Inter Office

Scientific Research Staff

June 12, 1975

PLAINTIFF'S
EXHIBIT
FD-271

To: D. R. Coulson

cc: T. Cole
S. Gratch

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

8000 0211

81-59

PRODUCED BY FORD

Table I

PERSONAL SAMPLES - AUTOMOBILE BRAKE SERVICE

Operation	Distance	Concentration (fibers/ml.)*
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

Operation	Distance from Operation	Time Lapse	Concentration (fibers/ml.)
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.

8000 0212

81.60

PRODUCED BY FORD

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)

Sample	750-1500Å	1500-2250Å	2250-3000Å	3000-3750Å	Total
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

8000 0213

PRODUCED BY FORD

Table III

PERSONAL SAMPLES - TRUCK BRAKE SERVICE

Operation	Concentration (fibers/ml.)
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

Operation	Distance	Concentration (fibers/ml.)
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

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

BACKGROUND SAMPLES - TRUCK BRAKE SERVICE

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

8000 0214

PRODUCED BY FORD

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

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

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

8000 0215

PRODUCED BY FORD

81.01

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

Asbestos exposure	No. with adequate PFT's	Obstructive only	Restrictive only	Both	Smoking: Smokers	Smoking: Ex.	Smoking: 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%)

could say if worse than normal. Smokers have poor pulmonary function

PQ 8006 0210

PRODUCED BY FORD

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 64	3 (5%)	3 (5%)	5 (8%)	5 (8%)	3 (5%)
Indirect and/or not evaluated 29	1 (3%)	2 (7%)	3 (10%)	5 (17%)	5 (17%)
Total 93	4 (4%)	5 (5%)	8 (9%)	10 (11%)	8 (9%)

R000 0217

PRODUCED BY FORD

History of job related symptoms

104 vehicular maintenance workers

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

8900 0218

PRODUCED BY FORD

Blood test findings in vehicular maintenance workers

	(10 inactive workers)	
Blood lead - 94 active workers	No.	%
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.

CBC's - 104 workers	No.	%	
Blood Hemoglobin <13gm	3	3	no conclusion
wbc < 4800	18	19	slightly high
wbc < 4000	3	3	slightly high

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

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

R006 0219

PRODUCED BY FORD

Bill Nicholson

Lung X-ray results [illegible]

6/2/75

93 garage workers

64 once a week brake work
29 not regular

25% have X-ray [illegible] classified [illegible] regular [illegible]

(fibrous scarring)

10% [illegible]

Not same garages can assumption

New York going over to vacuum (big [illegible])

Small service station [illegible]

Ann Mackler
Minerologist
M.S. → Ph.D.

8000 0220 PQ 81.62

PRODUCED BY FORD

Bill Nicholson 5/6/75

4 or 5 [illegible]

asb. in garage air.

breathing zone, drum blow (2 min. sample)

6-30 fibers/cc

5-10 ft aw 2-4

10-20 ft away 0.1-4.5

75 ft away 0.1 fiber/cc 15 [illegible]

10-60 ft grinding 0.2-1.7 fibers

breathing zone 1.7-7.0

8-30 ft beveling. 0.3-0.6

breathing zone 26-72.

X ray abnormalities — not definitive

just known it is excess

4 [illegible] in garage [illegible]

[illegible]

8000 0221

PQ

PRODUCED BY FORD

2 other sources in garage
- undercoating
- body shop - plastic mastic

fibers/cc

	blow-cleaning of drum	grinding	beveling
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 mm later	0.1	—	—
10-60 ft away	—	0.2-1.7	—
8-30 ft away	—	—	0.3-0.6

8000 0222

PRODUCED BY FORD

I called Bill Nicholson, Mount Sinai School of Medicine, on 5/6/75 regarding the status of their studies, partially supported by an SRS #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	fibers/cc grinding	beveling
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

8000 0223

PRODUCED BY FORD