

INDUSTRIAL HYGIENE REPORT
TEXAS OPERATIONSDOW CHEMICAL U.S.A.
AN OPERATING UNIT OF THE DOW CHEMICAL COMPANY

FILE NUMBER: A24-3066
DATE ISSUED: April 21, 1988
PLANT CODE: CMP-63100 - CEP-59000

TITLE:

EVALUATION OF EMPLOYEE EXPOSURES DURING ASBESTOS GASKET OPERATIONS, CEP/CMP MAINTENANCE DEPARTMENTS, A-1800 AND A-2400, TEXAS OPERATIONS, 1987

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SUMMARY

Asbestos monitoring was conducted during cutting, transporting, removal and installation of Garlock gaskets. The monitoring was done during January and February, 1987.

All potential 8-hour time-weighted average exposures to asbestos during routine gasket operations were below the Industrial Hygiene Guide of 0.2 fibers/cc. The exposures ranged from <0.01 fibers/cc to 0.07 fibers/cc. The use of local exhaust ventilation during gasket cutting operations reduced potential exposures from 0.06 fibers/cc to 0.03 fibers/cc as an 8-hour TWA.

A test using surfactant during scraping of gaskets successfully reduced potential exposures from 0.22 fibers/cc to 0.08 fibers/cc in a limited study.

The results of the monitoring were used to establish procedures for handling gaskets and to determine the appropriate protective equipment for the different operations. These have been incorporated into the 1987 revision of "The Texas Operations Asbestos Handbook".

The results of this survey have been furnished to Win-Way, Inc., the contractor for part of the work.

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**EVALUATION OF EMPLOYEE EXPOSURES DURING ASBESTOS GASKET
OPERATIONS, CEP/CHP MAINTENANCE DEPARTMENTS, A-1800 & A-2400**

INTRODUCTION

Asbestos monitoring was conducted during cutting, transporting, removal and installation of Garlock gaskets. The monitoring was done during January and February, 1987. The results of the monitoring were used to establish procedures for handling gaskets and to determine the appropriate protective equipment for the various operations. These have been incorporated into the 1987 revision of "The Texas Operations Asbestos Handbook".

CONCLUSIONS

1. All potential 8-hour time-weighted average exposures to asbestos during routine gasket operations were within the Industrial Hygiene Guide of 0.2 fibers/cc. The exposures ranged from <0.01 fibers/cc to 0.07 fibers/cc.
2. The use of local exhaust ventilation during gasket cutting operations reduced potential exposures from 0.06 fibers/cc to 0.03 fibers/cc as an 8 hr. TWA.
3. A test using a surfactant during scraping of gaskets successfully reduced potential exposures from 0.22 fibers/cc to 0.08 fibers/cc in a limited study.

RECOMMENDATIONS

The results of this report must be communicated to employees and documented on the attached form. Training should be completed and the form returned to Industrial Hygiene Services, B-101, within 60 days of this report.

RESULTS AND DISCUSSION

All exposures are potential exposures since all employees were required to wear respiratory protection and protective clothing during the survey. Half-face respirators were worn during all operations except for gasket cutting when full-face positive pressure supplied air respirators were worn.

Tables I and II give the results of personnel monitoring during transporting, removal and installation of Garlock 900 gaskets. All potential exposures during routine operations were well below the Industrial Hygiene Guide of 0.2 fibers/cc. The estimated 8-hour time-weighted average exposures ranged from <0.01 to 0.07 fibers/cc. The highest exposure of 0.07 fibers/cc occurred during change out of 20 gaskets which did not have to be scraped. The sample is not representative of daily exposures since normally only a few gaskets would be changed by one person in a day.

Table IIIA and IIIB are the results of monitoring during gasket cutting operations and when a surfactant was used during gasket removal operations. Table IIIA gives the results of monitoring when local exhaust ventilation was not used during gasket cutting. The 8-hour time-weighted average exposure was below the permissible exposure level of 0.2 fibers/cc but the short-term exposure when the chisel blade was used indicated that local exhaust ventilation should be added. Table IIIB gives the results of monitoring during gasket cutting when an asbestos vacuum hose was attached to the cutting tools.

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**EVALUATION OF-EMPLOYEE EXPOSURES DURING ASBESTOS GASKET
OPERATIONS, CEP/CMP MAINTENANCE DEPARTMENTS, A-1800 & A-2400**

RESULTS AND DISCUSSION (Cont'd)

Potential exposures during gasket cutting were reduced from 0.06 fibers/cc to 0.03 fibers/cc as an 8-hour time-weighted average. Table IIIA also shows the results of monitoring during scraping of gaskets with and without the use of a surfactant. The results of the limited monitoring indicate that the surfactant was effective in reducing exposures.

Table IV gives the results of area monitoring in gasket storage areas and during certain operations. All levels were <0.1 fibers/cc.

METHODOLOGY

Asbestos samples were collected using calibrated Gilian HFS 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. Samples were collected by G. Franklin of A-2429 and Zwahr of A-1882.

EVALUATION CRITERIA

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

	<u>Industrial Hygiene Guide</u>
Asbestos	0.02 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.

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TABLE I
PERSONNEL MONITORING DURING HANDLING OF ASBESTOS GASKETS
CHLORINATED ETHANES MAINTENANCE
(PIPEFITTER)

<u>Date</u>	<u>Master Number</u>	<u>Sample Description</u>	<u>Sample Time (Min)</u>	<u>Concentration fibers/cc Short-term</u>	<u>Concentration fibers/cc 8-hr. TWA</u>
1-14-87	136853	#13 - Transferred 5 Garlock 900 gaskets from storage to job site	10	0.05	
1-14-87	136853	# 8 - Changed out pipe, removed 5 Garlock 900 gaskets, used scraper screwdriver and hammer	204	0.05	0.02
1-14-87	137303	#14 - Transferred 5 Garlock 900 gaskets from storage to job site	10	ND(<0.02)	
1-14-87	137303	# 7 - Changed out pipe, removed 5 Garlock 900 gaskets, used scraper, screwdriver and hammer	204	0.04	0.02
1-16-87	136853	# 2 - Changed out 2 - 2" Garlock gaskets on C-3 Control Valve	10	0.13	
1-16-87	136853	# 1 - Removed 2 Garlock gaskets from control valve (used scrapper)	8	0.19	<0.01
1-16-87	141488	#18 - Removed 2 Garlock gaskets from control valve (used scrapper)	7	0.17	<0.01
Industrial Hygiene Guide					0.2 f/cc

TABLE II

**PERSONNEL MONITORING DURING HANDLING OF ASBESTOS GASKETS
CHLORINATED METHANES MAINTENANCE**

(PIPEFITTER)

<u>Date</u>	<u>Master Number</u>	<u>Sample Description</u>	<u>Sample Time (Min)</u>	<u>Concentration fibers/cc</u>	
				<u>Short-term</u>	<u>8-hr. TWA</u>
1-20-87	134763	# 4 - Travel to and from job site with gaskets in bucket	17	0.08	
1-20-87	134703	# 5 - Scrapping gasket from NE 151 rupture disk	31	<u>0.60</u>	
1-20-87	137785	# 6 - Travel to and from job site with gaskets in bucket	17	0.13	0.04
1-20-87	137785	# 3 - Changing gasket on NE 151 rupture disk	29	<u>0.15</u>	
1-22-87	137738	#21 - Travel to and from job site with gaskets in bucket	16	0.10	0.01
1-22-87	137738	#22 - Changed gasket from NT 200 vent motor valve	31	<u>ND(<0.01)</u>	
1-22-87	141462	#19 - Travel to and from job site with tools and gaskets	16	0.10	<0.01
1-22-87	141462	#20 - Changed gasket from NT 200 vent motor valve (scrapped for 30 seconds)	30	<u>0.05</u>	<0.01
1-29-87	143179	# 2 - Replaced gaskets on 16 flanges, no scraping	137	0.04	0.01
1-29-87	141697	# 3 - Replaced gaskets on 16 flanges, no scraping	136	0.03	0.01
1-30-87	141697	# 4 - Replaced gaskets on 20 flanges, no scraping	286	0.06	0.04
1-30-87	143179	# 5 - Replaced gaskets on 20 flanges, no scraping	289	0.11	0.07
				Industrial Hygiene Guide	
				0.2 f/cc	

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TABLE IIIA

MONITORING DURING ASBESTOS GASKET CUTTING (GARLOCK 900)
CHLORINATED ETHANES MAINTENANCE

(UTILITY MAN)

Date	Social Sec.No.	Sample Description	Sample Time (Min)	Concentration fibers/cc	
				Short-term	8-Hr. TWA
1-22-87	467-02-9536	Cutting gaskets with a chisel blade	44	0.65	
1-22-87	467-02-9536	Cutting gaskets with Bosch Unishears	40	0.30	
1-22-87	467-02-9536	Cutting gaskets with a Roller Cutter and and cleaning room	40	0.20	
1-22-87	467-02-9536	Cutting gaskets with chisel blade, Bosch unishears, Roller cutter and cleaning room	134	0.23	0.06
2-12-87	467-06-3780	Scraping gaskets without the use of surfactant	54	2.0	0.22
2-12-87	493-44-4832	Scraping gaskets using surfactant	60	0.65	0.08
Industrial Hygiene Guide				0.2 f/cc	

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TABLE 111B

MONITORING DURING ASBESTOS GASKET CUTTING (GARLOCK 900)
CHLORINATED ETHANES MAINTENANCE

(BOILERMAKER)

<u>Date</u>	<u>Master Number</u>	<u>Sample Description</u>	<u>Sample Time (Min)</u>	<u>Concentration fibers/cc</u>	
				<u>Short-term</u>	<u>8-Hr. TWA</u>
2-05-87	142750	# 8 - Cutting gaskets with Bosch Unishears (vacuum attached)	40	0.11	
2-05-87	142750	#10 - Cutting gaskets with roller cutter (vacuum attached)	30	0.07	
2-05-87	142750	#12 - Cutting gaskets with chisel blade (vacuum attached)	32	<u>0.09</u>	0.02
2-05-87	142329	# 9 - Cutting gaskets with Bosch Unishears (vacuum attached)	40	0.21	
2-05-87	142329	#11 - Cutting gaskets with roller cutter (vacuum attached)	30	0.03	
2-05-87	142329	#13 - Cutting gaskets with chisel blade (vacuum attached)	32	<u>0.13</u>	0.03
				Industrial Hygiene Guide	
				0.2 f/cc	

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TABLE IV
 AREA MONITORING RESULTS
 CHLORINATED ETHANES/METHANES MAINTENANCE

<u>Date</u>	<u>Sample Description</u>	<u>Sample Time (Min)</u>	<u>Concentration fibers/cc Short-term 8-hr. TWA</u>
1-14-87	#11 - AREA - Gasket Storage, A-2432	416	<0.01
1-14-87	#12 - AREA - Gasket Storage, A-2426	429	<0.01
1-15-87	# 9 - AREA - Gasket Storage, A-2432 (After Cleaning)	410	<0.01
1-15-87	#10 - AREA - Gasket Storage A-1876	437	<0.01
1-22-87	#24 - AREA - In gasket cutting room by exhaust	135	<0.01
1-22-87	#29 - AREA - Outside gasket cutting room by exhaust	134	<0.01
2-05-87	# 7 - AREA - Gasket cutting room during cutting when vacuum attached to tools.	102	0.07



DOW CHEMICAL U.S.A.

TEXAS OPERATIONS
FREEPORT, TEXAS 77541

L. D. Monical
U.S. Contractors, Inc.
P.O. Drawer 447
Clute, TX 77531

FILE: A24-3066

March 21, 1988

**EVALUATION OF EMPLOYEE EXPOSURES DURING ASBESTOS GASKET OPERATIONS AT
CEP/CMP MAINTENANCE DEPARTMENTS, A-1880 AND A-2400**

U.S. Contractor, Inc. employees have been included in an Industrial Hygiene Survey conducted by Dow Texas Operations' Industrial Hygiene Department. The results of this survey as it pertains to your employees is attached. It is your responsibility to inform your employees of the monitoring results along with conclusions and recommendations.

If you are not the correct person to be receiving this information, or if the address is incorrect, please contact Dee Barrow, telephone number 238-1281.

Industrial Hygiene Services
Texas Operations

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Attachment

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TABLE I

PERSONNEL MONITORING DURING ASBESTOS GASKET CUTTING (GARLOCK 900) & SCRAPING
CHLORINATED ETHANES MAINTENANCE

(UTILITY MAN)

<u>Date</u>	<u>Social Sec.No.</u>	<u>Sample Description</u>	<u>Sample Time (Min)</u>	<u>Concentration fibers/cc Short-term 8-Hr. TWA</u>
1-22-87	467-02-9536	Cutting gaskets with a chisel blade	44	0.65
1-22-87	467-02-9536	Cutting gaskets with Bosch Unishears	40	0.30
1-22-87	467-02-9536	Cutting gaskets with a Roller Cutter and and cleaning room	40	0.20
1-22-87	467-02-9536	Cutting gaskets with chisel blade, Bosch unishears, Roller cutter and cleaning room	134	0.23
2-12-87	467-06-3780	Scraping gaskets without the use of surfactant	54	2.0
2-12-87	493-44-4832	Scraping gaskets using surfactant	60	0.65
OHSA Permissible Exposure Limit				0.2 f/cc

CONCLUSIONS AND RECOMMENDATION

The potential exposure during gasket cutting operations was well within the OSHA Permissible Exposure Limit for asbestos, 0.2 fibers/cc as an 8-hour time-weighted average. The potential exposure during the test when scraping of gaskets was done with and without a surfactant was 0.22 fibers/cc when the surfactant was not used and was reduced to 0.08 when a surfactant was used. All exposures are potential exposures since employees wore supplied air respirators and protective clothing during operations.

APPENDIX C

DOCUMENTATION OF INDUSTRIAL HYGIENE EDUCATION

PLANT _____

CONDUCTED BY: _____

TYPE OF TRAINING: ☐ HEALTH HAZARDS TRAINING (EDUCATION INDEX)

☐ NOTIFICATION OF EXPOSURE MONITORING RESULTS
(INDUSTRIAL HYGIENE REPORT FILE NO.)

☐ OTHER (EXPLAIN): _____

The following chemical and physical agents were reviewed:

Agent	Data Sheet Used	Date of Sheet
_____	_____	_____
_____	_____	_____
_____	_____	_____
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Use additional pages if necessary

List attendees on reverse side

SEND ORIGINAL TO INDUSTRIAL HYGIENE SERVICES, B-101

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APPENDIX C

CONTRACTORS

DOCUMENTATION OF INDUSTRIAL HYGIENE EDUCATION

PLANT _____

CONDUCTED BY: _____

TYPE OF TRAINING: ☐ HEALTH HAZARDS TRAINING (EDUCATION INDEX)
☐ NOTIFICATION OF EXPOSURE MONITORING RESULTS
(INDUSTRIAL HYGIENE REPORT FILE NO.)
☐ OTHER (EXPLAIN): _____

The following chemical and physical agents were reviewed:

Agent	Data Sheet Used	Date of Sheet
_____	_____	_____
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Use additional pages if necessary

List attendees on reverse side

SEND ORIGINAL TO INDUSTRIAL HYGIENE SERVICES, B-101

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