



McCrone Environmental Services, Inc.
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12 October 1988

Korn, Kline & Kutner
1845 Walnut Street
21st Floor
Philadelphia, PA 19103

Attention: Mr. Kurt Straub
Attorney at Law

Subject: Technical Report. Occupational Exposures During Processing
and Handling of Asbestos-Containing Gaskets at Anchor Packing
Company, Atlanta, Georgia

Re: McCrone Project No. ME-5396

Dear Mr. Straub:

McCrone Environmental Services, Inc. has completed the subject air sampling services as authorized by you. Attached please find our report detailing the methods used, work performed, results of air samples collected and some additional comments on the samples collected as they relate to the Federal standards for asbestos concentrations in the work place (past and present).

We hope you have found our services helpful and our report informative. If you have any questions concerning this report or if we may be of further assistance, please do not hesitate to contact our office.

Sincerely,

Herman L. Kitt
Herman L. Kitt
Field Project Manager

Michael D. Mount
Michael D. Mount
Field Project Manager

HLK/MDM/pat

Attachments

cc: 1) ✓ Donald E. Ward
Claims Technical Specialist

a member of the mccrone group

850 PASQUINELLI DRIVE • WESTMONT, ILLINOIS 60559 • 312-887-7100

TECHNICAL REPORT

OCCUPATIONAL EXPOSURE OF ASBESTOS
DURING GASKET HANDLING AND PROCESSING

AT

ANCHOR PACKING COMPANY
MARIETTA, GEORGIA

MCCRONE PROJECT NO. ME-5396

12 OCTOBER 1988

MCCRONE ENVIRONMENTAL SERVICES, INC.
NORCROSS, GEORGIA

A MEMBER OF
THE MCCRONE GROUP, INC.
WESTMONT, ILLINOIS

INTRODUCTION

Asbestos levels in the work space are measured as the number of fibers in a given volume of air. OSHA's permissible exposure limit is currently two tenths (0.2) fibers of asbestos per cubic centimeter of air. It is in this light that this study was conducted. This paper presents the findings of the airborne concentrations of asbestos sampled during the processing and handling of Anchor Packing asbestos-containing gasket and packing material in an attempt to determine their contribution to the occupational exposure of asbestos.

METHOD

This study was designed to simulate the occupational exposure to asbestos fibers released during cutting, handling, punching, and scribing of Anchor Packing asbestos-containing gasket materials. To aid in this assessment, activities were defined and broken down into individual styles of gaskets, so each could be addressed, monitored and evaluated separately. All activities and operations involving processing and handling of Anchor Packing gaskets were conducted at the Anchor Packing Warehouse Facility in Marietta, Georgia by Anchor employees. Air monitoring and sample analysis were performed by McCrone Environmental Services, Inc. personnel.

DEFINITION OF THE VARIABLES STUDIED

1) Handling and Processing:

These operations include those activities that represent a workers potential exposure during the process of cutting out and shaping gaskets from Anchor Packing 400, 424, 425, 459, 480 gasket material and 210A packing material. Likely activities from this operation include cutting and punching holes in the material. To measure the contribution of these activities, air samples were collected during cutting (performed using electric scissors), a scribe, and punching using an industrial punching machine.

The sampling strategy employed was designed to address any potential exposure to airborne fibers a typical worker might encounter while handling asbestos-containing gasket materials, both at and around the designated

operations sample points and sample quantities were selected to represent these potential exposures. Specifically, samples were collected on the employees performing the operations (referred to as personal samples) and those collected in close proximity and remote areas to the operations (referred to as general samples). Prior to any actual monitoring of operations, background samples were collected in the plant where operations were to be performed to give an indication of the prevalent fiber concentrations in the surrounding air.

Air samples were collected and analyzed in accordance with NIOSH Analytical Method 7400. This method describes the equipment and procedures for collecting, mounting, sizing and counting fibers to determine the airborne concentrations of asbestos fibers. The purpose of this method is to determine an employee's index of exposure to airborne asbestos fibers. This method is primarily a personal monitoring technique but can be used for area monitoring.

RESULTS AND CALCULATIONS

Background samples collected at operations sites prior to any monitored activities indicated prevalent fiber concentrations that ranged from 0.003 fibers per cubic centimeter (f/cc) of air to 0.018 f/cc with a mean of 0.0095 f/cc.

Air samples collected during the handling and processing operations were divided into groups of gaskets styles. A total of five styles were used in this study. Personal samples for gaskets ranged from 0.015 f/cc to 0.058 f/cc with a four day mean of 0.035. The general air samples collected during the work that were located about 6 feet away and 40 ft. away from the gasket operations were comparable to the background levels (See Attached Tables).

DISCUSSION

Samples collected during the handling and processing operations represent an average workers exposure during a minimum of 4 hours working with Anchor gasket material styles. A personal sample was also collected during the

process of Anchor Packing materials (style J10A). The fiber level indicated concentrations similar to those detected during handling of the other gasket materials used in this study.

Fiber concentrations sampled indicated no significant differences in occupational exposures between material styles.

Fiber concentrations monitored during handling and processing of Anchor Packing gaskets indicate average occupational exposures that are about 1/100 of the current Federal standard of 0.2 fibers/cc, based on an 8-hour Time-Weighted Average.

CONCLUSIONS

The occupational exposure to asbestos fibers released during handling and processing of Anchor Packing gaskets style is, in worst cases measured in this study, ten fold below the currently allowed 0.2 fibers/cc Federal standard and below the Occupational Safety and Health Administrations 0.1 fibers/cc action level. These intermittent peak values may be several orders of magnitude higher than an actual 8-hour Time-Weighted Average during the same activity, none the less these concentrations are still considerably lower than both the current Federal standard and the proposed OSHA standard for an 8-hour TWA.

The handling of Anchor gaskets styles should reflect similar conditions of previous years because the gaskets were prepared in substantially the same manner as Anchor Packing prepared the materials from the 1940's to 1970's. It is reasonable to conclude that the same type of gasket material used in the same manner from 1940 through 1970 would produce the same contribution to the overall occupational exposure. In this light, one must then compare the concentrations sampled to the Federal Standards for asbestos during the previous years, those being:

Up to 1946	12 mppcf (120 fibers/cc)
1946 - 1969	5 mppcf (~ 50 fibers/cc)
1969 - 1972	2 mppcf (~ 12 fibers/cc)
1972 - 1976	5 fibers/cc
1976 - 1986	2 fibers/cc
1986 - Present	0.2 fibers/cc

Thus, Anchor Packing gaskets were found to release fiber concentrations ten fold below the current Federal Standards.

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APPENDIX A

NIOSH ANALYTICAL METHOD P & CAM 239: "ASBESTOS FIBERS IN AIR"

A sample is collected by drawing air through a membrane filter by means of a battery-powered personal sampling pump or, for suspected low concentrations of asbestos fibers, a high volume electric pump (ambient air sampling pump). The filter is transformed from an opaque solid membrane to a homogeneous, optically transparent gel. The fibers are sized and counted using a phase contrast microscopy at 400 x magnification.

Asbestos fibers for counting purposes are defined as a particulate which has a physical dimension longer than 5 (five) micrometers and with a length to width ratio of 3:1 or greater.

The accurate calibration of the sampling pump is essential to the correct calculation of the air volume sampled. The frequency of calibration is dependent on the use, care and handling to which the pump is subjected. The accuracy of calibration is dependent upon the type of instrument used as a reference. McCrone Environmental Services, Inc. utilizes a one liter buret used as a primary standard which is regarded as the most accurate and least variable type of calibration for air sampling pumps. For field calibration, a rotameter is a secondary standard, which, due to its high quality, compactness and ease of use, allows on site calibration of the pumps with the filter in-line.

OPTIMUM SAMPLING TIMES

The optimum sampling times are dependent on several factors:

1. Microscope count field area;
2. Pump flow rate;
3. Average airborne concentrations;
4. Counting rule range from 20 to 100 fields;
5. Adequate fiber density to obtain a minimum count of 10 fibers in 100 fields, which is the least total fiber count that yields an acceptable count precision;
6. Background airborne particulate levels that can reduce the count precision due to an obscuring of fibers on the filter surface.

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OSHA Federal regulation standards state average exposure as 8-hour Time Weighted Average (TWA) limits. McCrone Environmental Services, Inc. makes every attempt to obtain air samples which provide 8-hour TWA exposures so as to be comparable with the Federal standards. NIOSH sampling strategy indicates that a minimum of 70-80% of 8 hours is required to obtain an 8-hour TWA exposure. Sometimes, however, work conditions or shift length on a given day preclude obtaining a sample sufficient to yield an 8-hour TWA exposure.

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TABLE I

Fiber Concentrations During the Handling of Style 400

Sample Description	Flow (l/min)	Time (mins)	Fiber Density (f/mm ²)	Conc. (f/cc)	Gasket Style	Code
Personnel	3.0	240	36.6	0.046		
General (6 ft)	10.0	262	35.0	0.0051	400	
General (40 ft)	10.0	259	45.2	0.0067	400	

Four Day Average

(not including ambient and background samples)

NOTE: In code column numbers indicate the following:

1-Number of fibers counted indicates fiber concentrations
below sensitivity of this method

2-Insufficient sampling time for TWA (Time Weighted Average)

In concentration column, "TH" = too heavily loaded

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TABLE II

Fiber Concentrations During the Handling of Style 424

Sample Description	Flow (l/min)	Time (mins)	Fiber Density (f/mm ²)	Conc. (f/cc)	Gasket Style	Code
Personnel	3.0	127	57.3	0.058		
General (6 ft)	10.4	450	91.7	0.0078	424	
General (40 ft)	10.4	446	112.7	0.0097	424	
Personnel	3.0	120	18.4	0.019	424	
General (6 ft)	10.0	140	27.3	0.0075	424	
General (40 ft)	10.0	130	16.5	0.0043		

Four Day Average

(not including ambient and background samples)

NOTE: In code column numbers indicate the following:

1-Number of fibers counted indicates fiber concentrations
below sensitivity of this method

2-Insufficient sampling time for TWA (Time Weighted Average)
In concentration column, "TH" = too heavily loaded

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TABLE III

Fiber Concentrations During the Handling of Style 425

Sample Description	Flow (l/min)	Time (mins)	Fiber Density (f/mm ²)	Conc. (f/cc)	Gasket Style	Code
Personnel	3.0	240	121.0	0.063		
General (6 ft)	10.0	328	26.7	0.0073	425	
General (40 ft)	10.0	270	51.5	0.0078	425	

Four Day Average

(not including ambient and background samples)

NOTE: In code column numbers indicate the following:

1-Number of fibers counted indicates fiber concentrations
below sensitivity of this method

2-Insufficient sampling time for TWA (Time Weighted Average)

In concentration column, "TH" = too heavily loaded

TABLE IV

Fiber Concentrations During the Handling of Style 459

Sample Description	Flow (l/min)	Time (mins)	Fiber Density (f/mm ²)	Conc. (f/cc)	Gasket Style	Code
Personal	3.0	120	18.5	0.019		
General (6 ft)	10.0	120	22.9	0.0073	459	
General (40 ft)	10.0	120	22.9	0.0073	459	

Four Day Average

(not including ambient and background samples)

NOTE: In code column numbers indicate the following:

1-Number of fibers counted indicates fiber concentrations
below sensitivity of this method

2-Insufficient sampling time for TWA (Time Weighted Average)
In concentration column. "TH" = too heavily loaded

TABLE V

Fiber Concentrations During the Handling of Style 480

Sample Description	Flow (l/min)	Time (mins)	Fiber Density (f/mm ²)	Conc. (f/cc)	Gasket Style	Code
Personnel	3.0	240	42.0	0.022		
General (8 ft)	10.0	240	46.5	0.0075	480	
General (40 ft)	10.0	240	31.3	0.0051	480	

Four Day Average

(not including ambient and background samples)

NOTE: In code column numbers indicate the following:

1-Number of fibers counted indicates fiber concentrations
below sensitivity of this method

2-Insufficient sampling time for TWA (Time Weighted Average)

In concentration column. "TH" = too heavily loaded

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TABLE VI

Background Concentrations Before Gasket Handling

Sample Description	Flow (l/min)	Time (mins)	Fiber Density (f./mm ²)	Conc. (f/cc)	Gasket Style Code
Background	12.0	200	114.0	0.018	
Background	12.0	200	28.7	0.0046	
Background	12.0	200	19.1	0.0030	
Ambient (Outside	10.0	268	22.9	0.015	Building)

Four Day Average

(not including ambient and background samples)

NOTE: In code column numbers indicate the following:

1-Number of fibers counted indicates fiber concentrations
below sensitivity of this method

2-Insufficient sampling time for TWA (Time Weighted Average)

In concentration column, "TH" = too heavily loaded

Table 1 - Page 1

Summary of Phase Contrast Air Sample Results
McCrone Environmental Services, Inc.
Norcross, Georgia

Project Name: Anchor Packing Company
Client: Korn, Kline & Kutner/Philadelphia, PA

Project No.: ME-5398

Method: NIOSH 7400
Rules: A

Client I.D.	Laboratory I.D. No.	Date Analyzed	Reticle			Total Time (min.)	Total Fibers	Total Fields	Conc. * (f/cc)	Fiber Density (f/mm ²)	Comments
			Field Area (mm ²)	Flow Rate (l/min.)	Field						
1	880830004-1	8/31/88	0.00785	12.0	200	89.5	100	0.018	114.0	Background in Warehouse	
2	880830004-2	8/31/88	0.00785	12.0	200	22.5	100	0.0046	28.7	Background in Warehouse	
3	880830004-3	8/31/88	0.00785	12.0	200	15.0	100	0.0030	19.1	Background in Warehouse	
4	880830004-4	8/31/88	0.00785	3.0	127	45.0	100	0.058	57.3	Personal in Warehouse	
5	880830004-5	8/31/88	0.00785	10.0	450	72.0	100	0.0078	91.7	General in Warehouse, 8 ft.	
6	880830004-6	8/31/88	0.00785	10.0	446	88.5	100	0.0097	112.7	Background in Warehouse, 40 ft.	

*NOTE: In concentration column, FOL = Filter Overloaded, FTD = Filter Tampered With or Damaged
 Results reported as 'less than' (<) values are below the limit of detection
 (5.5 fibers/100 fields for NIOSH 7400 Method) for the air volume sampled.

N/P = Information Not Provided
 N/A = Not Applicable

Table 1 - Page 11

Summary of Phase Contrast Air Sample Results
McCrone Environmental Services, Inc.
Norcross, Georgia

Project Name: Anchor Packing Company
Client: Korn, Kline & Kutner/Philadelphia, PA

Project No.: ME-5396

Method: NIOSH 7400
Rules: A

Client I.D.	Laboratory I.D. No.	Date Analyzed	Metric		Total Time (min.)	Total Fibers	Total Fields	Conc.* (f/cc)	Fiber Density (f/mm ²)	Comments
			Field Area (mm ²)	Flow Rate (l/min.)						
7	880830004-7	8/31/88	0.00785	3.0	128	30.5	100	0.039	38.9	Personal in Warehouse, (459)
8	880830004-8	8/31/88	0.00785	3.0	240	95.0	100	0.065	121.0	Personal in Warehouse, (425)
9	880830004-9	8/31/88	0.00785	10.0	388	21.0	100	0.0026	26.7	General in Warehouse, (425)
10	880830004-10	8/31/88	0.00785	10.0	270	40.5	100	0.0073	51.5	General in Warehouse, 40 ft.
11	880830004-11	8/31/88	0.00785	10.0	288	42.5	100	0.0078	54.1	Ambient outside loading dock
12	880830004-12	8/31/88	0.00785	3.0	193	18.0	100	0.015	22.9	Personal (Packing Material)

*NOTE: In concentration column, FOL = Filter Overloaded, FTD = Filter Tampered With or Damaged
 Results reported as 'less than' (<) values are below the limit of detection.
 (5.5 fibers/100 fields for NIOSH 7400 Method) for the air volume sampled.

N/P = Information Not Provided
 N/A = Not Applicable

Table I - Page III

Summary of Phase Contrast Air Sample Results
McCrone Environmental Services, Inc.
Norcross, Georgia

Project No.: ME-5306

Project Name: Anchor Packing Company
 Client: Korn, Kline & Kutner/Philadelphia, PA

Method: NIOSH 7400

Rules: A

Client I.D.	Laboratory I.D. No.	Date Analyzed	Reticle		Total Time (min.)	Total Fibers	Total Fields	Conc.* (f/cc)	Fiber Density (f/mm ²)	Comments
			Field Area (mm ²)	Flow Rate (l/min.)						
13	880830004-13	8/31/88	0.00785	10.0	202	27.5	100	0.0051	35.0	General (6 ft.) in Warehouse, (400)
14	880830004-14	8/31/88	0.00785	10.0	259	35.5	100	0.0067	45.2	General (40 ft.) in Warehouse, (400)
15	880830004-15	9/01/88	0.00785	3.0	240	68.0	100	0.046	88.6	Personal, (400)
16	880830004-16	9/01/88	0.00785	10.0	130	13.0	100	0.0048	16.5	General (40 ft.) in Warehouse, (424)
17	880830004-17	9/01/88	0.00785	10.0	140	21.5	100	0.0075	27.3	General (8 ft.) in Warehouse, (424)
18	880830004-18	9/01/88	0.00785	3.0	120	14.5	100	0.019	18.4	Personal, (424)

*NOTE: In concentration column, FOL = Filter Overloaded, FTD = Filter Tampered With or Damaged
 Results reported as 'less than' (<) values are below the Limit of Detection
 (5.5 fibers/100 fields for NIOSH 7400 Method) for the air volume sampled.

N/P = Information Not Provided

N/A = Not Applicable

Table 1 - Page VI

Summary of Phase Contrast Air Sample Results
McCrone Environmental Services, Inc.
Norcross, Georgia

Project No.: ME-5390

Project Name: Anchor Packing Company
 Client: Korn, Kline & Kutner/Philadelphia, PA

Method: NIOSH 7400

Rules: A

Client I.D.	Laboratory I.D. No.	Date Analyzed	Reticle		Flow Rate (l/min.)	Total Time (min.)	Total Fibers	Total Fields	Conc. (f/cc)	Filter	
			Field Area (mm ²)	Field Area (mm ²)						Density (f/mm ²)	Comments
19	880830004-19	9/01/88	0.00785	0.00785	10.0	240	36.5	100	0.0075	46.5	General (6 f.c.) in Warehouse, (480)
20	880830004-20	9/01/88	0.00785	0.00785	10.0	240	25.0	100	0.0051	31.8	General (40 f.c.) in Warehouse, (480)
21	880830004-21	9/01/88	0.00785	0.00785	3.0	240	33.0	100	0.022	42.0	Personal, (480)
22	880830004-22	9/01/88	0.00785	0.00785	3.0	120	14.5	100	0.010	18.5	Personal, (459)
23	880830004-23	9/01/88	0.00785	0.00785	10.0	120	18.0	100	0.0073	22.9	General (4 f.c.) in Warehouse, (459)
24	880830004-24	9/01/88	0.00785	0.00785	10.0	120	18.0	100	0.0073	22.9	General (40 f.c.) in Warehouse

*NOTE: In concentration column, FOL = Filter Overloaded, FTU = Filter Tapered With or Damaged
 Results reported as 'less than' (<) values are below the limit of detection
 (5.5 fibers/100 fields for NIOSH 7400 Method) for the air volume sampled.

N/P = Information Not Provided

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**TLVs^o
THRESHOLD
LIMIT VALUES
and
BIOLOGICAL
EXPOSURE INDICES
for
1987-1988**



Second Printing

**American
Conference
of Governmental
Industrial Hygienists**

ISBN: 0-930712-72-4

New material or revisions for 1987-88: Chemical Substances: 1) Some 54 STELs deleted from those substances proposed in 1985, with the adopted TLV-TWAs retained. In place of these deleted STELs, the Exceedence Limits section contained in the Introduction to the Chemical Substances is to be used when short-term exposures are encountered, even when the 8-hour TLV-TWA is within recommended limits; 2) All dusts are now carried in the alphabetical listing for easy reference to their adopted values; 3) The expanded definition of Appendix A, Carcinogens, totally replaces the old A1s, A1b, and A2 categories and chemical entities as well as the Committee Guidelines for Classification of Experimental Animal Carcinogens. All substances with the new A1 or A2 classification will carry their respective designation in the adopted alphabetical listing only; 4) New Appendix F, Particle Size-Selective Sampling Criteria for Airborne Particulate Matter; 5) Appendix G, Nightshift Trade Hours, has been deleted. It served its purpose during the transition to genetic chemical listings; 6) Chemical Substances and Other Issues Under Study is now Appendix G, Biological Exposure Indices; 7) The Introduction has been expanded and the Special Notations section has been redefined and the actual notations changed. These changes are reflected throughout the adopted and NIOSH BEI tables; 8) BEIs for benzene, n-hexane, lead, and phenol are the second group to be adopted by ACGIH; 9) Notice of Intent to Establish BEIs for methyl chloroform, arylisopropylphenol, chloroethane, trichloroethylene, and perchloroethylene, Physical Agents; 10) Notice of Intent to Establish BEIs for Laser beam wavelength in the UVC Spectral Region (Tables 10, 11, and 12); 11) Light and Near-Infrared Radiation remains on the Notice of Intent to Establish with changes in equations 3a, 3b, 5a, and 5b; 12) Notice of Intent to Establish TLVs for Static Magnetic Fields.

The limits listed in this book are intended for use in the practice of industrial hygiene as guidelines or recommendations in the control of potential health hazards and for no other use. These limits are not the lines between safe and dangerous concentration and should not be used by anyone untrained in the discipline of industrial hygiene. It is imperative that the user of this book read the Introduction to each section before applying the recommendations contained herein as this is an integral part to the understanding and use of this book. The ACGIH disclaims liability with respect to the use of the TLVs.

Interpretation of TLVs: All requests for interpretations of TLVs must be in writing. In case of the Executive Secretary ACGIH. Interpretations will be made only after full committee review and approval. Interpretations will be published annually in the Supplemental Documentation.

Documentation of the Threshold Limit Values and Biological Exposure Indices: A separate companion piece to the TLVs/BEIs is issued by ACGIH under this title. This publication gives the pertinent scientific information and data with reference to the sources that were used to base each limit or index. For better understanding of the TLVs and BEIs, it is essential that the Documentation be consulted when the TLVs are being used or when brokering the BEIs. For further information contact the Publications Office, ACGIH.

Requests for interpretations, reproduction permission, information, and/or placement of an order may use the following address: ACGIH, 8500 Gateway Ave., Bldg. D-7, Cincinnati, OH 45211-4138, 513/681-7081.

TLVs® THRESHOLD LIMIT VALUES and BIOLOGICAL EXPOSURE INDICES for 1987-1988



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Cincinnati, Ohio

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Table 1 - Page V

Summary of Phase Contrast Air Sample Results
McCrone Environmental Services, Inc.
Norcross, Georgia

Project No.: ME 5396

Project Name: Anchor Packing Company
Client: Korn, Kline & Kutner/Philadelphia, PA

Method: NIOSH 7400
Rules: A

Client	Laboratory	Date Analyzed	Reticle		Flow Rate (l/min.)	Total Time (min.)	Total Fibers	Total Fields	Conc.* (f/cc)	Fiber Density (f/mm ²)	Comments
			Field Area (mm ²)	Flow Rate (l/min.)							
Assigned	080830004-25	9/01/88	0.00785	---	---	---	1.0	100			Blank
Bl. 1											

*NOTE: In concentration column, FOL = Filter Overloaded, FTB = Filter Tampered With or Damaged
Results reported as 'less than' (<) values are below the limit of detection
(5.5 fibers/100 fields for NIOSH 7400 Method) for the air volume sampled.

N/P = Information Not Provided
N/A = Not Applicable