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NATLSCO
National Loss Control Service Corporation

Long Grove, IL 60049 • 312 | 540-2400
TWX 910 | 651-3571

a subsidiary of
KEMPER CORPORATION

January 19, 1978

R. Hampton, Product Engineering Manager
AMMCO Tools, Inc.
210 Commonwealth Avenue
North Chicago, IL 60064

Dear Mr. Hampton:

Attached is the Industrial Hygiene Study performed at the training center on January 6, 1978.

If you have any questions concerning this study, or if I can be of any further assistance, please don't hesitate to call or contact me.

Very truly yours,

Frank O. Brown Jr.

Frank O. Brown, Jr.
Industrial Hygienist
Certified/Comprehensive Practice

FOB/lb

Attachment

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H 0051

1-6-78

REPORT OF INDUSTRIAL HYGIENE STUDY
FOR
AMMCO TOOLS, INC.
NORTH CHICAGO, ILLINOIS

NATLSCO
National Loss Control Service Corporation
Long Grove, IL 60049

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REPORT OF INDUSTRIAL HYGIENE STUDY
FOR
AMMCO TOOLS, INC.
NORTH CHICAGO, ILLINOIS

INTRODUCTION

An Industrial Hygiene Study was performed at this location on January 6, 1978, to determine area concentrations of, and operator exposure to, asbestos fiber concentrations present in work room air as a result of the operation of:

1. Ammco Model 880 brake shoe grinder, with the Model 8150 brake shoe clamp and the Model 8925 Dust Collection System (representative also of other Ammco grinders, see Equipment and Study Procedures)

2. Ammco Model 1250 Brake Assembly Washer.

SUMMARY OF RESULTS

Under the conditions present during the study, operator exposures to asbestos fibers during grinding on either grinder, or during brake washing, were, on a Time-Weighted Average basis, below all present or proposed Federal limits, if each series of tests was considered to be the only exposure to be encountered by an operator during an eight hour work day. (In other words, if the operator operated only one grinder, and did a similar amount of grinding)

Due to the brief duration of grinding work, personal samples could not be compared to the present or proposed ceiling limits. Asbestos concentrations as determined do seem to indicate that the present OSHA ceiling limits would not be exceeded during brake dressing on a properly maintained brake shoe grinder.

Under the conditions present during the study, general area samples in workroom air showed low fiber concentrations during grinding and washing work, except some taken around the dust collection systems of the grinders. It should be noted that those near the collection system were not breathing zone samples. Fibers generated around the dust collection system, however, could contribute to personal exposures.

EQUIPMENT AND STUDY PROCEDURES

Atmospheric asbestos concentrations were determined by collection using MSA Model S battery powered pumps and millipore membrane filters, with a submicron pore size. The top cap of each filter

sample was removed to expose the entire area of the filter during sample collection. Air was drawn through the filter at 2.0 liters per minute, and the sampling media was positioned as close as possible to the breathing zone of the exposed employee, except for the general area samples which were positioned at indicated locations, at approximate breathing zone height unless otherwise noted in the tables.

Subsequent to collection, the filters were brought to the NATLSCO Environmental Sciences Laboratory where fibers were counted on the filters using phase contrast microscopy techniques at a magnification of 450. The NATLSCO Environmental Sciences Laboratory is accredited by the American Industrial Hygiene Association and licensed by the U.S. Department of Health, Education, and Welfare's Center for Disease Control.

The Time-Weighted Average Exposure was calculated using the formula:

$$\frac{C_1T_1 + C_2T_2 + \ldots C_nT_n}{T_s}$$

Where C represents the contaminant concentration, T the sampling time at that concentration, and T_s represents the total sampling time.

The conditions under which air sampling was conducted is defined as follows:

1. Work room: 60'1" x 38'6" x 19'4" (height)
   or 44,727 ft.^{3}
   All doors and bays closed
   Ventilation in the room consisted of recirculating warm air through 2 warm air returns mounted about 10 feet above the floor.

2. Grinders: Two Model 880 brake shoe grinders were used, both equipped with Model 8150 cam action brake shoe clamp, and the Model 8925 Dust Collection system. It is felt that air sampling results would have be similar with the other grinders (Model 890 and 8000) since they differ only in the type of brake shoe clamp employed. The sanding drums on each grinder rotated at 3450 rpm. The grinders were positioned a few feet apart on the south side of the room

   The "poorly maintained" brake shoe grinder was several years old, and had been used considerably. The inner plastic collection bag of the 8925 dust

collection system was about half full. The bag was oversized, and as a result was bunched in spots around the outer rim of the metal collection drum. As a result, small gaps were present around the rubber gasket where the drum is fastened to the underside of the collection system fabric bag. It was observed that puffs of dust were blown out from around the gasket during start-up of the poorly maintained grinder.

The "well maintained" grinder was about the same age, but the dust collection system had been cleaned, and a fresh, unused plastic bag was apparently carefully fitted in the Dust Collection System. No dust was observed to have been blown out through the gasket junction of the drum and fabric bag during operation.

3. Comparison Grinder tests:

(See attached tables)
General area air samples were duplicated on both grinders during some typical dressing of brake shoes. In addition, samples were duplicated during the destroying of brake linings. In all, about 16 total grindings were made, on eight different shoes, at each of the two brake shoe grinders. In the opinion of the operator, this represented a good day's work in a typical garage.

4. Other grinder tests:

In addition to the above tests, follow up air samples were taken on the "poorly maintained" grinder after the dust collection bag was replaced and the metal collection drum was washed. A test was attempted with the collection system disconnected, but this was terminated when it became apparent that large amounts of dust and fibers would accumulate in the air when shoe grinding was done.

5. Grinder operator personal exposure:

During operation of both grinders, personal samples to evaluate operator exposure to asbestos fibers were taken. The time weighted average exposure for the sampling period was calculated for the operator based on the results of each set of samples taken at the "poorly maintained" and "well maintained" grinders.

6. Brake shoe washer:

Air samples to determine area concentrations of, and personal exposure to, asbestos fibers was done during the use of the model 1250 Brake Assembly Washer with the #1256 Brake Washer Concentrate. The car (a late 60's model Chevrolet) was located on the lift in the same workroom, about 20 feet diagonally northwest of the brake shoe grinders. This test was considered a good example of a set of wheels in poor shape, with heavy corrosion and a large deposit of ground material contained in each wheel.

DISCUSSION

The samples taken during destruction of brake shoe linings showed that during such abuse, significant fiber concentrations were generated in the operator's breathing zone, as well as in the general area.

Based on visual observations made during the aborted test during grinding with the Dust Collection System detached, it is advised that these brake shoe grinders always be employed with the use of such a System. Excessive airborne asbestos fiber levels could be generated in the absence of the Dust Collection System.

Based on visual observation made during brake washing, it is advised that the outside of the wheel be wetted if possible before hitting it to disloge corrosion around the brake cover. Considerable airborne suspended particulate was generated when the wheel brake covers were struck, before the inside was washed.

Respectfully submitted,

Frank O. Brown, Jr.

Frank O. Brown, Jr.
Industrial Hygienist
Certified/Comprehensive Practice

FOB/lb

TABLE I
ATMOSPHERIC ASBESTOS CONCENTRATIONS
AMMCO TOOLS, INC.
NORTH CHICAGO, ILLINOIS
JANUARY 6, 1978
MODEL 880 BRAKE SHOE GRINDERS

SAMPLE NUMBER	LOCATION	TIME START/STOP	FIBER CONCENTRATION (fibers/ml)[a] Poorly Maintained Model 880	Well Maintained Model 880
OSHA Allowable Limit				2*
				10**
OSHA Proposed Limit				0.5*
				5.0**
NIOSH Proposed Limit				0.1*
				0.5**
OPERATOR'S BREATHING ZONE				
	Ken Bullock, brake shoe grinder operator			
Y22	Grinding 12" relined WEP-43-FE-MM shoe, and 11" new MAN-594-FF, destroyed lining	0852/0857	1.4	--
Y47	Same grinding, destroyed lining	1116:15/1121:15	--	1.4
Y28	Grinding 4 shoes; 2 11" Maremont MG-08-FE-P; 2 11" Maremont MG-12-FE-3	0906:20/0913:00	0.77	--
Y43	Same grinding	1056:45/1101:15	--	< 0.38
Y31	Grinding 2 shoes twice; 11" Chrysler SEC 336X; 11" MG-08-FE-P	0930:10/0936:05	2.6	--
Y40	Same grinding	1042:27/1046:05	--	< 0.44
Y33	Grinding 4" shoes twice; 2,9" GM-304-F, 2,9" GM-207-FE	0948:35/0959:30	0.62	--
Y36	Same grinding	1022:20/1028:00	--	0.29
	TIME WEIGHTED AVERAGE EXPOSURE for Sampling Period[b], all grinding work		1.2	< 0.63

TABLE I
PAGE TWO

SAMPLE NUMBER	LOCATION	TIME START/STOP	FIBER CONCENTRATION (fibers/ml)[a] Poorly Maintained Model 880	Well Maintained Model 880
Y46	In area, no grinding work	1103/1116 1122/1136		<0.06
	Estimated 8 Hour Time Weighted Average Exposure, for grinding work, assuming no other brake work		0.05	<0.02
Y51	Changing collection bag from #8925 dust collection system, on poorly maintained model 880 brake shoe grinder	1243/1252	0.19	--
Y53	Grinding shoes on Poorly Maintained model 880, after collection bag change and collection bucket wash. Grind 2, MG-08-FE-P shoes and 2 MG-12-FE-S shoes	1306:30/1310:15	<0.46	--
	GENERAL AREA SAMPLES			
Y21	One foot above arbor, no activity	0809/0839	<0.06[b]	<0.06[b]
Y24	One foot above arbor, during grinding as per Y22	0852/0859	2.1	--
Y48	One foot above arbor, during grinding as per Y47	1116:15/1121:15	--	<0.34
Y26	One foot above arbor, grinding as per Y28	0906:20/0913:00	0.26	--
Y44	One foot above arbor, grinding as per Y43	1056:45/1101:15	--	<0.38
Y30	One foot above arbor, grinding as per Y31	0930:10/0936:05	<0.29	--
Y41	One foot above arbor, grinding as per Y40	1042:27/1046:05	--	<0.44
Y34	One foot above arbor, grinding as per Y33	0948:35/0959:30	0.62	--
Y37	One foot above arbor, grinding as per Y36	1022:20/1028:00	--	0.29

TABLE I
PAGE THREE

SAMPLE NUMBER	LOCATION	TIME START/STOP	FIBER CONCENTRATION (fibers/ml)[a] Poorly Maintained Model 880	Well Maintained Model 880
Y25	Two inches from collar where collection bag joins grinder housing, 2½' above floor. During grinding as per Y22	0852/0857	6.5	--
Y27	Two inches from collar where collection bag joins grinder housing, 2½' above floor. During grinding as per Y28	0906:20/0913:00	0.51	--
Y29	Two inches above end of collection system housing, 1 foot above floor where plastic lined collection drum meets housing. Grinding as per Y31	0930:10/0936:05	3.1	--
Y42	Two inches above end of collection system housing, 1 foot above floor where plastic lined collection drum meets housing. Grinding as per Y40	1042:27/1046:05	--	< 0.44
Y35	Two inches above end of collection system housing, 1 foot above floor where plastic lined collection drum meets housing. Grinding as per Y33	0948:35/0959:30	0.31	--
Y38	Two inches above end of collection system housing, 1 foot above floor where plastic lined collection drum meets housing. Grinding as per Y36	1022:20/1028:00	--	0.29
Y45	Two inches above end of collection system housing, 1 foot above floor where plastic lined collection drum meets housing. Grinding as per Y28	1056:45/1101:15	--	< 0.38
Y49	Two inches above end of collection system housing, 1 foot above floor where plastic lined collection drum meets housing. Grinding as per Y47	1116:15/1121:15	--	3.8

TABLE I
PAGE FOUR

SAMPLE NUMBER	LOCATION	TIME START/STOP	FIBER CONCENTRATION (fibers/ml)[a]	
			Poorly Maintained Model 880	Well Maintained Model 880
Y23	Middle of work shop, 15 feet from grinders, during all grinding on poorly maintained Model 880.	0852/1001	0.25	--
Y39	Middle of work shop, 15 feet from grinders, during all grinding on well maintained Model 880	1022/1123	--	0.06
Y50	Middle of work shop, 15 feet from grinders, no activity	1142/1243	<0.03[b]	<0.03[b]

[a] fibers greater than 5 microns in length per milliliter of air sampled. All fibers with an aspect ratio of 3:1 or greater were counted

[b] Concentration is representative for both grinders.

* Eight hour time weighted average exposure limit.

** ceiling concentration not to be exceeded.

< - denotes "less than". Where a "less than" value is used in the table, it means that no countable fibers were observed on the sample. The calculated fiber concentration for these samples was arrived at using "less than 1" in the calculation.

TABLE II
ATMOSPHERIC ASBESTOS CONCENTRATIONS
AMMCO TOOLS, INC.
NORTH CHICAGO, ILLINOIS
JANUARY 6, 1978
MODEL 1250 BRAKE ASSEMBLY WASHER

SAMPLE NUMBER	LOCATION	TIME START/STOP	FIBER CONCENTRATION (fibers/ml)[a]
OSHA Limits - See Table I			
OPERATOR'S BREATHING ZONE			
	Ken Bullock, brake washing operator		
K54	Detach 4 tires, (from old Chevrolet), knock corrosion off wheels with hammer, take wheel cover off, wash 4 brake housings with Washer and #1256 Brake Washer Concentrate	1322:25/1337:00	1.1
Y56	As above, plus not activity following brake washing	1322:25/1352:30	0.53
Estimated 8-Hour Time Weighted Average Exposure, assuming no other brake work			0.03
GENERAL AREA SAMPLES			
Y55	Left side of car, at door, during washing	1322:45/1337:30	0.36
Y52	15' from shoe grinders, 25' from car, during 1 grinding operation and 1 brake washing operation	1306:30/1353	0.04

[a] Fibers greater than 5 microns in length per milliliter of air sampled. All fibers with an aspect ratio of 3:1 or greater were counted.

< - denotes "less than". Where a "less than" value is listed in the table, it means that no countable fibers were observed on the sample. The calculated fiber concentration for these samples was arrived at using the number "less than 1" in the calculation.

NATLSCO
National Loss Control Service Corporation
ENVIRONMENTAL SCIENCES LABORATORY, A-1
Long Grove, IL 60049 • 312]540-2488

a subsidiary of Kemper corporation

Name F. O. Brown Jr.
Title "
Firm Hamco Inc.
Address North Chicago

Bus. Tel. No.

ANALYSIS REQUEST **Nº 6267**

FIELD NUMBER	SAMPLING VOLUME	ANALYZE FOR—	LABORATORY NO.	RESULTS Fibers/cc	N/C or ± 2 SD
Y [illegible]	60	Asbestos	RTV 00532	<0.06	<1
Y [illegible]	10			1.4	4
Y [illegible]	13.0			0.25	1
Y 24	10			2.1	6
Y 25	10			6.5	13
Y 26	13.4			0.26	1
Y 27	13.4			0.51	2
Y 28	13.4			0.77	3
Y 29	12.0			8.1	11
Y 30	17.0			<0.37	<1
Y 31	12.0			2.6	9
Y 32	[illegible]			SUBTRACTED	<1
Y 33	[illegible]			0.62	4
Y 34	[illegible]			0.62	4
Y 35	[illegible]		V	0.31	2

DATE SAMPLES TAKEN 11/6/78
DATE RECEIVED BY LABORATORY 11/[illegible]/78
DATE COMPLETED

COMMENTS:
Please report [illegible]

ANALYTICAL METHOD:
NIOSH [illegible]

NC 82-3 7-77 5M

H 0060

(K)

NATLSCO
National Loss Control Service Corporation
ENVIRONMENTAL SCIENCES LABORATORY, A-1
Long Grove, IL 60049 • 312 | 540-2488

a subsidiary of Kemper Corporation

Name F. J. Brown, P.
Title
Firm INMICO TOOLS
Address No. Chicago
Bus. Tel. No.

ANALYSIS REQUEST **№ 6268**

FIELD NUMBER	SAMPLING VOLUME	ANALYZE FOR—	LABORATORY NO.	RESULTS f/cc	No. of f/cc
Y36	11.7	Asbestos		< 09	1
Y37	11.7			< .09	1
Y38	11.7			< .09	1
Y39	12.2			< .06	1
Y40	7.7			< .14	< 1
Y41	7.7			< .14	< 1
Y42	7.7			< .14	< 1
Y43	7.7			< .38	< 1
Y44	7.7			< .38	< 1
Y45	7.7			< 0.38	< 1
Y46	54			< 0.06	< 1 Str
Y47	10.2			1.4	4
Y48	10.2			< 0.34	< 1
Y49	11.0			3.8	11
Y50	12.2			< 0.03	< 1

DATE SAMPLES TAKEN

DATE RECEIVED BY LABORATORY

DATE COMPLETED

ANALYTICAL METHOD:

COMMENTS:

NATLSCO
National Loss Control Service Corporation
ENVIRONMENTAL SCIENCES LABORATORY, A-1
Long Grove, IL 60049 • 312 | 540-2488

a subsidiary of Kemper corporation

Name F. O. Brown

Title

Firm

Address AMMCO TOOLS
North Chicago

Bus. Tel. No.

ANALYSIS REQUEST

Nº 6242

FIELD NUMBER	SAMPLING VOLUME	ANALYZE FOR—	LABORATORY NO.	RESULTS Fibers/cc	No. of Fields
Y51	18	Asbestos		0.19	1
Y52	93.0			< 0.04	< 1
Y53	7.5			< 0.46	< 1
Y54	1.0			1.1	2
Y55	7.5			< 0.56	< 1
Y56	1.0			0.53	1
Y57	.5			0.54	1
Y58	2.0			< 1.7	< 1
Y59					< 1
Y60			0590		< 1

DATE SAMPLES TAKEN

DATE RECEIVED BY LABORATORY

DATE COMPLETED

COMMENTS:

ANALYTICAL METHOD:

ASBESTOS COUNTS

Count No.	Spl. No. 01					Spl. No. 22					Spl. No. 23				
1	0	0	0	0	0	[illegible]	0	0	[illegible]	0	0	0	[illegible]	[illegible]	0
2	1														
3															
4															1
5						1								1	
6														0	
7															
8						2									
9						0									
10															
11															
12															
13															1
14												1	1		
15												0		1	
16											1			0	
17											0				
18											0		1		
19											0		0	1	
20										1	1		0	0	
N					<1					1					16
Ave.					<01					.04					.10
Air Vol.					60					10					138
Fib./ cc					<.06					.4					.25

Formula - $\frac{\text{Ave. N} \times 342}{\text{Air Vol.}}$ = fibers/cc (for 37 mm filter)

AHMCO

A S B E S T O S C O U N T S

Count No.	Spl. No.				21	Spl. No.				25	Spl. No.				26
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
N					6					19					1
Ave.					.06					.9					.01
Air Vol.					10					10					134
Fib./ cc					2.1					6.5					.26

Formula - $\frac{\text{Ave. N x 342}}{\text{L Air Vol}}$ = fibers/cc (for 37 mm filter)

ASBESTOS COUNTS

Count No.	Spl. No.					Spl. No.					Spl. No.				
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
N					2					3					11
Ave.					.02					.03					.11
Air Vol.					13.4					13.4					12
Fib./ cc					.51					.77					5.1

HAMACO

ASBESTOS COUNTS

Count No.	Spl. No. 33					Spl. No. 34					Spl. No. 35				
1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
2													1		1
3															
4															
5												1			
6					2							1			
7					0							0			
8						1									
9						0									
10															
11															
12						0									
13	2					2									
14	0					0									
15															
16														1	
17														0	
18								1						0	
19								1							
20								0						0	0
N					4					4					2
Ave.					.04					.04					.02
Air Vol.					22					22					22
Fib./ cc					.12					.12					.1

ASBESTOS COUNTS

Count No.	Spl. No. 29					Spl. No. 31					Spl. No. 33				
1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
2	1						1	1	0						
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17						3									
18						1		2							
19						0		0							
20															
N					<1					9					<1
Ave.					<.01					.09					<.01
Air Vol.					41.29					12					30
Fib./cc					<.29					0.8					

AMMCO

ASBESTOS COUNTS

Count No.	Spl. No. 36					Spl. No. 37					Spl. No. 38				
1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
2								0							1
3								0							
4								1							
5								0							
6															
7															
8															
9															
10															
11															
12		↓											↓		
13		1										1	1		
14		0											0		
15															
16															
17															
18															
19															
20	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
N					1					1					1
Ave.					.01					.01					.01
Air Vol.					11.7					11.7					11.7
Fib./cc					.29					.29					.29

AMMICO

ASBESTOS COUNTS

Count No.	Spl. No. #2					Spl. No. #3					Spl. No. #4				
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
N					<1					<1					<1
Ave.					<.01					<.01					<.01
Air Vol.					7.7					9					9
Fib./ cc					<.44					<.38					<.38

AMMICO

ASBESTOS COUNTS

Count No.	Spl. No. 39					Spl. No. 76					Spl. No. 41				
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2															
3															
4															
5															
6															
7					1										
8					c										
9		1													
10		0													
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
N					2						<1				<1
Ave.					.02						<.01				<.01
Air Vol.					122						7.7				7.7
Fib./cc					.06						<.44				<.44

ASBESTOS COUNTS

Count No.	Spl. No. 45					Spl. No. 46					Spl. No. 47				
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2															
3															
4															
5															
6															
7															
8															
9													1		
10													1		
11													0		
12												1			
13												1			
14												0			
15													1		
16													2		
17													0		
18															
19															
20															
N					<1					<1					4
Ave.					<.01					<.01					.01
Air Vol.					9					34					10
Fib./cc					<.38					<.06					.4

MMCC

ASBESTOS COUNTS

Count No.	Spl. No. 48					Spl. No. 49					Spl. No. 50				
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2						1									
3						1									
4						1									
5						0									
6								↓							
7								1		0					
8								0		1					
9								0		0					
10							↓	0							
11							1	0							
12						↓	1	0							
13						1	0								
14						0	0								
15							0								
16							1								
17							0								
18							0								
19							0								
20	↓	↓	↓	↓	↓	↓	0	↓		↓	↓	↓	↓	↓	↓
N					21					11					21
Ave.					0.01					.11					0.01
Air Vol.					10					10					122
Fib./ cc					0.34					3.8					0.03

ASBESTOS COUNTS

Count No.	Spl. No. 151	Spl. No. 52	Spl. No. 53
1		0	0
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17	1		
18			
19			
20			
N	1	0	0
Ave. Air Vol. Fib./ cc			

ASBESTOS COUNTS

Count No.	Spl. No. 454	Spl. No. 55	Spl. No. 56
1		0	
2			
3			
4			
5			
6			
7			
8			
9	i		
10			
11			
12	1		1
13			
14			
15			
16			
17			
18	1		
19			
20			
N	3	0	1
Ave. Air Vol.			
Fib./ cc			

ASBESTOS COUNTS

Count No.	Spl. No. 457	Spl. No. 58	Spl. No. 59 BL
1		0	1
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13	1		
14			
15			
16			
17			
18			
19			
20			
N	1	0	10
Ave. Air Vol.			
Fib./ cc			

ASBESTOS COUNTS

Count No.	Spl. No. 60 BL	Spl. No.	Spl. No.
1	0		
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
N	0		
Ave. Air Vol.			
Fib./ cc			

52

1/6/78

Frank Bucaro submitted 10 vermiculite samples
Taken 1/4/78 at

Ammco Tool
N. Chicago, IL

Asbestos

LAB NO	FIELD NO	COUNTS/100 FIELDS	AVG N	AIR VOL	FIBERS/cc
ROZ63A	Y21	<1	<.01	60	<.06
64	22	4	.04	10	1.4
65	23	10	.10	138	.25
66	24	6	.06	10	2.1
67	25	19	.19	10	6.5
68	26	1	.01	13.4	.26
69	27	2	.02	13.4	.51
70	28	3	.03	13.4	.77
71	29	11	.11	12	3.1
72	30	<1	<.01	12	<.29
73	31	9	.09	12	2.6
			<.11	BL	SUBTRACTED

[redacted]

Lots

ASBESTOS COUNT

LAB NO.	FIELD NO.	COUNTS/100 FIELDS	AREA N	AREA (A)	FIBERS/cc
R0280	Y48	<1	<.01	10	<.54
81	49	11	.11	10	5.8
82	50	<1	<.01	122	<.05
V0295	51	1	.01	18	0.19
84	52	<1	<.01	93	<0.04
85	53	<1	<.01	7.5	<0.46
86	54	3	.03	9.0	1.1
87	55	<1	<.01	9.5	<0.36
88	56	1	.01	6.5	0.53
89	57	1	.01	6.3	0.54
90	58	<1	<.01	2.0	<1.7
91	59 BL	<1	<.01	SUBTRACTED	
V0292A	Y60 BL	<1	<.01	SUBTRACTED	

$$\text{FIBERS/cc} = \frac{AVS\ N \times 3\%}{\ell}$$

METHOD: PHASE CONTRAST MICROSCOPY

COMPLETED: 1/7/78 REPORTED: 1/8/78