



Inter Office

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Engineering and Research Staff

November 21, 1980

To: Executive Director
Directors

cc: W. D. Compton
Research Task Force on Carcinogens in the Workplace

Subject: Asbestos Survey Report

Attached is the Task Force report that has surveyed, identified and made recommendations on the elimination or accommodation of asbestos materials in Research laboratories and facilities.

J. A. Brown Jr.
J. A. Brown, Jr.

R. C. Machen
R. C. Machen

fd

Attachment

8004 0692

RESEARCH TASK FORCE
ON CARCINOGENS IN
THE WORKPLACE

ASBESTOS REPORT
November 21, 1980

8004 0693

SUMMARY AND RECOMMENDATIONS

- 1) The Task Force on Carcinogens in the Workplace surveyed the operations in Research that utilize materials containing asbestos.
- 2) The results of this survey showed that three major areas: brake lining research, brake shoe changing in the garage and chassis rolls in engine research involve operations that may generate airborne asbestos fibers in amounts that justify consideration of precautionary measures.
- 3) In addition a special area in the machine shop should be designated if there is to be work on asbestos containing materials. Procedures have been adopted to prevent asbestos fiber pollution in building repair operations involving removal of old pipe insulation.
- 4) Substitution of nonasbestos implements and materials such as gloves, insulation board, tape has been going on for quite some time and commendable progress has already been made in this regard. The recommendation is to replace all uses of asbestos with substitutes where they are available as soon as feasible (Appendix F).
- 5) Procedures based on proven methods for controlling the release of asbestos fibers have been outlined for the various areas in Research particularly the above mentioned areas. Regular periodic assessment of the ambient asbestos fiber level in these areas by means of appropriate methods is recommended.
- 6) In cases where clothing could become contaminated it is recommended that disposable protective garments be utilized and disposed of in accordance with OSHA standards (Appendix G).

RESEARCH TASK FORCE ON CARCINOGENS
IN THE WORKPLACE

Chemical Sciences Laboratory	James A. Brown Jr.	Co-Chairman
Engine Research Office	Durga N. Rao	
Long Range Research	Matthew Dzieciuch	
Manufacturing Processes Laboratory	Rome M. Nowicki Don Melotik	
Material Sciences Laboratory	Robert Gardon	
Research Planning and Services Ofc.	John J. Jenick Ronald C. Machen Harold D. March	Co-Chairman
Safety, General Services	Russell Quarles	
Systems Research Laboratory	M. A. Shulman	
Vehicle Concepts Office	Paul A. Ervin	

Action

The Task Force on Carcinogens in the Workplace was established during the first quarter of 1980 by memo from Vice President-Research (Appendix A). The Task Force was established to coordinate plans and efforts among research activities; to identify and control carcinogens in products, manufacturing and research activities. This report summarizes findings and recommendations relevant to asbestos.

Background

Studies into the occupational factors involved in the development of cancer have provided clear evidence that cancer is of serious occupational concern in some circumstances. Personnel and Organizational Staff has exerted a continuing effort to provide employee protection, as knowledge of toxic/hazardous materials has accumulated.

The Company shares public concerns relative to the control of toxic/hazardous materials because of its regard for the protection of the environment, and employee health and the potential impact of legislation on its products and manufacturing operations. In addition the right to examine certain reports from the Company's computer file of hazardous materials, and on-line access to the Materials and Toxicology System (MATS) has been extended to the UAW by contract.

Resolution of workplace exposure concerns relative to the management of toxic/hazardous materials involves a consideration of the relationship between the internal and external environments. Emphasis on wastewater pretreatment standards, toxic pollutant effluent standards, nonregulated air pollution emissions and solid waste management has been increased. These factors reinforce the desirability of reducing the amount of waste materials generated by the Company through more efficient research and manufacturing techniques. This includes the substitution of materials where necessary.

The Company has been subjected to a growing number of laws which regulate material use, transport, handling and disposal. Under certain environmental laws, a "knowing/willful" criminal violation can punish individuals as well as officers of the Company with up to five years imprisonment. Civil and criminal penalties have maximum fines up to \$25,000 per day and a citation usually consists of multiple related violations. The Company recognizes the significance of these regulations. Since March 1977, when Directive B-101 was issued designating responsibilities within the Company, new standards have been issued, additional standards are anticipated, and the level of potential financial liability has increased. Directive B101 was revised September 22, 1980 establishing a Toxic/Hazardous Substance program management activity within Environmental and Safety Engineering Staff and designating related responsibilities of other staff and line components.

Positive evidence has established that inhalation of asbestos-containing dust can cause chronic respiratory disease (asbestosis) as well as several forms of cancer. The most common complication of asbestosis is cancer of the lung. Mesothelioma, involving the membranes lining the chest and abdominal cavities, is now considered a cause of death among asbestos workers. Other forms include lung cancer and gastro-intestinal cancer.

Asbestos is used in a variety of automotive components and thus in the research laboratory many occupational exposures are possible. The permissible OSHA exposure limit at the present time is 2.0 fibers per cubic centimeter of air which may be changed to as low as 0.5 fibers per cubic centimeter by 1981. An EPA ban on all non-critical uses may occur by 1985.

In research laboratories asbestos can possibly be encountered in the following materials:

- 1) Insulation materials (e.g., gloves, furnaces, curtains, tape, rope, paper)
- 2) Filler in finished plastics
- 3) Mastics
- 4) Gaskets
- 5) Clutch plates
- 6) Brakes
- 7) Contaminant in talc
- 8) Roofing materials
- 9) Millboard (transite)
- 10) Asbestos reinforced paper
- 11) Core and mold making materials
- 12) Safety apparel

Objectives

The Research Task Force was established to implement the work plans developed by the Corporate Task Force and establish additional plans that deal specifically with Research problems regarding carcinogens. These plans include identifying under what conditions and where Category I and II carcinogens are used in Research. Asbestos was designated as priority one by the Corporate Task Force and thus received first consideration. The strategy in general involves identification of workplace areas where Research operations need review to see if they meet OSHA regulations and in cases of possible non-compliance the determination of whether the strategy should be used in compliance or elimination.

OSHA Classification

In 1977 OSHA issued a draft policy listing various chemicals that could be classified as "Category I and Category II" carcinogens. The final listing is due later this year, and is fairly certain to include asbestos. According to OSHA policy, Category I substances are those known to be carcinogenic in humans or those that have been demonstrated to be carcinogenic in two separate laboratory animal studies. Category II substances are those where available data is suggestive of carcinogenicity in test animals and humans or unreplicated tests indicate potential occupational carcinogenicity in a single mammalian test species.

Survey

The following activities were surveyed for asbestos in Research facilities:

Chemical Sciences Laboratory
Engine Research Office
Long Range Research Office
Manufacturing Processes Laboratory
Material Sciences Laboratory
Research Planning and Services Office
System Research Laboratory
Vehicle Concepts Office

In Appendix E, survey sheets for each office or laboratory are summarized and grouped according to Research facility, i.e., Gas Turbine Laboratory, Manufacturing Development Center, Scientific Research Laboratories, and Auto Laboratory, University of Michigan, Ann Arbor.

Survey Results indicate a number of areas in Research that may involve the generation of asbestos fiber in amounts that justify consideration of precautionary measures:

1. Brake lining research - Manufacturing Processes Laboratory
2. Brake Shoe Changing (garage) - Research Planning and Services
3. Chassis rolls in Engine Research - Research Planning and Services
4. Machining Shop - Research Planning and Services
5. Building Repairs - Dearborn General Services; Glendale Research & Planning Services

Recommendations

Brake Lining Research - Manufacturing Processes Laboratory

- A. If research on brake linings using asbestos is resumed, a separate hood exhaust system should be provided.
- B. An OSHA approved vacuum should be provided for cleanup.
- C. Areas designated for asbestos work should be marked with hazard signs.
- D. Ambient air concentrations of asbestos should be determined in rooms S1151, 1154, 1158 & 1160 by the following 3 methods periodically and continued at regular intervals designated by Industrial Hygiene and Toxicology.
 - 1) EPA Phase Contrast Microscopy
 - 2) Phase Contrast Microscopy with Index of Refraction
 - 3) Scanning Electron Microscopy (SEM)

- E. Disposal of friable and encapsulated asbestos waste material as well as safety procedures for personal hygiene in handling asbestos should adhere to OSHA CFR 29 1910.1001 (2) (Appendix G). These materials shall be collected and disposed of in double sealed impermeable bags and packed in metal drums for MDMR approved land-fill.

Chassis Rolls

GTL Bldg. #1065 - Research Planning and Services
SRL Room E2226A
SVL Room S2002

The ambient air concentration of asbestos is not available, therefore, SRL Room E2226A should be a representative testing area. The basis for making a decision as to whether this operation is a potential hazard will be the result of this analysis.

Brake and Clutch Repair (Garage) - Research Planning and Services

Standard operating procedures should be followed (Appendix C, Plant Engineering Letter - #80-1 March 17, 1980). An approved OSHA vacuum for cleanup should be obtained.

Machine Shop - Research Planning and Services

A special area in the machine shop should be designated for asbestos work. This area should be properly ventilated, marked, and contain an OSHA approved vacuum.

Building Repairs (Pipe Insulation) - General Services

Standard procedures for doing repairs on buildings containing asbestos should be followed (Appendix C). A survey of nonproduction materials has been conducted by Plant Engineering, General Services and the report forwarded to Manufacturing Staff (Appendix D). A copy of this report should be obtained for the Task Force records.



Vice President
Research

February 21, 1980

Mr. N. A. Gjostein
Mr. S. Gratch
Mr. J. J. Harwood
Mr. M. Humenik, Jr.

Mr. D. F. Moyer
Ms. M. A. Roberts
Mr. R. C. Ronzi
Mr. T. J. Walsh

cc Mr. J. D. Collins

Subject: Carcinogens in the Work Place

A corporate task force on Carcinogens in the Work Place was established recently in order to examine potential problems and develop action plans to correct them. Serge Gratch represents Research on this task force. A result of the deliberations of this task force has been development of the enclosed Asbestos Work Plan. Similar work plans for other materials will be developed in the future.

In order to implement this work plan, we should set up a task force within Research, with representatives from each Laboratory and Office, charged with identifying under what conditions and where suspected carcinogens are used in Research. If any such usage is found, then with the help of Industrial Hygiene, the task force would have to determine what actions may be required so that we meet OSHA requirements. The first assignment will be to carry out the steps for the case of asbestos-containing materials.

I am asking Drs. J. A. Brown and R. C. Machen to co-chair this task force. I would appreciate it if each of you would select a representative to this task force. Serge Gratch will provide the liaison between this group and the corporate task force.


W. Dale Compion

Enclosure

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8004 0700

Research Task Force on Carcinogens in the Workplace

<u>Activity</u>	<u>Name</u>	<u>Company Mailing Adse</u>	<u>Telephone</u>
Chemical Sciences Laboratory	J. A. Brown	E-3198, SRL	21483
Engine Research Office	D. N. Rao	E-2164, SRL	31519 40012
Long Range Research Office	M. Dzieciuch	S-1077, SRL	31423
Manufacturing Processes Laboratory	M. DeCello R. M. Nowicki	K-9280, Glendale K-9240, Glendale	59-22376 59-22280
Material Sciences Laboratory	R. Gardon	S-2093 SRL	20140
Research Planning and and Services Office	J. J. Jenick R. C. Machen H. D. March C. D. Wilson	K-9230, Glendale S-3061 SRL S-2090 SRL S-2068 SRL	59-22102 31667 29655 25688
Systems Research Laboratory	M. A. Shulman	E-1176 SRL	34556
Vehicle Concepts Office	P. R. Ervin	1000 GTL	40217
Safety (General Services)	R. Quarles	154, P&A Bldg.	29108

PLANT ENGINEERING LETTER NO. 30-1

MARCH 17, 1980

ASBESTOS - RECOMMENDED WORK PRACTICES

Asbestos is a recognized human carcinogen. The first regulation limiting employee exposure to asbestos was promulgated in 1972. In July 1976, the Occupational Safety and Health Administration (OSHA) established a two fiber per cubic centimeter exposure limit. OSHA is considering an even lower permissible exposure limit indicating growing concern over asbestos exposure and use.

Despite the hazards associated with asbestos fiber, the reduction in allowable exposure limits, and the number of proven cases of cancer caused by exposure to asbestos, workers tend to ignore the hazard. A potential hazard exists wherever asbestos is cut, ripped, drilled, ground, or handled in any way which causes dust to become airborne. The best way to minimize the effects of asbestos exposure is to follow good work practices and use equipment designed to protect employees from breathing asbestos.

This article lists the work practices which should be used if asbestos must be handled. These work practices are based on OSHA regulations, Company guidelines, and common sense. In those cases where asbestos is being removed (as in thermal insulation on pipes), it is suggested that available substitutes be used for replacement. Some substitutes are listed below. Company research projects are presently underway to attempt removal of asbestos from all Company operations wherever it is possible.

Pipe Insulation

Most pipe insulation installed prior to 1960 contains asbestos. Generally maintenance and/or replacement of insulated pipes requires removal of the asbestos covering. To minimize the release of asbestos fibers into the air and decrease potential employee exposure, the following work practices should be followed:

- All employees removing asbestos pipe insulation must wear approved respirators and special clothing. This is not only a good work practice, it is a requirement of OSHA regulation 29CFR 1910.1001 (C)(2)(iii). Contact Industrial Hygiene and Toxicology (313) 337-8955 for information on approved respirators.
- OSHA regulation 1910.1001 contains explicit requirements and work practices which must be followed when the potential for asbestos overexposure can occur. The regulation provides details on: respirator programs, change rooms and clothes lockers, area and personal sampling requirements, caution signs and labels, house-keeping, waste disposal, medical recordkeeping and medical examinations. The regulation should be consulted and followed particularly in those areas where asbestos is encountered routinely.
- Isolate the area to keep other employees as far as possible from the repair operation. The surfaces to be repaired should be wetted down where possible or treated with commercially available dust suppressant to control dispersion of asbestos fibres.
- Place plastic sheeting on the floor beneath the repair site so that all pieces of insulation, however small, can be collected when finished. Pedestrian and vehicular traffic can redistribute asbestos into the air if pieces are left on the floor.

- If it is necessary to sweep the asbestos, the floor should be wetted down to keep the fibers from becoming airborne. Approved vacuum cleaners should be used to clean the floor of any remaining dried asbestos dust and small pieces of material (see Plant Engineering Office, Manufacturing Staff Maintenance Bulletin No. 137 for recommended vacuum cleaners).
- All waste, scrap, and debris, as well as asbestos-contaminated clothing, should be placed in sealed, impermeable bags or containers for proper disposal. No asbestos-containing insulation should ever be placed in open trash containers or dumpsters. All waste material containing asbestos or containers into which they are placed for disposal must be labeled in accordance with OSHA Standard 1910.1001 (G)(2)(i)(ii).
- Because asbestos fiber can be dispersed throughout adjacent areas by ventilation systems, air-supply fans in the vicinity of asbestos removal projects should be turned off; exhaust fans should be left on (unless these fans are part of an air recirculation system) to keep the area under negative pressure.

When repair operations are complete, if the pipe must be reinsulated, asbestos containing products are not to be used for two reasons: (1) cutting and fitting of asbestos-containing insulation generates significant amounts of airborne asbestos fiber even though it cannot be seen, and (2) eventually asbestos will be banned from use completely except where suitable substitutes are not available. Future regulations may even require complete removal of asbestos already installed in Company facilities.

Currently, there is not any one material on the market which can be substituted for asbestos in all of its applications. As regulations tighten, it is expected that manufacturers will produce substitute materials. There are insulation substitutes currently on the market and some are listed in "Mechanical Design and Equipment Standards" (Plant Engineering Office, Manufacturing Staff, Page M4-1, January 1976). Typical substitutes are listed below:

Steam Piping

Inside Boiler Houses

Manufacturer

Certain-Teed Saint Gobain (CSG)
Johns-Manville
Owens-Corning
Celotex Corporation
Pabco

Acceptable Material

Snap-On (to 450 F)
Calcium Silicate
Kaylo
Careytemp Expanded Silica (1/2")
Calcium Silicate

Inside Manufacturing and Office Buildings

Manufacturer

Certain-Teed Saint Gobain (CSG)
Johns-Manville
Owens-Corning Fiberglas
Pabco

Acceptable Material

Snap-On
Flame Safe
Heavy Density Sectional
Calcium Silicate

Condensate Piping -- (Inside Building)

Manufacturer

Armstrong Cork Co.
Certain-Teed Saint Gobain (CSG)
Johns-Manville
Owens-Corning Fiberglas

Acceptable Material

FR/Armaflex
Snap-On
Flame Safe
One Piece

Brake and Clutch Repair

Brake and clutch mechanisms on vehicles, presses and cranes utilize asbestos friction materials. Overexposure to asbestos fiber in the air can occur during inspection and repair operations especially when compressed air is used to blow off dust. The Plant Engineering Office, Manufacturing Staff Maintenance Bulletin No. 137 recommends a procedure for minimizing asbestos fiber exposure. Important points are summarized below:

- Under no circumstances should compressed air blowoffs be used to clean parts which may contain asbestos laden dust.
- Brake and clutch mechanisms should be cleaned using an industrial vacuum cleaner with a filter system capable of capturing a three micron particle size. Information is available from the Industrial Hygiene and Toxicology Department on availability of recommended units.
- Disposal of any asbestos laden waste resultant from brake or clutch repair and maintenance or from vacuum cleaning should be by an employee wearing an approved respirator. The waste material and any vacuum cleaner bags should be placed in sealed containers and labeled as to the hazardous nature of their contents. Vacuum cleaner bags are not to be emptied by shaking; these bags are not to be reused.
- The repair area should be kept clean of all visible dust on the floor. Even small amounts become airborne repeatedly by pedestrian and vehicular traffic. If sweeping is practiced, it should be done only after wetting down the floor. Approved vacuum cleaners should be used to clean the dried asbestos dust from the floors. Conventional vacuum cleaners may not be capable of retaining asbestos fibers which may penetrate the filter and be dispersed into the air.
- Any grinding or cutting of asbestos containing material must be done with local exhaust ventilation which conforms to OSHA Standard 1910.1001.

General Precautions

The work practices above are intended to help in minimizing the hazard involved in handling this substance. In addition to insulation removal and brake and clutch repair, the following general precautions are recommended which pertain to respirator usage:

- Employees must be trained in the proper use of respirators and their limitations.
- Respirators should be cleaned and disinfected after each day's use.
- Employees must be evaluated by medical personnel to determine if they are qualified to do required tasks while wearing respirators.

- Initial monitoring must be conducted (as prescribed in CFR 1910.1001 (F)(1) to determine if employee exposure to asbestos is below allowable levels.

There are other maintenance materials that may contain asbestos and may be in use at Company facilities. To the extent that commercially available alternates are available, they should be substituted for any materials presently in use which may contain asbestos. While the following list, condensed from a government synopsis of asbestos-containing products, is not all inclusive, it can be useful in suggesting candidate materials for which asbestos substitutes may already be available:

- Paper Products: pipe and boiler covering, sheets for heat insulation, millboard sheet, filtering materials.
- Cloth and Woven Products: seals for high temperature gaskets, valve stem packing, insulation for glass-handling tools.
- Flame Resistant Garmets: gloves and mittens, sleeves and arm protectors, aprons, blankets.
- Asbestos Cement Products: welding shields, siding.
- Miscellaneous: acoustical and sprayed thermal insulation, asbestos powder, bulk fiber.

In future Plant Engineering Letters we plan to include additional information on asbestos as well as on other material which could contain potentially carcinogenic substances.

PROTECTION OF SPRINKLER HEADS DURING PAINTING OPERATIONS -- UPDATE

As a result of the last article on the above subject (Plant Engineering Letter 79-4) some important comments have been received from the Corporate Fire Control Office. The Fire Control Office concurs with the requirement to cover sprinkler heads during painting operations, however, it should be emphasized that the protective material used must not interfere with the normal operation of the sprinkler. Reference to "canvas covers" as one of the approved methods of protection should, therefore, be deleted from page 4, line 11 of Letter 79-4.

Two references were also made on the same page to cleaning of painted sprinkler heads. Fire Control Bulletin No. 8, entitled "Automatic Sprinkler Systems," dated September 14, 1979, states that painted sprinkler heads should not be cleaned but should be promptly replaced with new heads. The reference to cleaning painted sprinkler heads on page 4, lines 16 and 21 of Letter 79-4, should also be deleted.

2-7-8

Mr. S. Gratch ✓

June 5, 1980

cc L. E. Johnson
W. Lilac
R. F. Morrison
L. Tomkow

Subject: Survey of Asbestos in Research Facilities

This letter is in response to your request to locate and identify asbestos materials used in the construction and subsequent repairs of Research facilities. As previously discussed, a survey of non-production materials has been conducted and a report submitted by General Services to Manufacturing Staff.

If you have any further questions, please contact me on extension 21922.

1-SEABORN-

JUN 30 11:25-



F. M. Sanders, Supervisor
Plant Engineering
General Services
(Room 119, Facilities Services Bldg.)

dms

8004 0706

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RESEARCH SURVEY SUMMARY OF CARCINOGENS

Manufacturing Development (

Asbestos Materials

Activity	Dept. Number	Room Number	Item	Use/Process/Equipment
Manufacturing Pro. Lab				
Metal Melting & Processing	K9240		No usage	
Machining & Wear	K9220		No usage	
Chemical Sciences Lab Polymer Science			No usage	
Mfg. Proc. Lab Metal Forming	K9210	Powder Met Lab	Gloves	Insulation
Surface Processing	K9280	Paint Lab	Gloves	Insulation
			Ovens (2) (Despatch)*	
			Oven (Blu-Surf)*	
			Oven (Blue-M)*	
			Oven (Greenberg)*	
		Paint Area	Oven (Young)	
			Oven (Body)*	
			Oven (Hot Pack)*	
			Oven (Precision Scientific)*	
Res Png & Services Ofc Analytical Sciences	K9030	Lab A	Heat trace lines	Insulation

*() Manufacturer

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RESEARCH SURVEY SUMMARY OF CARCINOGENS IN THE WORK PLACE

Manufacturing Development Center

Asbestos Materials

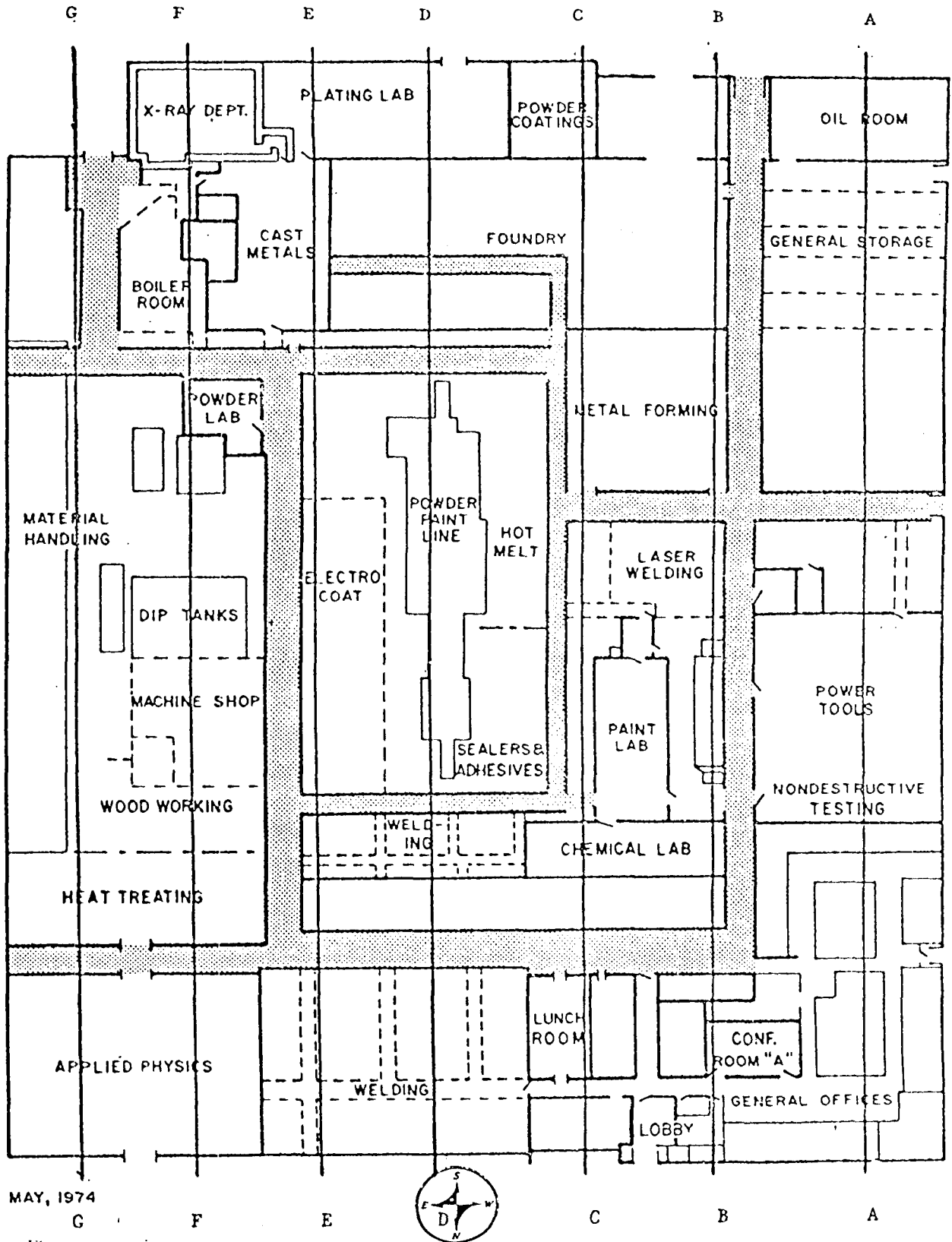
Activity	Dept. Number	Room Number	Item	Use/Process/Equipment
Research Planning & Serv. Office	K9026	A-2, A-3 A-4, A-5	Pipe insulation Heating ducts	Insulation
Technical Services		A-6, A-7	Hot water pipes	
Technical Services		B-1, B-2	Heating ducts	
Building & Facilities Services		B-3, B-4	Hot water pipes	
		B-5, B-6 B-7	Overhead pipes	
		C-1	Old hot water tank	
		C-2, C-3 C-4	Hot water pipes	
		C-5, C-6 C-7	Heating ducts	
		D-1, D-2 D-3	Overhead pipes	
		D-4, D-5 D-6, D-7	Pipes, water	
		E, F, G 1-2, 3-4 5-6, 7-8	Overhead pipes Heating ducts	

5/80



MANUFACTURING DEVELOPMENT CENTER

Overhead pipes and heat ducts covered with asbestos materials



8004 0709

April 9, 1980

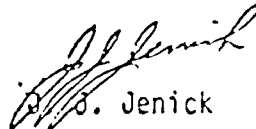
To: F. J. Schank

Subject: Survey of Asbestos Materials in the
Research-Glendale Facilities

In compliance with Mr. Compton's request for a complete survey of our facilities for Carcinogens substance materials (Asbestos), our findings are as follows:

After a thorough inspection of our plant, we find that a large percentage of our overhead piping and heating ducts are wrapped with asbestos insulating material, which was commonly used when the building was constructed approximately 25 years ago. After checking with maintenance personnel, we find that the asbestos material has been painted three to four times over the past several years so, basically, there is no raw asbestos material exposed.

Also we have checked in our crib area for asbestos material, which may have been stored in cabinets or shelf areas, and find there is no trace of this material in the crib area.


J. J. Jenick

8004 0710

RESEARCH SURVEY SUMMARY OF CARCINOGENS IN THE WORK PLACE

Scientific Research Laboratories

Asbestos Materials

Activity	Dept. Number	Room Number	Item	Use/Process/Equipment
Chemical Sciences Lab				
Chemistry	K9330	S3066	Gloves	Insulation
		S2002	Gloves	Insulation
			Tape	
		S3044	Gloves	Insulation
			Oven	Insulation
		S3079	Gloves, Coat	Insulation
		E3188 -	Furnace, Gloves	Insulation
		E3190		
Fuels & Lubricants	K9380		None	
Polymer Sciences	K9390	E1151	Friction Matls	Brake lining formulations
				30 lbs in 5 sealed pails
		4th floor	Friction Matls	2-100 lbs sealed drums
		E2152	Clamps, Tongs,	Insulation
			Stoppers	
			Press	Insulation (transite)
			Oven	Insulation (gasket)
			Thermal	Insulating base (transite)
			Conductivity	
			Apparatus	
			Furnace	Insulation (transite)
		E2156	Gloves	Insulation
			3-presses	Insulation (transite)
			Steam pipe	Insulation
		Hi-Bay	Gloves	Insulation
			Steam pipe	Insulation (some peeling)
		E3183	Gloves	Insulation
Polymer Sciences	K9390	E3185	Gloves	Insulation
			Rope	
			Tape	
		E3187	Rope	Insulation
			Heating	
			Mantle	
		E3199	Gloves	Insulation

8004 0711

RESEARCH SURVEY SUMMARY OF CARCINOGENS IN THE WORK PLACE

Scientific Research Laboratories

Asbestos Materials

Activity	Dept. Number	Room Number	Item	Use/Process/Equipment
Engine Research Office				
Diesel & Ems. Research	K0531	Exp. Garage	Brake Linings	Wear during vehicle test
		Chassis Rls		
		Heat Treat. Lab	Gloves, end seals, rope	Heat treat furnaces
		Engine Re-build Rm	Engine baskets	
			Gloves, end seals, rope	Trap assay for evaluation tests
		Welding Lab		
		E2228	Tape	Sealing catalysts in containers for test
Stratified Charge and Alternate Engines	K0536	Exp. Garage	Brake Linings	CVS testing of vehicles
		Chassis Rls		Deglaze linings
		Dyno Wing	Engine gaskets	Engine Research
		Exp. Garage		
Advanced Concepts Res. Research and Engineering	K0535	Chassis Rls	Gaskets	General engine/vehicle
		Engine Buildup, Garage, E2166	Brake linings	Development testing
		E2166	Insulation wrap	
			Gloves	Welding
Long Range Research Ofc	K9016	S1077	Clamps, gloves, transite	Insulation
		S2016	transite	Table tops
		S2075, S2079	Furnace, gloves, transite, clamps, ovens	Table tops
		S2081	Tape, transite	Insulation

8004 0712

RESEARCH SURVEY SUMMARY OF CARCINOGENS IN THE WORK PLACE
Scientific Research Laboratories

Asbestos Materials

Activity	Dept. Number	Room Number	Item	Use/Process/Equipment
Manufacturing Processes Laboratory				
Machining and Wear	K9220	E1151, 1154 1158, 1160	Friction mats, Brake linings Clutch facings Wet forming mats Sliding metals Gloves Paper, Tape Transite Insulators	Friction materials & syst.
Surface Processing	K9280	2010	Gloves Curtains (woven strands) Transite Furnace (L&N) (Hevi-Duty)	
		3155	Transite Board Door gasket Oven (PS)	

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RESEARCH SURVEY SUMMARY OF CARCINOGENS IN THE WORK PLACE

Scientific Research Laboratories

Asbestos Materials

Activity	Dept. Number	Room Number	Item	Use/Process/Equipment
Material Sciences Lab				
Physics	K9120	3012 3028	Gloves, tape, string Transite Sheets	Solid state light emitting devices and electro-optic devices
		3021	Gloves (6) Transite Sheets	Metal physics
		3036, 3055	Gloves	Electronic materials
Ceramic Materials	K9130	2069	Gloves, tape Furnace	
		2023	Gloves, transite	
		E2220	Air duct tubing furnaces (2)	Transite
		E1157	Cloth blanket	Transite
		E2220, 2230, 2231 1183, 1157	Rope Heat resistant coat	
Metallurgy	K9140	Dept. labs	Gloves Paper	

8004 0714

RESEARCH SURVEY SUMMARY OF CARCINOGENS IN THE WORK PLACE

Scientific Research Laboratories

Asbestos Materials

Activity	Dept. Number	Room Number	Item	Use/Process/Equipment
Research Planning and Services Office				
Analytical Sciences	K9030	S2030	Gloves Transite board	Transite - Glass Fabricat Shop
		S3052	Paper, tape Table tops (2)	
		S3060	Gloves, sheet	
		S3061	Gloves, clamps Pads, tape	
		S3062	1'x3'x2" block pressed asbestos	
		S3069	Transite board	
Tech. Services	K9020	E2226	Brake lines & Clutch facings	Changed on vehicles
	K9020	S1045	Transite	Machined in machine shop
	K9020	E2226 E1161	Gloves	Working with hot exhaust systems
	K9020	Dyna Wing E1161 E2226	Tape	Insulate hot exhaust systems and high temperature ceramic testi
Systems Research Lab	K9070	E1189	Firebrick, Gaskets, Gloves, sheets	Insulation

8004 0715

RESEARCH SURVEY SUMMARY OF CARCINOGENS IN THE WORK PLACE

Gas Turbine Laboratory

Asbestos Materials

Activity	Dept. Number	Room Number	Item	Use/Process/Equipment
Engine Research Office				
Diesel & Emis. Research	K0531	Chassis Rls	Brake Linings	Wear during vehicle test:
		Cell 13	Engine Gaskets	
		Cell 7	Gloves, end seals, rope	Trap development
Vehicle Concepts Office			No usage	

8004 0716

RESEARCH SURVEY SUMMARY OF CARCINOGENS IN THE WORK PLACE

Auto Laboratory, University of Michigan, Ann Arbor

Asbestos Materials

Activity	Dept. Number	Room Number	Item	Use/Process/Equipment
Systems Research Lab	K9070	249	Shields	Heat shields for spark plug wires from exhaust heat

8004 0717

RESEARCH SURVEY SUMMARY OF CARCINOGENS IN THE WORK PLACE

Gas Turbine Laboratory

Asbestos Materials

Activity	Dept. Number	Room Number	Item	Use/Process/Equipment
Line Research Office				
Vehicle & Emiss. Research	K0531	Chassis Rls	Brake Linings	Wear during vehicle tests
		Cell 13	Engine Gaskets	
		Cell 7	Gloves, end seals, rope	Trap development
Vehicle Concepts Office			No usage	

8004 0718



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asbestos fibers, or to their containers, except that no label is required where asbestos fibers have been modified by a bonding agent, coating, binder, or other material so that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section will be released.

(ii) *Label specifications.* The caution labels required by paragraph (g)(2)(i) of this section shall be printed in letters of sufficient size and contrast as to be readily visible and legible. The label shall state:

CAUTION

Contains Asbestos Fibers

Avoid Creating Dust

Breathing Asbestos Dust May Cause Serious Bodily Harm

(h) *Housekeeping*—(1) *Cleaning.* All external surfaces in any place of employment shall be maintained free of accumulations of asbestos fibers if, with their dispersion, there would be an excessive concentration.

(2) *Waste disposal.* Asbestos waste, scrap, debris, bags, containers, equipment, and asbestos-contaminated clothing, consigned for disposal, which may produce in any reasonably foreseeable use, handling, storage, processing, disposal, or transportation airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section shall be collected and disposed of in sealed impermeable bags, or other closed, impermeable containers.

(i) *Recordkeeping*—(1) *Exposure records.* Every employer shall maintain records of any personal or environmental monitoring required by this section. Records shall be maintained for a period of at least 20 years and shall be made available upon request to the Assistant Secretary of Labor for Occupational Safety and Health, the Director of the National Institute for Occupational Safety and Health, and to authorized representatives of either.

(2) *Employee access.* Every employee and former employee shall have reasonable access to any record required

to be maintained by paragraph (i) of this section, which indicates the employee's own exposure to asbestos fibers.

(3) *Employee notification.* Any employee found to have been exposed at any time to airborne concentrations of asbestos fibers in excess of the limits prescribed in paragraph (b) of this section shall be notified in writing of the exposure as soon as practicable but not later than 5 days of the finding. The employee shall also be timely notified of the corrective action being taken.

(j) *Medical examinations*—(1) *General.* The employer shall provide or make available at his cost, medical examinations relative to exposure to asbestos required by this paragraph.

(2) *Preplacement.* The employer shall provide or make available to each of his employees, within 30 calendar days following his first employment in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination, which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 × 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV₁).

(3) *Annual examinations.* On or before January 31, 1973, and at least annually thereafter, every employer shall provide, or make available, comprehensive medical examinations to each of his employees engaged in occupations exposed to airborne concentrations of asbestos fibers. Such annual examination shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 × 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV₁).

(4) *Termination of employment.* The employer shall provide, or make available, within 30 calendar days before or after the termination of employment of any employee engaged in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination which shall