



Inter Office

Scientific Research Staff

June 12, 1975

To: D. R. Coulson

cc: T. Cole
S. Gratch

PLAINTIFFS
EXHIBIT
FD-271

Subject: SRS Research Grant -- Mount Sinai School of Medicine, City University of New York

The grantee is utilizing the grant funds in its investigation of possible health hazards due to exposure of workers in vehicular maintenance shops to respirable particles of brake dust. Measurements were made of asbestos fiber in the air of several such shops in New York City; and lung X-rays, pulmonary tests, and blood tests were taken of garage workers.

The asbestos fiber concentrations were determined at various distances from different brake maintenance operations, including the cleaning of drums by blowing with an air jet, brake lining grinding, and brake lining beveling. (The Mount Sinai people recognize that vacuum-brush cleaning of brake drums is preferred to air jet blowing because of the clouds of dust raised by the latter method, and indicated that the larger shops in New York City are in fact converting to vacuum systems.)

The clinical tests were performed on 93 garage workers (not necessarily associated with the garages which were air-sampled), and the incidence of abnormalities in lung X-rays, pulmonary functions, and blood were assessed. Some of the examined workers regularly do brake work while some are exposed only occasionally or incidentally.

The investigation is headed by Dr. William Nicholson, a physicist on the staff of the Mount Sinai School of Medicine. Dr. Nicholson will forward details of the results of the study.

Ann Mackler, a M.S. mineralogist who is working toward her Ph.D. degree, is a participant in this work, along with CUNY staff members.

Roy L. Gealer

R. L. Gealer
Chemical Engineering &
Catalysis Department

ao

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SCF-ALLF-05510

Table I

PERSONAL SAMPLES - AUTOMOBILE BRAKE SERVICE

<u>Operation</u>	<u>Distance</u>	<u>Concentration (fibers/ml.)*</u>
Blowing dust out of drum brakes	3-5 ft.	13.8
" " " " " "	"	29.4
" " " " " "	"	6.6
" " " " " "	"	13.6
" " " " " "	5-10ft.	3.8
" " " " " "	"	2.0
" " " " " "	"	4.2
" " " " " "	10-20ft.	0.4
" " " " " "	"	4.8

BACKGROUND SAMPLES - AUTOMOBILE BRAKE SERVICE

<u>Operation</u>	<u>Distance from Operation</u>	<u>Time Lapse</u>	<u>Concentration (fibers/ml.)*</u>
Blowing dust out of drum brakes	10 ft.	0 min.	0.3
" " " " " "	20 ft.	0 min.	0.8
" " " " " "	12 ft.	5 min.	0.2
" " " " " "	50 ft.	5 min.	0.1
" " " " " "	65 ft.	7 min.	0.1
" " " " " "	75 ft.	14 min.	0.1

*Only fibers longer than 5μ were counted by phase microscopy at 400x.

Table II

SIZE DISTRIBUTION OF CHRYSOTILE FIBERS IN BRAKE DRUM DUST (LENGTH)

Fibers counted and measured at 42,000X
(all fibers had diameters from 250Å to 500Å)

<u>Sample</u>	<u>750-1500Å</u>	<u>1500-2250Å</u>	<u>2250-3000Å</u>	<u>3000-3750Å</u>	<u>Total</u>
1	40%	34%	11%	11%	96%
2	32	23	32	--	87
3	20	25	25	--	70
4	26	37	26	7	96
5	57	17	4	--	78
6	23	9	12	12	56
7	50	26	21	2	99
8	29	30	21	17	97
9	6	41	18	10	75
10	11	6	31	31	79

Table III

PERSONAL SAMPLES - TRUCK BRAKE SERVICE

<u>Operation</u>	<u>Concentration (fibers/ml.)</u>
Renewing used linings by grinding	2.7
" " " " "	7.0
" " " " "	2.2
" " " " "	4.1
" " " " "	5.0
" " " " "	4.7
" " " " "	5.6
" " " " "	1.7
" " " " "	2.5
" " " " "	2.0

BACKGROUND SAMPLES - TRUCK BRAKE SERVICE

<u>Operation</u>	<u>Distance</u>	<u>Concentration (fibers/ml.)</u>
Background to grinding used linings	10 ft.	1.2
" " " " "	10 ft.	1.7
" " " " "	25 ft.	1.0
" " " " "	25 ft.	0.6
" " " " "	60 ft.	0.2

Table IV

PERSONAL SAMPLES - TRUCK BRAKE SERVICE

<u>Operation</u>	<u>Concentration (fibers/ml.)</u>
Bevelling new linings	31.7
" " " "	23.7
" " " "	32.7
" " " "	72.0
" " " "	26.3

BACKGROUND SAMPLES - TRUCK BRAKE SERVICE

<u>Operation</u>	<u>Distance</u>	<u>Concentration (fibers/ml.)</u>
Background to bevelling linings	8 ft.	0.6
" " " "	12 ft.	0.5
" " " "	12 ft.	0.3
" " " "	30 ft.	0.3

X-ray Changes in 93 Vehicular Maintenance Workers with over 10 years Experience

<u>Occupational History</u>	<u>Asbestos exposure</u>	<u>Total</u>	<i>Diagnose</i> <u>t-1/0</u>	<u>Pleural thickening or Ca++</u>	<u>Both parenchymal and pleural changes</u>
<u>Brake work $\geq$ 1/week</u>	Known direct	64	16 (25%)	5 (8%)	2 (3%)
Mechanics doing brake maintenance -64 <u>$\geq$ 1/week</u>					
<u>Brake work < 1/week:</u>					
General mechanic - 7	Indirect and/or				
Body work - 6	not fully				
Painting - 6	evaluated	29	6 (21%)	4 (14%)	1 (3%)
Undercoating - 4					
Lubrication - 3					
Miscellaneous - 3					
Clerical (parts) - 2					
		<u>93</u>	<u>22</u> (24%)	<u>9</u> (10%)	<u>3</u> (3%)

Normally, ~10% of population will have
lung X ray abnormalities

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Pulmonary function tests in
93 vehicular maintenance workers with
at least 10 years experience

Asbestos exposure	No. with adequate PFT's	Smoking					
		Obstructive only	Restrictive only	Both	Smokers	Ex.	Non
Direct 64	61	17 (28%)	14 (23%)	3 (5%)	19 (29%)	18 (28%)	24 (43%)
Indirect and/or not evaluated 29	25	5 (20%)	7 (28%)	6 (24%)	12 (48%)	10 (40%)	3 (12%)
Total 93	86	22 (25%)	21 (24%)	9 (10%)	31 (35%)	28 (32%)	27 (31%)

*cannot say if more than
normal. Smokers have poor
pulmonary function*

PQ

R005 0216

Other pulmonary findings
93 vehicular maintenance workers
with at least 10 years on the job

asbestos exposure	dry rales	clubbing	rhonchi, wheezing	chronic bronchitis	dyspnea on exertion (2 flights)
Direct	3	3	5	5	3
64	(5%)	(5%)	(8%)	(8%)	(5%)
Indirect and/or not evaluated	1	2	3	5	5
29	(3%)	(7%)	(10%)	(17%)	(17%)
Total	4	5	8	10	8
93	(4%)	(5%)	(9%)	(11%)	(9%)

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History of job related symptoms
104 vehicular maintenance workers

	<u>Number</u>	<u>Percent</u>
Headache only on job	33	32
Headache also off job	2	2
Light-headedness	6	6
Blurred vision	3	3
Tinnitus	4	4
Cough	3	3
Palpitation	3	3
Angina	2	2
Nausea	5	5

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**Blood test findings in
vehicular maintenance workers**

	(10 inactive workers)	
Blood lead - 94 active workers	<u>No.</u>	<u>%</u>
20µg/100ml and below	4 (4)	4 (40)
21-30	33 (3)	35 (30)
31-40	36 (2)	38 (20)
41-50	17 (1)	18 (10)
51-60	4	4
>60	0	0

*High lead. Normally,
less than 5% of population
has more than 40 µg/100ml.*

CDC's - 104 workers	<u>No.</u>	<u>%</u>
Blood Hemoglobin <13gm	3	3
wbc < 4800	18	19
wbc < 4000	3	3

*no conclusion
} slightly high*

Liver function tests - 102 workers		
Alkaline phosphatase > 85mU/ml	24	24
Other abnormality	7	7
(SGOT > 40, SGPT > 40 and/or Bilirubin > 1.0mg%)		

slightly high

Blood calcium - 102 workers > 10.5mg%	5	5
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no conclusion

R006 0219

Bill Nicholas

Long X-ray results

6/2/75

no same
sampled
no sampled

93 graph work

64

once a week broken
no regular

29

25% have

X-ray

class in

(broken down)

10% played

New York going over to vacuum (big info)

Small service station probably 1/2 of the way

Ann Masker

Mineralogist

M.S. → Ph.D.

8000 0220

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Bill Nicholas 5/6/58

#

40-50 ft

act. in garage air.
breathing zone ^{above} blow (2 min sample)
6-30 fibers/cc

5-10 ft air 2-4

10-20 ft air 0.1-0.5

75 ft air 0.1 ft/cc 15 minutes

10-60 ft grinding
breathing zone 1.2-2.0

0.2-1.7 fibers

8-30 ft beveling

0.2-0.6

breathing zone 2.1-7.2

X ray abnormalities — not definite

just know it's excess

4-5 mm in lungs in garage work
in chest

8000 0221

PC

2 other sources in garage

• undercoating

• body shop - plastic mastic
fibers/ice

	blow-cleaning of drum	granularity	leveling
breathing zone	6-30	1.7-7.0	26-72
5-10 ft away	2-4	—	—
10-20 ft away	0.4-4.8	—	—
75 ft away, 15 min later	0.1	—	—
10-60 ft away	—	0.2-1.7	—
7-30 ft away	—	—	0.3-0.6

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I called Bill Nicholson, Mount Sinai School of Medicine, ^{on 5/6/75} regarding the status of their studies, partially supported by an NRS \$5100 grant, of exposure of brake shop garage workers to asbestos dust.

His measurements at a few garages (he wouldn't say exactly how many) showed the following amounts of asbestos in the air (2-minute samples)

	blow-cleaning of drum	grinding fibers	beveling
breathing zone	6-36	1.7-7.0	26-75
5-10 ft away	2-4	—	—
10-20 ft away	0.4-4.8	—	—
75 ft away, 15 min later	0.1	—	—
10-60 ft away	—	0.2-1.7	—
7-30 ft away	—	—	0.3-0.6

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