INDUSTRIAL HYGIENE REPORT
TEXAS OPERATIONS

DOW CHEMICAL U.S.A.
AN OPERATING UNIT OF THE DOW CHEMICAL COMPANY

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TITLE:

EVALUATION OF EMPLOYEE EXPOSURES TO ASBESTOS DURING REMOVAL OPERATIONS, UTILITIES DISTRIBUTION A, TEXAS OPERATIONS, 1986

PLAINTIFF'S EXHIBIT

DOW-779

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SUMMARY

Employee exposures to asbestos were evaluated during the removal of asbestos insulation in the pipeway of the A-1600 block on August 7, 1986. All potential exposures were well within acceptable guidelines during the removal operation and ranged from 0.01 to 0.09 f/cc as an 8-hour time-weighted average.

The procedures outlined in the Texas operations Asbestos handbook were followed during the operation and all workers within the restricted area used approved respiratory protection and protective clothing.

ST0015170

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EVALUATION OF EMPLOYEE EXPOSURE TO ASBESTOS DURING REMOVAL OPERATIONS, UTILITIES DISTRIBUTION A

INTRODUCTION

Employee exposures to asbestos were evaluated during the removal of asbestos insulation in the pipeway of the A-1600 block on August 7, 1986.

CONCLUSIONS

All potential exposures to asbestos were well within acceptable guidelines during the removal operation.

RECOMMENDATIONS

The individual monitoring results have been communicated to employees. The wet methods and procedures used during the job should be used whenever asbestos is removed to minimize potential employee exposures.

RESULTS AND DISCUSSION

The potential exposures to asbestos for the Coverers from the Insulation and Utilities A Departments ranged from 0.01 to 0.09 f/cc as an 8-hour time-weighted average. (See Table I.) At the time of the survey, the Industrial Hygiene Guide (IHG) for asbestos was 2 f/cc. The exposures were potential since all workers within the restricted area used single use dust respirators (3M 8710) or half-mask negative pressure respirators (Scott-a-Vista) and protective clothing during the removal operation. The procedures outlined in the Texas Operations Asbestos Handbook were followed during the operation.

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METHODOLOGY

Asbestos samples were collected using calibrated Gilian HFS 113A air sampling pumps. A known volume of air was pulled through 25 mm cellulose ester membrane filters, 0.8 micron pore size. Samples were collected at a flow rate of approximately 1 liter per minute. The samples were counted by McKee Environmental Health Services using phase contrast microscopy as outlined in NIOSH Method P&CAM 239.

EVALUATION CRITERIA

The evaluation of exposure levels was based on the following criterion:

	Industrial Hygiene Guide	Source
Asbestos	2 fibers/cc*	OSHA-PEL

*As of January 16, 1987, the OSHA PEL is 0.2 fibers/cc.

The OSHA Permissible Exposure Limit (PEL) is the time-weighted average concentration for a normal 8-hour workday, 40 hour work week, to which nearly all workers may be repeatedly exposed without adverse health effects.

lr
4-27-88

IHS File A7-3010

TABLE I

ASBESTOS MONITORING RESULTS
UTILITIES DISTRIBUTION
A-1600

Sample Number	Master Number	Job Classification	Date	Sample Time(Min)	8-hour TWA Concentration Fibers/cc
1	141598	Coverer (Insulation Dept)	8-7-86	296	(0.09)
2	144498	Coverer (Utilities Dept)	8-7-86	172	(0.06)
3	141596	Coverer (Insulation Dept)	8-7-86	301	(0.01)
4	144357	Coverer (Insulation Dept)	8-7-86	293	(0.07)
				Industrial Hygiene Guide	(2)
				New Industrial Hygiene Guide (1-16-87)	(0.2)

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INDUSTRIAL HYGIENE SAMPLE RECORD

FILE NO. A7-3010	PROCESS Utilities Dist A	BLDG. A702	DATE 8/7/86
MATERIAL asbestos	SAMPLING METHOD personal	TRAPPING MEDIUM 25mm filter	
TYPE OF PUMP S/N 12059	FLOW SET Rotameter @	FLOW RATE 1.03 l/min	FLOW FACTOR

REMARKS (VENTILATION, ETC.)

Removing asbestos in the A1600 Block

SAMPLE NO.	DESCRIPTION OF SAMPLES		TIME	CONC. ( )
#1	Plant A Insulation Dept	Rotameter		
	George L. Carrales, Coverer	STROKE COUNT		
	#15498	STOP 1	3:24	
	Removing in ILG	START 1	10:28	
			296 min	
	Scott a Vista respirator			
	1.03 l/min X 296 min = 305 l			

FILE NO. A7-3010	PROCESS Utilities Dist A	BLDG. A702	DATE 8/7/86
MATERIAL asbestos	SAMPLING METHOD personal	TRAPPING MEDIUM 25mm filter	
TYPE OF PUMP 12057	FLOW SET Rotameter @ 2	FLOW RATE 1.94 l/min	FLOW FACTOR

REMARKS (VENTILATION, ETC.)

Pump stopped

SAMPLE NO.	DESCRIPTION OF SAMPLES		TIME	CONC. ( )
#2	Power Generation Mtc.			
	John Bork, Coverer	STROKE COUNT		
	#14478	STOP 2		
		START 2	10:31	
	Repairing (removing asbestos from ILG)		172 mins.	
	Scott a Vista respirator			
	172 mins x 1.94 l/min = 334 l			

SIGNATURE

DATE

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INDUSTRIAL HYGIENE SAMPLE RECORD

FILE NO. A7-3010	PROCESS Utilities Dist A	BLDG. A702	DATE 8/7/86
MATERIAL asbestos	SAMPLING METHOD personal	TRAPPING MEDIUM 25 mm filt	
TYPE OF PUMP S/N 12056	FLOW SET Rotameter @ 1	FLOW RATE 1.09 l/min	FLOW FACTOR

REMARKS (VENTILATION, ETC.)

~~[illegible]~~ (Bradshaw 5113) Removing asbestos in the A1600 Block

SAMPLE NO.	(Plant A Insulation Dept) DESCRIPTION OF SAMPLES		TIME	CONC. ( )
#4	T. S. (Sammy) Dillard, Coverer	Rotameter ~~STROKE COUNT~~		
	144357	STOP 1	3:25	
		START 1	10:32	
	one top of piperack		293	min.
	used handsaw			
	(worn 8710 respirator)			
	293 mins X 1.09 l/min = 319 l			

FILE NO. A7-3010	PROCESS Utilities Dist A	BLDG. A702	DATE 8/7/86
MATERIAL asbestos	SAMPLING METHOD	TRAPPING MEDIUM 25 mm filter	
TYPE OF PUMP S/N 8698	FLOW SET Rotameter 1.1	FLOW RATE 1.11 l/m	FLOW FACTOR

REMARKS (VENTILATION, ETC.)

SAMPLE NO.	(Plant A Insulation Dept) DESCRIPTION OF SAMPLES		TIME	CONC. ( )
#3	F. D. Serna, Coverer	STROKE COUNT		
	141596	STOP 1.1	3:30	
		START 1.1	10:30	
	on ground		301	min
	(wore 8710 respirator)			
	301 mins X 1.11 l/min = 334 l			
#5	= blank			

SIGNATURE Donna D. [illegible] DATE 0[illegible]

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A7-3010

$C = \frac{(E)(Ac)}{U \cdot 10^3} = \frac{(\text{fibers/mm}^2)(385\ \text{mm}^2\ \text{for 25mm filter})}{U(\ell) \times 10^3}$ D. Hick

Ac for 25 mm filter = 385 mm²

McKee Environmental
Health Services

August 18, 1986

ST00015175

LAB ANALYSIS REPORT

Client: Dow Chemical, USA

Address: Texas Operations
Freeport, Tx 77541

Attention: Mr. Benny Jenkins (B101)

Analysis performed: NIOSH Method# 239
Fiber Counts

Sample Identification		M.E.H.S. Sample No.	Sample Volume	Results fibers/mm²	Concentration fibers/cc
A50-2899-1		86606		41.56	
	2	7		80.60	
	3	8		81.86	
	4	9		61.71	
Utilities/Distribution OCD-2960	3-1A	10		5.04	
	3-2A	11		2.52	
A7-3010-1		12	305 ℓ	118.4	0.15
	2	13	334 ℓ	134.8	0.16
	3	14	334 ℓ	13.85	0.02
	4	15	319 ℓ	88.16	0.11
	5 Blank	16		5.04	
1-2998		17		5.04	
2- "		18		83.12	
3- "		19		123.43	
4- "		20		23.93	
5- "		21		100.8	
6- "		22		115.9	
7- "		23		25.19	
8- "		24		LT 1.26	
B-5213-1		25		391.4	
	2	26		375.9	
	3	27		LT 1.26	

LT = less than

Ronald L. McKee, C.I.H.

A7-3010
S. D. Hicks
8/6/86

Pump Calibration for asbestos monitoring

Gilian Hi Flow Samplers
Model HFS 113A
25 mm asbestos cassette in line

	Before	Rotameter	After
S/N 8698	1.093 l/min	Rotameter @ 1.1	1.118 l/min
	1.096		1.116
	1.111		1.112
Ave. 1.11 l/min	1.106		1.122
	1.109		1.117
S/N 12059	1.042 l/min	Rotameter @ 1.0	1.014
	1.044		1.023
Ave. 1.03 l/min	1.044		1.022
	1.041		1.008
	1.037		1.009
S/N 12057	1.920	Rotameter @ 2	1.963
	1.929		1.952
	1.931		1.940
Ave. 1.94 l/min	1.932		1.927
	1.942		1.939
S/N 12056	1.105	Rotameter @ 1	1.102
	1.109		1.077
	1.109		1.078
Ave. 1.09 l/min.	1.105		1.071
	1.105		1.071

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SECTION IV

SAFE WORK PROCEDURE

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

Minimum Safety Equipment Requirements:

1. Hard hat must be worn.
Full face respirator with high efficiency Particulate filters will be worn.
2. Sideshield glasses must be worn.
3. Approved dust respirator must be worn during material removal and also during cleanup.
Full face respirator with high efficiency Particulate filters will be use.
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. We will use disposable coveralls with hoods and gloves. A dumpster will be there to dispose the asbestos.
5. Rubber boots are required and must be washed before leaving the isolated area.
6. 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 [illegible]). [illegible] security in order to barricade the street. [illegible] the [illegible] sight.
7. [illegible] List (page 13) must be filled out prior to the job and properly approved.
8. [illegible] which is required by job location must be used. ([illegible] Safe Work Permit.) We'll have two JLG lifts to do the job plus our safety belts.

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 airborn 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. Will be using the [illegible] hand sprayers or have approved fan sprayer to wet the [illegible]
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. Poly film plastic will be use to contain deteriorated material.
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. As soon as the asbestos pipe cover is remove. It will be put in a polyethylene Asbestos bag.
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. We will clean the area of the pipe where the asbestos material was and seal the ends lefted expose with CP-11 Mastic.

ST00151.78

ASBESTOS SAFETY CHECK LIST

JOB DESCRIPTION: [illegible] DATE 8-4-86
LOCATION [illegible]

PRE-JOB REQUIREMENTS:

1. Environmental Services Contacted (ph. 1505)? Yes ✓ No ___
   Name: R. Snellgrove Date: [illegible]
   Dow Project Supervisor: Gerald [illegible]
2. Safe Work Procedure Written? Yes ✓ No ___ Date: [illegible]
3. Project Review Held? Yes ✓ No ___
   Industrial Hygienist: Donna [illegible] Date: 8-4-86
   Safety Director: Don Werbick Date: [illegible]
   Craftsmen: [illegible] Sammy Willard Date: 8-4-86
   George Chavales, Frank Sanna

	YES	NO
Safe Work Procedure Approved:	✓	
Hygiene Monitoring Required:	✓	
Audit Required:	✓	

Auditor Assigned: Don Werbick APB Phone: 2925
Donna Hicks B101 5036

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
   ✓ Dust Respirator
   ___ Other: See Safe Work Permit
   ✓ Side Shield Glasses
   ✓ Rubber Boots

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.

ST0015179

To Gerald Bevers/A702 Date 9/8/86
Imaro Vera, A510

The results of monitoring of asbestos at the A1600 Block are attached.

The exposures were within accepted guidelines on the day monitoring was done.

We will monitor other jobs in the future. Be sure to let me know if you have a job that will last all day. We will try to get more monitoring data for a long job.

From Donna Hicks

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Dow Code 07-02505-000

A7-3010 ST0015180 Asbestos Monitoring Results 9/6/86
D. D. Hicks Utilities Distribution
A1600

Sample Number	Master Number	Job Classification	Date	Sample Time (Min.)	Concentration* Fibers/cc
1	141598	Coverer (Insulation Dept)	8/7/86	296	0.15 (0.09)
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Industrial Hygiene Guide (2)
New Industrial Hygiene Guide (1/14/87) (.2)

* Numbers in parenthesis is the 8-hr time-weighted average Concentration.