping, furnace refractories, pump packing, pipe gaskets, brake shoes, etc.) These materials should be disposed of in an approved container and sent to the designated asbestos landfill.
4. If asbestos is present, consult the appropriate section of this handbook. Friable materials containing more than 1% by weight must be handled as asbestos.
5. All asbestos waste (old insulation, dust collector solids, disposable clothing, gaskets, packing, etc.) must be put in approved containers (polyethylene bags are available in Dow Stock) for disposal. The bags must be properly labeled to warn of the asbestos hazard.

DON'TS

1. Do not sandblast materials containing asbestos. When sandblasting adjacent areas, protect the asbestos materials from overblast. Examples of items to be protected are transite walls, pipe insulation, fireproofing, etc.
2. Do not use new materials containing asbestos where an adequate alternate exists, such as insulation, fireproofing, transite siding, Haveg piping, weatherproofing, and cooling tower materials. **Major Manager approval is required** when using new asbestos materials for matching replacement/repair of existing asbestos covered structures or equipment if a suitable alternate is known.
3. Do not clean brake drum and clutch housings with compressed air. This procedure may fill the surrounding atmosphere with asbestos fibers. An acceptable method is to use an approved vacuum. Dispose of the debris in approved containers and send to the designated asbestos landfill.

SECTION III

ASBESTOS AWARENESS

SUBJECT: COMMUNICATIONS/REVIEW PROCEDURES

It is the responsibility of the plant superintendent/owner of the area that has the asbestos removal work to be done to notify Environmental Services at extension 1505 a minimum of 25 days prior to starting the actual removal work, and to specify who the project supervisor is that will be handling the job.

Environmental Services has the responsibility for notifying the Texas Air Control Board of applicable jobs in writing 20 days prior to any work starting.

Environmental Services has the responsibility of notifying Industrial Hygiene and the Safety Department of the jobs. The Safety Department will in turn notify the Safety Director of the area involved of the planned asbestos removal work.

The project supervisor is responsible for setting up a meeting with the industrial hygienist and the Safety Director for his area to discuss the job, arrange for audit of the job and decide if industrial hygiene monitoring is needed. The Safety Director and the industrial hygienist are responsible for doing the auditing and industrial hygiene monitoring during the job as needed.

Audit observations of the asbestos removal job and industrial hygiene monitoring data, with recommendations, should be handled in writing to the project supervisor with copies sent to the plant superintendent, safety director, and Manager of Industrial Hygiene. Recommendations should be responded to in writing with distribution to the same people.

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SECTION III

ASBESTOS AWARENESS

SUBJECT: Example pictures of past asbestos uses. Partial listing of examples that we must handle according to the guidance provided in this manual.



Figure 1. Many of our daily jobs involve repairing flange leaks, replacing valves, etc. The old insulation that is removed in many cases will contain asbestos.



Figure 2. Asbestos insulating tape has been commonly used in the past to insulate small lines and tubing.

SECTION III

ASBESTOS AWARENESS

SUBJECT: Example pictures of past asbestos uses. Partial listing of examples that we must handle according to the guidance provided in this manual.

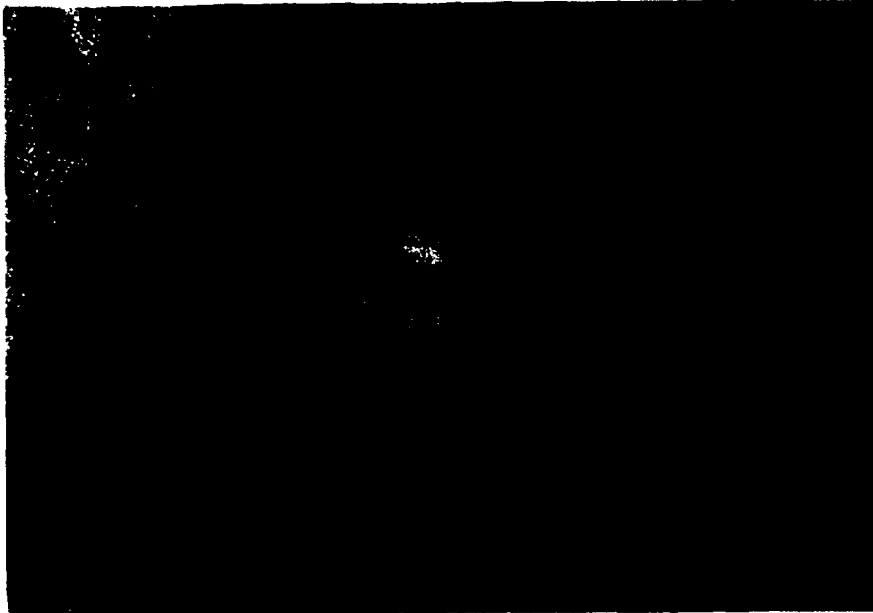


Figure 3. There still remain some asbestos blankets that need disposal.

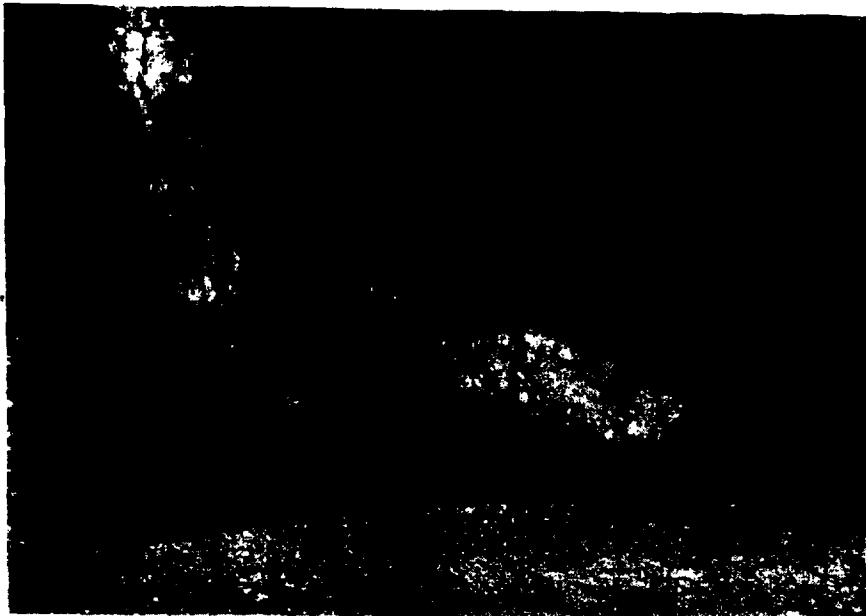


Figure 4. Also used in past years was fiberglass insulation mixed with asbestos fibers.

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SECTION III

ASBESTOS AWARENESS

SUBJECT: Example pictures of past asbestos uses. Partial listing of examples that we must handle according to the guidance provided in this manual.



Figure 5. Structural fireproofing often contained asbestos materials.



Figure 6. Asbestos insulation blocks in combinations with refractory materials exist in many of our boilers and furnaces.

SECTION III
ASBESTOS AWARENESS

SUBJECT: Example pictures of past asbestos uses. Partial listing of examples that we must handle according to the guidance provided in this manual.

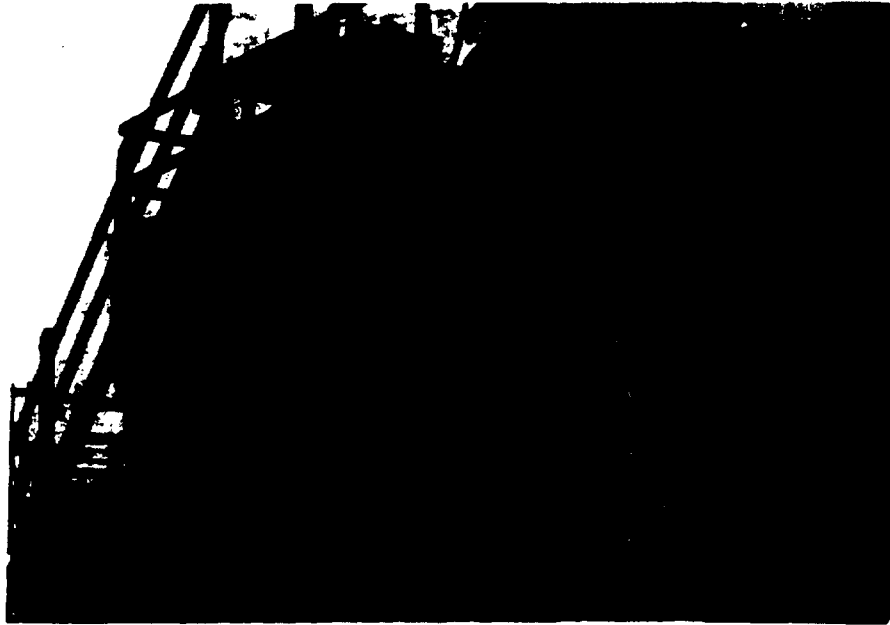


Figure 7. Transite which contains asbestos has been extensively used in the past in many applications in Texas Operations such as cooling towers, buildings, warehouses, etc. Asbestos is also present in cement board and asbestos siding shingles which were also used in various type buildings.



Figure 8. Our most extensive use of asbestos in the older plants was the thousands of square feet used on piping and equipment insulation.

SECTION IV

SAFE WORK PRACTICES

SUBJECT: GENERAL REQUIREMENTS AND PRECAUTIONS

1. The acceptable levels of exposure and the procedures for handling and disposing of asbestos, are regulated by the Occupational Safety and Health Act and the EPA National Emission Standards for Hazardous Air Pollutants. For employees who may have exposures exceeding acceptable limits, monitoring must be done at least every six (6) months. Acceptable limits are: EPA Air Standards - no visible emissions, OSHA - 2 FIBERS/CC 8 HOUR TWA.
2. Handle materials in a manner that will minimize generation of and exposure to asbestos dust. Use water to moisten the material (during sawing, removal from containers, etc.) if there are no problems with material damage or operation safety.
3. Avoid breathing asbestos dust. Make sure that approved respirators are available and that the proper use of this equipment is understood. (See Appendix A.) Disposable respirators must be disposed of daily.
4. Keep all personnel, not directly involved in the asbestos work, away from the area. Anyone required to work in the "isolated" area must first be advised of the potential health hazards and must observe the minimum safety requirements for asbestos related work.
5. Government regulations require the posting of caution signs in areas where the asbestos concentration can exceed acceptable levels. These signs should be placed at the boundaries of the isolated work area to warn people not directly involved in the asbestos work. (See Appendix B.)
6. Good housekeeping is essential to avoid contaminating other work areas. Any asbestos accumulation must not be dry swept. Wet vacuum, water wash down or squeegee is acceptable. The cleanup should be done as soon as the asbestos handling is completed, or daily, as a minimum. In some cases, continuous cleanup and other equipment such as tarpaulins, etc., may be required. Wind conditions should be considered to prevent spreading asbestos throughout the surrounding areas.
7. Along with waste asbestos, all contaminated materials must be wetted and placed in labeled polyethylene bags. The properly sealed plastic bags are to be sent to the designated asbestos landfill. (See Appendix A & B.)
8. Slipping or falling is a hazard to be considered when working around wet asbestos.
9. The superintendent/owner must contact Environmental Services (1505) a minimum of 25 days prior to starting asbestos removal work and specify a project supervisor.
10. The project supervisor must provide a Safe Work Procedure for each job which includes as a minimum the Safe Work procedures listed in this handbook. The Safe Work Procedure will be reviewed with the industrial hygienist and safety director for the area and the personnel performing the work.
11. The project supervisor must meet with the industrial hygienist and safety director for the area to discuss the Safe Work Procedures, arrange for audit and determine if industrial hygiene monitoring is needed.

SECTION IV

SAFE WORK PROCEDURE

SUBJECT: REMOVAL OF FRIABLE ASBESTOS MATERIALS (INSULATION, ETC.)

Minimum Safety Equipment Requirements:

- ST0422730
1. Hard hat must be worn.
 2. Sideshield glasses must be worn.
 3. Approved dust respirator must be worn during material removal and also during cleanup.
 4. Disposable coveralls with hoods must be worn during removal and cleanup operations. Disposable coveralls will be disposed of daily by placing in properly sealed plastic bags and sent to the designated asbestos landfill.
 5. Rubber boots are required and must be washed before leaving the isolated area.
 5. A sufficient area must be taped off and signs placed to warn of asbestos removal work and possible presence of asbestos dust. Wind direction should be considered (see Appendix B).
 7. An Asbestos Safety Check List (page 13) must be filled out prior to the job and properly approved.
 8. All other safety equipment which is required by job location must be used. (Read Area Safe Work Permit.)

Special Precautions:

1. Comply with General Requirements and Precautions.
2. Use water to wet down the material before, during and after removal as necessary to prevent airborne emissions. Avoid high pressure blasting. Use a gentle spray/stream of water and avoid over wetting to the point that the material crumbles and turns to mush. An acceptable method is to use a 2 gallon hand sprayer.
3. Material must not be dropped to the ground. Pre-job planning must include provisions for keeping deteriorated material in place after jacketing is removed. Tarping of scaffold landings, rubber bands, etc., should be considered.
4. Upon removal, provisions are needed so that the asbestos material can be placed directly into labeled polyethylene bags or containers approved by Environmental Operations. This will prevent the scattering of asbestos dust throughout the work area. Bags or containers must be lowered to the ground, not dropped.
5. After material removal, a thorough inspection and cleanup must be made to remove all asbestos materials. Examples of areas to be cleaned are pipe/vessels, scaffold boards, piperacks, surrounding area at grade, etc.

SECTION IV

SAFE WORK PROCEDURE

SUBJECT: REMOVAL OF NON-FRIABLE ASBESTOS MATERIALS (TRANSITE, HAVEG PIPING, ETC.)

Minimum Safety Equipment Requirements:

1. Hard hat must be worn.
2. Sideshield glasses must be worn.
3. Approved dust respirator must be worn during materials removal and also during cleanup.
4. If sawing or drilling is required as part of the job then an Asbestos Safety Checklist (page 13) must be filled out prior to the job. The safe work procedure for sawing and drilling of materials containing asbestos must be followed.
5. All other safety equipment which is required by job location must be used. (Read Area Safe Work Permit.)

Special Precautions:

1. In some instances, the use of water to wet the material to prevent airborne emissions may be required.
2. Materials should not be handled in a manner that will creat dust.
3. Upon removal, provisions must be made with Environmental Operations for disposal.
4. After removal, a thorough inspection and cleanup must be made to remove all asbestos material. Examples of areas to be cleaned are pipe/vessels, scaffold boards, piperacks, surrounding area at grade, etc.

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SECTION IV

SAFE WORK PROCEDURE

SUBJECT: SAWING AND DRILLING OF MATERIALS CONTAINING ASBESTOS

Minimum Safety Equipment Requirements:

1. Hard hat must be worn.
2. Sideshield glasses must be worn.
3. Approved dust respirator must be worn.
4. Disposable coveralls with hoods or slicker suit with hood must be worn during sawing, drilling, and cleanup. Disposable coveralls will be disposed of daily by placing in properly sealed plastic bags and sent to the designated asbestos landfill.
5. Rubber boots are required and must be washed before leaving the isolated area.
6. Tape off area around sawing and cutting operations and place signs to warn of asbestos material (see Appendix B).
7. An Asbestos Safety Checklist (page 13) must be filled out prior to the job and properly approved.
8. All other safety equipment which is required by job location must be used. (Read Area Safe Work Permit.)

Special Precautions:

1. Comply with Items 1-8 of the General Requirements and Precautions (page 9).
2. Materials containing asbestos shall be worked wet (cutting, drilling, etc.) Air driven tools shall be used and materials "adequately wet" with water to eliminate dust hazards. Runoff water shall be contained and wet debris collected. Dispose of wet debris in containers approved by Environmental Operations and send to the designated asbestos landfill. Caution should be exercised when using water above electrical equipment, ceilings, etc. In these situations a means to divert runoff water to a collection system should be considered.
3. Materials should be handled carefully to avoid breakage.
4. Provisions are needed so that scrap asbestos material can be placed directly into labeled polyethylene bags or containers approved by Environmental Operations and sent to the designated asbestos landfill. This will prevent the scattering of asbestos dust throughout the work area. Bags or containers must be lowered to the ground, not dropped.
5. After job completion, a thorough inspection and cleanup must be made to remove all asbestos materials. Examples of areas to be cleaned are pipe/vessels, scaffold boards, piperacks, surrounding area at grade, etc.

SECTION V

ASBESTOS SAFETY CHECK LIST

JOB DESCRIPTION: _____ DATE _____
LOCATION _____

PRE-JOB REQUIREMENTS:

1. Environmental Services Contacted (ph. 1505)? Yes ____ No ____
Name: _____ Date: _____
Dow Project Supervisor: _____
2. Safe Work Procedure Written? Yes ____ No ____ Date: _____
3. Project Review Held? Yes ____ No ____
Industrial Hygienist: _____ Date: _____
Safety Director: _____ Date: _____
Craftsmen: _____ Date: _____

	YES	NO
Safe Work Procedure Approved:	____	____
Hygiene Monitoring Required:	____	____
Audit Required:	____	____
Auditor Assigned: _____ Phone: _____	____	____

JOB REQUIREMENTS: YES NO

- | | | |
|---|------|---------------------|
| 1. Safe Work Procedure reviewed: | ____ | ____ |
| 2. Area taped off and signs up to warn others: | ____ | ____ |
| 3. Have all involved personnel been informed? | ____ | ____ |
| 4. Block personnel informed? | ____ | ____ |
| 5. Auditor notified: | ____ | ____ |
| 6. Water available to control dust: | ____ | ____ |
| 7. Has disposal of asbestos debris been arranged? | ____ | ____ |
| 8. Arrangements for clean-up made? | ____ | ____ |
| 9. Safety Equipment Required | ____ | ____ |
| ____ Disposable Coveralls with Hood | ____ | Side Shield Glasses |
| ____ Dust Respirator | ____ | Rubber Boots |
| ____ Other: See Safe Work Permit | | |

NOTE: Work may commence when Safe Work Permit issued.

10. Final clean up complete (all traces of asbestos removed) Yes ____ No ____
11. Job Complete: Dow Project Supervisor: _____ Date: _____
12. Send completed Checklist to Industrial Hygiene Services - B-101.

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SECTION VI

NOTIFICATION OF DEMOLITION OR RENOVATION WORK INVOLVING ASBESTOS

The National Emission Standard for Hazardous Air Pollutants (NESHAP) established specific requirements for the removal of friable asbestos containing materials and established reporting requirements. The Texas Air Control Board (TACB) has assumed the responsibility of enforcing the asbestos regulations. It is the responsibility of the superintendent/owner to contact Environmental Services (1505) 25 days prior to the start of any asbestos work.

Notification Requirements

1. Demolition - All demolition projects must be reported.
2. Planned Renovation - To determine if notification is required, predict the amount of friable asbestos, either as separate projects or coupled with other associated facility renovations, to be removed from a facility during the calendar year. Asbestos removal resulting from small jobs such as repair of leaking valves, leaking pipelines, or other equipment maintenance should be included in the estimate. If the additive amount exceeds 260 linear feet on pipe or 160 square feet on other facility components, notification is required.

Definitions

The following definitions and explanations are given to assist the superintendent/owner in preparing the notification:

1. Friable Asbestos - Any material containing more than one percent asbestos by weight that hand pressure can crumble, pulverize, or reduce to powder when dry.
2. Demolition - The wrecking or taking out of any load-supporting structural member of a facility.
3. Renovation - Altering in any way one or more facility components.
4. Planned Renovation - Renovation operation in which the amount of friable asbestos material that will be removed or stripped within a given period of time can be predicted. Individual non-scheduled operations are included if a number of such operations can be predicted (i.e., leaking valves).
5. Facility - Any institutional, commercial, or industrial structure, installation, or building. An individual process or production block will be considered a facility in Texas Operations.

References

Additional information can be obtained from Texas Operations Environmental Standard ES-314.

SECTION VII

DOW INDUSTRIAL HYGIENE GUIDE

Eight-hour time-weighted average exposures to asbestos fibers shall not exceed two fibers per cubic centimeter. Peak exposures shall not exceed 10 fibers per cubic centimeter. Asbestos exposures between 2 and 10 fibers/cc shall not exceed fifteen minutes at any one time and must be controlled so that the eight-hour time-weighted average of 2 fibers/cc is not exceeded.

Asbestos concentrations of 2 or 10 fibers/cc are not noticeably dusty conditions; the absence of visible dust should not be used as an indicator of acceptable levels. Where a potential for exposure exists, the asbestos concentrations must be determined by a very specific method using membrane filter monitoring and phase contrast microscopy analysis. For analytical purposes, an asbestos fiber is defined as an asbestos particle longer than five microns with a length to diameter ratio greater than three.

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Consequences of Exposure to Toxic Amounts

COMPOUND: ASBESTOS

EYES: Contact with the dust can cause mechanical irritation similar to that caused by any solid particle.

SKIN: Unlike fibrous glass, the fibers do not cause discomfort or mechanical irritation.

INGESTION: Some evidence suggests that long term ingestion of asbestos may increase chances of stomach cancer.

DUST INHALATION: SHORT TERM: High concentrations (well above acceptable levels) may cause only moderate discomfort from mechanical irritation.

LONG TERM: The fibers can cause scarring of the lungs (Asbestosis). A cancer of the chest lining (Mesothelioma) may also result from asbestos exposure. Most important, asbestos exposure and cigarette smoking greatly increase the risk of lung cancer.

IHG: ACGIH TLV is 2 fibers/cc (Chrysotile), 0.5 fibers/cc (Amosite), 0.2 fibers/cc (Crocidolite), 0.5 fibers/cc (other forms)- 1984-85 TLV Book.

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Issue Date: Revised 6-6-80
Revised 2/22/85 *PPQ*

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HEALTH & ENVIRONMENTAL RESEARCH Industrial Hygiene & Toxicology Laboratories

THE DOW CHEMICAL COMPANY

GENERAL

DATA SHEET OF PROPERTIES, HEALTH HAZARDS, AND PRECAUTIONS FOR SAFE HANDLING OF MATERIALS

K-28126

MOLECULAR FORMULA	NAME Asbestos
MOLECULAR WEIGHT	SYNONYMS
INDUSTRIAL HYGIENE GUIDE See (2) over	
STRUCTURAL FORMULA OR COMPOSITION	

PHYSICAL AND CHEMICAL PROPERTIES	BOILING POINT °C	EXPLOSIVE LIMITS % VOL. IN AIR None	FLASH POINT None	IGNITION TEMP. °C None	MELTING POINT °C	VAPOR PRESS. mm. Hg. Negligible
	CORROSIVENESS (To Common Metals)			PHYSICAL STATE		COLOR
	Not corrosive			Fibrous solid		White, gray or green
	CHEMICAL REACTIVITY			ODOR (Include Concentration in Air)		
	Not reactive			None		
	TOXICITY (To pH Changes, Heat, Light)					
	Excellent					

TYPE OF CONTACT		CLASSIFICATION OF TOXIC PROPERTIES	
TOXIC PROPERTIES	EYE	☒ MAY CAUSE NO RESPONSE OR NO MORE THAN VERY SLIGHT TO SLIGHT TRANSITORY PAIN AND/OR SLIGHT TRANSIENT CORNEAL INJURY AND/OR IRRITATION OF THE EYE. MAY CAUSE SUFFICIENT INJURY TO THE EYE TO RESULT IN LOSS OF TIME FROM WORK. (THIS INCLUDES DAMAGE TO THE CORNEA WHICH HEALS OR NEARLY HEALS IN A WEEK AND/OR CONSIDERABLE CONJUNCTIVAL IRRITATION WITH EDEMA.) ☐	☐ MAY CAUSE SOME PERMANENT LOSS OF VISION (THIS INCLUDES DAMAGE TO CORNEA OR INTERNAL INJURY WHICH IS INCOMPLETELY HEALED IN ONE WEEK.) ☐ VAPOR EXPOSURE MAY CAUSE SEVERE PAIN, LACRYMATION OR SERIOUS INJURY TO THE EYES.
	SKIN	☒ SINGLE PROLONGED EXPOSURE (HOURS) CAUSES NO EFFECT. SEVERAL REPEATED PROLONGED EXPOSURES MAY OR MAY NOT CAUSE THE DEVELOPMENT OF SOME SLIGHT IRRITATION. ☐ SINGLE PROLONGED EXPOSURE MAY CAUSE SOME REDDENING OF THE SKIN. REPEATED PROLONGED CONTACTS MAY CAUSE APPRECIABLE IRRITATION, POSSIBLY A MILD BURN AND/OR MAY CAUSE APPRECIABLE SYSTEMIC INJURY DUE TO ABSORPTION.	☐ SINGLE SHORT EXPOSURE (MINUTES) MAY CAUSE CONSIDERABLE IRRITATION AND/OR SINGLE PROLONGED OR FREQUENTLY REPEATED SHORT EXPOSURES CAUSE A BURN AND/OR MAY CAUSE SYSTEMIC INJURY, EVEN DEATH. ☐ AN EXPOSURE RAPIDLY CAUSES SEVERE BURNS AND/OR SERIOUS SYSTEMIC INJURY, EVEN DEATH.
	DUST OR MIST	☐ NO SYSTEMIC INJURY EXPECTED. NO IRRITATION TO NOSE AND THROAT IN DUSTY OR MISTY ATMOSPHERES. ☐ THROAT AND NOSE IRRITATION IN A DUSTY OR MISTY ATMOSPHERE IS PAINFUL, BUT NOT INTOLERABLE AND/OR PROLONGED OR REPEATED EXPOSURES MAY CAUSE SYSTEMIC INJURY.	☒ DUSTY OR MISTY ATMOSPHERE EXPOSURE MAY CAUSE SERIOUS SYSTEMIC INJURY, EVEN DEATH. ★★ ☐ SHORT EXPOSURE (MINUTES) MAY CAUSE DEATH OR SERIOUS SYSTEMIC INJURY.
VAPOR	☐ EXPOSURES DO NOT CAUSE ANY EFFECTS OTHER THAN SOME VERY SLIGHT IRRITATION OR PAIN TO THE EYES OR RESPIRATORY PASSAGES AT THE MOST. ☐ SINGLE EXPOSURES EXCEEDING 1/2 HOUR, OR FREQUENTLY REPEATED EXPOSURES OF SHORTER DURATION, MAY CAUSE SLIGHT ANESTHESIA AND/OR SLIGHT SYSTEMIC INJURY, AND/OR CAUSE APPRECIABLE, BUT NOT INTOLERABLE, IRRITATION OF RESPIRATORY PASSAGES. ☐ EVEN VERY SHORT EXPOSURE WILL CAUSE SERIOUS SYSTEMIC INJURY OR DEATH.	☐ EXPOSURES MAY CAUSE EXTREME DROWSINESS, AND/OR SERIOUS SYSTEMIC INJURY, AND/OR MAY CAUSE INTOLERABLE IRRITATION TO THE RESPIRATORY PASSAGES. ☐ SHORT EXPOSURES MAY CAUSE UNCONSCIOUSNESS, AND/OR SERIOUS SYSTEMIC INJURY, INCLUDING DEATH.	
INGESTION	☒ AMOUNTS WHICH MAY BE SWALLOWED INCIDENTAL TO INDUSTRIAL HANDLING WILL NOT CAUSE INJURY. HOWEVER, IF SUBSTANTIAL QUANTITIES SHOULD BE SWALLOWED, MORE OR LESS SERIOUS EFFECTS MAY OCCUR.	☐ AMOUNTS WHICH MAY BE SWALLOWED INCIDENTAL TO INDUSTRIAL HANDLING AND USE MAY CAUSE SERIOUS INJURY.	

COMMENTS

ST0422737

Asbestos

DEGREES OF EXPOSURE RELATED TO TYPES OF OPERATION		PRECAUTIONS (SEE CODE BELOW)				
		EYES	SKIN	INHALATION		INGESTION
				DUST OR MIST	VAPOR	
I NO CONTACT	CHARACTERIZED BY REMOTE OPERATION WITH EQUIPMENT ISOLATED FROM THE WORK AREA. THE PERSONS ENTERING ISOLATED AREAS WILL WEAR THE PERSONAL PROTECTION OUTLINED FOR IV BELOW.	A	A	A		A
II MINOR CONTACT	CHARACTERIZED BY CLOSED SYSTEMS WITH EQUIPMENT VENTED OUTSIDE THE WORK AREA; INSTRUMENT CONTROL; MECHANICAL HANDLING OF MATERIALS IN BULK. EXAMPLES ARE: CONTINUOUS REACTORS, STILLS AND FILTERS; ENCLOSED CONVEYORS; VENTILATED PACKAGING.	B	A	A		A
III OCCASIONAL DAILY CONTACT	CHARACTERIZED BY MANUAL HANDLING OF MATERIALS IN PACKAGES SUCH AS BAGS, DRUMS AND FIBERPAKS. VENTILATION MAY BE PROVIDED FOR SPECIFIC JOBS. MANY BATCH OPERATIONS FALL INTO THIS CATEGORY.	B	B	D		A
IV GROSS CONTACT LIKELY	CHARACTERIZED BY HAND OPERATION. EXAMPLES ARE: EMERGENCY REPAIRS, CLEANING EQUIPMENT, CLEANING FILTERS, TAKING CARE OF SPILLS, PACKAGING VOLATILE OR DUSTY MATERIALS WITHOUT VENTILATION, WHEELING AND TRAY DRYING.	B	B	D		A
EYE CONTACT		A NO EYE PROTECTION NEEDED. B USE SAFETY GLASSES WITHOUT SIDE SHIELDS. C USE SAFETY GLASSES WITH SIDE SHIELDS. D USE CHEMICAL WORKERS GOGGLES. E USE GAS TIGHT GOGGLES OR A FULL FACE GAS MASK.				
SKIN** CONTACT See below (1)		A A BATH AND CLEAN CLOTHES ONCE PER WEEK ALONG WITH THE USUAL WASHING AT MEALTIMES SHOULD BE ADEQUATE PRECAUTIONS. B GROSSLY CONTAMINATED CLOTHING AND SHOES SHOULD BE REMOVED IMMEDIATELY AND WASHED SEPARATELY FROM OTHER CLOTHING. C REGULAR SHOWER AT THE END OF THE WORK PERIOD AND CLEAN CLOTHING FROM THE SHED OUT AT THE START OF EACH WORK DAY. D CLOTHING SHOULD BE CHANGED AND SKIN WASHED PROMPTLY UPON ANY DETECTABLE CONTACT. EACH USE WILL REQUIRE SPECIAL CONSIDERATION TO DETERMINE SUITABLE PROTECTIVE DEVICES AND STANDARDS OF PERSONAL CLEANLINESS. E IMPERVIOUS CLOTHING SUCH AS RUBBER BOOTS, RUBBER APRONS, AND RUBBER GLOVES WILL BE REQUIRED. SPECIFIC ITEMS WILL BE DICTATED AS REQUIRED BY CIRCUMSTANCE.				
INHALATION	DUST OR MIST	A NO RESPIRATORY PROTECTION. B NO PROTECTION REQUIRED FOR EXPOSURE OF THIRTY MIN. DURATION OR LESS TO OBVIOUSLY DUSTY ATMOSPHERES. EXPOSURES OF LONGER DURATION WILL REQUIRE THE USE OF A DUST RESPIRATOR BEARING THE APPROVAL OF THE U.S. BUREAU OF MINES FOR THE USE WITH TOXIC DUSTS. C ANY EXPOSURE TO OBVIOUSLY DUSTY ATMOSPHERES WILL REQUIRE A DUST RESPIRATOR BEARING THE APPROVAL OF THE U.S. BUREAU OF MINES FOR USE WITH TOXIC DUSTS. D ANY EXPOSURE TO DUSTY ATMOSPHERES WILL REQUIRE THE USE OF AN AIR-LINE RESPIRATOR, BLOWER MASK, OR CHAMBER MASK.				
	VAPOR	A NO PRECAUTIONS NECESSARY. B NO PRECAUTIONS NECESSARY FOR SINGLE EXPOSURES OF LESS THAN 1/2 HOUR. LONGER SINGLE EXPOSURES, OR FREQUENTLY REPEATED EXPOSURES WILL REQUIRE A GAS MASK OR RESPIRATOR EQUIPPED WITH APPROPRIATE CANISTER. C TEN MINUTES. LONGER EXPOSURES EITHER SINGLE OR REPEATED, WILL REQUIRE GAS MASK OR RESPIRATOR EQUIPPED WITH APPROPRIATE CANISTER. D GAS MASK WITH APPROPRIATE CANISTER REQUIRED AT ALL TIMES. E EVACUATE AREA AT ONCE AND ENTER ONLY WITH AIRLINE RESPIRATOR, BLOWER MASK OR CHAMBER MASK.				
INGESTION		A NO UNUSUAL PROCEDURES REQUIRED. B FOOD AND TOBACCO SHOULD NOT BE PRESENT IN THE WORK AREA. HANDS AND FACE SHOULD BE WASHED BEFORE SMOKING AND EATING.				

COMMENTS

**GOOD PRACTICE REQUIRES THAT GROSS AMOUNTS OF ANY CHEMICAL BE REMOVED FROM THE SKIN AS SOON AS IS PRACTICAL

*SUITABLE GAS MASK CANISTER

(See SLP Tek Bulletin #3)

Approved dust respirator

NOTE: Asbestos workers who smoke cigarettes have increased risk of lung cancer.

(1) Grossly contaminated clothing should be removed immediately and must be thoroughly cleaned before reuse.

(2) 1984-85 TLV book published by the ACGIH, page 40, appendix A.1.a.

A18. Human Carcinogens. Substances, or substances associated with industrial processes, recognized to have carcinogenic or cocarcinogenic potential, with an assigned TLV:

Asbestos	
Amosite	0.5 fiber > 5µm/cc
Chrysotile	2 fibers > 5µm/cc
Crocidolite	0.2 fiber > 5µm/cc
Other forms	2 fibers > 5µm/cc

SIGNED _____ REVISED: DERapp _____ CHECKED _____ RRLangner _____

DATE 3/24/77 _____ DATE 4/25/77 _____

Reviewed: R. L. Daniel 2/22/85 DO NOT PHOTOCOPY

IHG change 2/85

(BACK)

APPENDIX A
RECOMMENDED EQUIPMENT

The equipment listed below has been approved for the specific use, but is not necessarily the only equipment available.

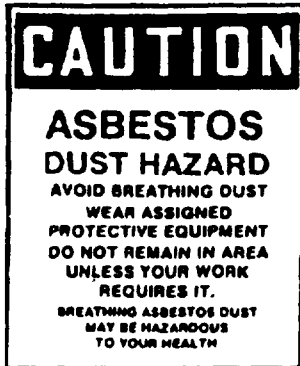
1. Dust Respirator	<u>Dow Stock No.</u>
Wilson Dust Respirator 1200 1200 S (small)	Vendor Vendor
Wilson Replacement Dust Filter R10 with R683 Retainer	Vendor
Wilson Disposable Respirator 1400	Vendor
3M Model 8710 Disposable Respirator	01-4165
3M Model 9920 Disposable Respirator with exhalation valve	Vendor
2. Clothing	
Disposable Paper Coveralls - Hooded Small Medium Large Extra Large	01-03551-001 01-03552-001 01-03553-001 01-03554-001
Disposable Paper Coveralls	
Small Medium Large Extra Large	01-03551 01-03552 01-03553 01-03554
3. Labeled Bags for Asbestos Disposal	
Polyethylene Bag, Special Purpose, 4 mil	17-30520
Polyethylene Bag, Special Purpose, 6 mil	17-30522

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APPENDIX B

Dow and the U.S. Government require the posting of signs and labels at locations where asbestos related work is being done to warn of possible air-borne concentrations of asbestos fibers that may exceed exposure limits.

1) Asbestos Warning Signs



14" x 20" Asbestos Hazard Signs

Block lettering on a yellow background

Dow Stock #01-03374

2) Asbestos Caution Labels



4" x 4" Vinyl Asbestos Hazard Labels

Dow Stock #01-03372