

ENGINEERING AND RESEARCH SUBCOMMITTEE
MANUFACTURING AND SUPPLY SUBCOMMITTEE

CARCINOGENS IN THE WORKPLACE

TASK FORCE REPORT

Engineering Staff
Manufacturing Staff
May 27, 1980

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PRODUCED BY FORD

CARCINOGENS IN THE WORKPLACE

INTRODUCTION

At the October 1979 joint meeting of the Engineering and Research and Manufacturing and Supply Subcommittees, a report on the Occupational Safety and Health Administration (OSHA) Policy for Regulating Workplace Carcinogens was presented by Personnel and Organization Staff. This report noted that final regulations for carcinogens in the workplace were anticipated by the end of 1979. It was agreed that efforts to eliminate the use of potential carcinogens where possible should be preceded by analysis of the affected materials and processes. In this regard, a Task Force was established by the Subcommittees to identify carcinogens and quantities in use, set targets for elimination ahead of regulation, take steps to find substitutes, develop a directive and workplan and organize to identify and control potentially carcinogenic substances.

Since October, OSHA has released its Policy which establishes criteria and procedures for the identification, classification and regulation of potential carcinogens in the workplace. The Policy further defines Category I potential carcinogens as substances known to be carcinogenic in humans or which have been demonstrated to be carcinogenic in two separate laboratory animal studies. Category II substances are those where data are suggestive of carcinogenicity in humans and test animals. The Policy also outlines criteria for classifying a substance into Categories I or II and establishes the mechanism for issuance of standards governing use of a particular substance. No specific substances were categorized, or standards promulgated, with the issuance of the Policy. Normally, once the need for a standard is determined by OSHA, it could take one to two years before the standard is issued. If an "Emergency Standard" is set, the ruling is issued and immediate compliance is required. A number of court challenges of the new Policy are expected to center primarily on stringent rules virtually precluding use of negative evidence studies when defining the carcinogenicity of a substance and cost/benefit criteria. A draft list of candidate substances governed by the Policy was issued by OSHA two years ago. A revised list is expected to be released in July, 1980 followed by a prioritized extract in September.

The Task Force has concentrated on developing the capability for managing the elimination or control of Category I potential carcinogens in the workplace. A start has been made in identifying specific applications for subsequent elimination or control of asbestos, hexavalent chromium compounds and benzene.

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**FEDERAL ACTS REGULATING TOXIC/HAZARDOUS MATERIALS
HAVING IMPACT ON THE COMPANY**

<u>Workplace Related</u>	<u>Packaging & Stacking</u>
- Occupational Safety and Health Act - 1970 D.O.L. (OSHA) - Hazardous Materials Transportation Act - 1975 D.O.T. (HTMA) - Toxic Substances Control Act - 1976 E.P.A. (TSCA) - Resource Conservation and Recovery Act - 1976 E.P.A. (RCRA) - Clean Air Act and Clean Water Act Amendments - (CAA) 1977/78 E.P.A.	- Federal Hazardous Substances Act - 1970 - Poison Prevention Packaging Act - 1970 - Consumer Product Safety Act - 1972
	<u>Waste Management</u>
	Resource Conservation and Recovery Act - 1976 E.P.A. (RCRA)

FIGURE 2

**CORPORATE STAFFS RESPONSIBILITY FOR TOXIC/HAZARDOUS MATERIALS
(DIRECTIVE B-101)**

<u>Staff</u>	<u>Responsible Activity</u>	<u>REGULATORY ACT</u>		
		<u>OSHA</u>	<u>TSCA</u>	<u>HMTA</u>
ESES	- SSECO		Compliance Reporting Material Inclusion in EPA Inventory	
P&O	- Employee Health Services	Compliance Reporting	- Interpretations - Eval. working conditions - Audit	
		Identification of Controls		DOT label in Data Base
		Monitoring		
	- Safety Engrg.	Enforce Controls		
MFG. STAFF	- Plant Engrg. Office	Facility Controls Development	Non-Prod. & Prod. Matls. Review	
	- Mfg. Engrg. & Systems	Process Controls Development	Non-Prod. Matls. Review	Packaging Storage
	- Plants	Process Controls Implementation Facility Control Implementation	Non-Prod. Matls. review	Material Characteri- zation
E&RS	- Prog. Anal. & Matls. Engrg.		Production Matls. Review	
	- Research Staff	Develop new matls., mfg. processes, & measurement devices.		
SUPPLY	- Trans. & Traffic			Compliance Reporting

BACKGROUND

Scientific investigations into the occupational factors involved in the development of cancer, conducted in recent years, have provided evidence that occupational related cancer is a serious concern. It has been estimated by the U.S. Department of Health, Education and Welfare that in coming decades up to 20% and perhaps as much as 40% of cancer in the U.S. might be associated with occupational factors.^{1/} Accordingly, Personnel and Organization Staff, Employee Health Services, has been involved in a continuing effort to provide employee protection, as knowledge of toxic/hazardous materials has been introduced.

Public concerns relating to the control of toxic/hazardous materials, are shared by the Company and the UAW. The right to examine the Hazardous Materials Catalog 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.

Emphasis on wastewater pretreatment standards, toxic pollutant effluent standards, nonregulated/hazardous air pollutant emissions control and solid/hazardous waste management has been increased by governmental authority. These factors reinforce the desirability of reducing the amount of residuals generated by Company manufacturing processes and operations, through more efficient manufacturing techniques and by materials substitution.

During the past decade, the Company was subjected to a growing number of laws which regulate material use, transport, handling, and disposal (Fig. 1). Under certain of these Acts, a "knowing/willful" criminal violation can expose individuals, including officers of the Company, to five years imprisonment. Civil and criminal penalties include maximum fines of \$25,000 per day; a citation normally consists of multiple related violations.

Litigation is also a growing concern. For example at present the Office of the General Counsel has three suits pending, involving deaths allegedly due to the inhalation of asbestos.

Internal and external pressures regarding hazardous substance control and compliance have increased substantially since March, 1977, when Directive B-101 was issued to assign responsibilities within the Company (Fig. 2). Since that time new standards have been issued, additional standards are anticipated, and the level of economic risk has increased.

^{1/} Federal Register 45(15): 5031, January 22, 1980.

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FIGURE 3

REPRESENTATIVE PAST COMPANY ACTIONS

Production

- Removal of lead and chromium from topcoat paints for passenger vehicles.
- Removal of "Tris" flame retardant
- Controls instituted for asbestos in new designs.

Nonproduction

- Removal of asbestos from,
 - Structural fireproofing
 - Thermal insulation
 - Molding compounds
- Substitution of vacuum for air blowing in brake and clutch maintenance
- Protection of personnel potentially exposed to benzene in light oil tanker loading operations
- Substitution for lead-containing maintenance oils
- Substitution for benzene-containing adhesives
- Reduction of lead-chromates in vinyl operations

REPRESENTATIVE PAST COMPANY ACTIONS (Fig. 3)

The Company has issued Directive B-101 which assigns responsibilities for Toxic/Hazardous material control. Product Engineering Procedure PEP 3-189 and Manufacturing Procedure II.d.1. provide for systematic review and clearance of new production and nonproduction materials.

Production Materials

In response to OSHA regulations issued in 1978, the Company removed lead chromates and lead molybdates from paint used for topcoats on exterior and interior surfaces, effective with Job #1, 1980. School bus yellow and fleet vehicles were excepted. Also, "Tris" flame retardant treatment for fabrics, was removed during 1977. In response to initial OSHA regulations in 1972, the Company determined plant areas in which employee exposure to asbestos exceeded regulated limits. All domestic line operations were apprised of the OSHA standards and the requirements for employee protection and medical examination. In 1979, Car Engineering released a practice banning new designs containing asbestos unless a documented rationale for its use is provided and it is encapsulated.

Nonproduction Materials

In 1969, sprayed-on structural steel fireproofing containing asbestos fibers was eliminated in all new and reworked construction. In 1970, Corporate mechanical construction standards were revised to prohibit asbestos in thermal insulation. Maintenance Bulletin No. 137 was published, prohibiting the use of air blow-off in all brake/clutch maintenance and substituted vacuum fiber/dust pick-up. Since 1973 new suppliers have been required to furnish complete compositional data to obtain clearances prior to use in the plants. In 1974, Steel Division light oil by-product tanker loading operations were reviewed and personnel exposures were pinpointed and appropriate protective equipment supplied. In 1977, the Company replaced M-2C60 Series of maintenance lubricants with lead naphthenate free M-2C142 materials, and deleted the use of asbestos containing molding compound for heater housings at Sheldon Road. In 1978, an adhesive used at San Jose was reformulated to eliminate benzene exposure. During 1979, analytic chemistry procedures at Central Laboratories were revised to eliminate benzene, where possible. The volume of lead-chromate employed in vinyl plant operations was reduced and ventilation/protective measures were identified at the Romeo Tractor Plant to minimize potential hazards from chromium compounds used in painting.

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FIGURE 4

TASK FORCE CHARTER

The Task Force was chartered by E&I and M&S Subcommittees (Meeting of 10/24/79) for coordinating plans and efforts to:

1. Identify substances in use (OSHA Categories I and II).
2. Determine quantities used (for materials regulated by Michigan Department of Natural Resources).
3. Set targets for elimination of as many Category I substances as possible.
4. Take aggressive steps to find substitutes for as many Category I substances as possible in anticipation of government regulations.
5. Develop a policy and action plan for eliminating potential carcinogens where possible.
6. Organize to identify substances systematically.

FIGURE 5

1979 USAGE OF MICHIGAN CRITICAL MATERIALS
AS REPORTED TO MATS* (ADJUSTED BY THE PLANTS IN THEIR MDNR REPORTS)

Material	Lbs. of Usage	Principal Users
Acrylic Acid	251,707	PPV - Paint
**Acrylonitrile	641,133	PPV - Paint
Aniline	90	MCC, Dbn. Glass, T&C Sterling
Antimony	830,571	PPV - Vinyl
**Arsenic	11,157	T&C Vandyke, PPV - Vinyl
**Benzene	385,028	AAD - Dearborn Assy., Gen. Service
**Cadmium	3,311	PPV - Vinyl
**Chromium	81,377	PPV - Paint, EED - Ypsi.
Cloroprene	24,676	AAD - Utica
Cobalt	210	PPV - Saline
Copper	321,704	AAD - Dearborn, PPV - Saline, MSD - Monroe
Cyanides	923,069	MSD - Monroe
**Dichlorobenzenes	2,542	FTO - Highland Park
Formaldehyde	488,965	MCC, PPV - Paint
**Hydrazene	130	PPV
Hydroquinone	1	PPV - Vinyl
Hypochlorite	15,841,758	MSD - Monroe
**Lead	626,027	AAD - Wayne/Dearborn, PPV - Paint
Lithium	123	ED - Northville, T&C Sterling
**Nickel	126,624	MSD - Monroe, T&C Sterling
Phenol	5,839	Mich. Cast. Cntr.
Selenium	127	T&C Sterling
Silver	25	T&C Sterling
Silicon-Dioxide Coated Lead Chromate	2,317	PPV
Styrene	1,413,986	PPV - Milan, PPV - Vinyl
Tetrachloroethylene	1,095	AADGO, Mich. Prov. Grnd.
**Thiourea	18	PPV - Vinyl
Triaryl Phosphate Esters	160,022	Steel, T&C Sterling
Trichloroethylene	91,849	EED - Rawsonville
**Vinyl Chloride	118	PPV - Vinyl
Zinc	1,085,724	PPV - Paint, AAD, FPSD, FTO
* Michigan locations reported to the State of Michigan but not to MATS:		
Detroit Industrial Engine Research & Engineering Center		Vulcan Forge
Research - Glendale		Dearborn Glass
Troy - Tractor		Dearborn Specialty Foundry
		Wixom Assembly
** Category I Potential Carcinogens		

TASK FORCE CHARTER

The complete Task Force Charter assigned by the Engineering and Research and Manufacturing and Supply Subcommittees is shown in Figure 4. To implement the charter, the Task Force has coordinated plans and efforts to identify usage of potentially carcinogenic substances, developed specific strategies to eliminate, where possible, the use of these substances and initiated plans to find substitutes for substances ahead of government regulations.

- A listing of 36 Category I substances or groups of substances in use in the automotive industry has been prepared. (Exhibit I), based on a 1978 MVMA Information Bulletin on substances associated with automotive production.
- For materials regulated by Michigan Department of Natural Resources, quantities have been determined, as shown in Figure 5. As reported to the State of Michigan, in 1979, the Company used 81,377 pounds of chromium compounds, and 385,028 pounds of benzene (primarily in gasoline). Asbestos is not one of the currently designated critical materials. The largest use, 641,000 pounds of acrylonitrile principally at the PPV paint plant, is planned to be removed from topcoats by Job #1, 1981 and from DSO and fleet colors by year end, 1980.

Action on the remaining items in the Task Force Charter will be discussed on the following pages. Category I substances were examined in detail.

FIGURE 6

POTENTIALLY CARCINOGENIC SUBSTANCES

<u>Prioritized Substance</u>	<u>Occurrence within Company</u>	<u>Current Exposure Limits</u>
1. Asbestos	Friction materials, gaskets, sealers	2 fibers/cc
2. Hexavalent Chromium Compounds	Paint pigments	52 $\mu\text{g}/\text{m}^3$ (as Cr)*
3. Benzene	Product of coking operations, foundry operations, petroleum products, paints, thinners	10 ppm *
4. Cadmium Oxides and inorganic salts	Fastener plating, solders, foundry effluent, valve alloy	0.1 mg/m^3 (fumes)* 0.2 mg/m^3 (dust)*
5. Coke Oven Emissions/ Coal Tar Pitch Volatiles	Coke oven and foundry emissions	0.2 mg/m^3
6. Vinyl Chloride	Vinyl Manufacturing	1 ppm
7. Beryllium Oxide and inorganic salts	Aluminum foundry operations	2 $\mu\text{g}/\text{m}^3$ *
8. Trichloroethylene	Degreaser	100 ppm*

*Exposure limit not based on carcinogenicity.

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POTENTIALLY CARCINOGENIC SUBSTANCES

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The development of a capability for managing the elimination/control of Category I potential carcinogens was determined by evaluating the scope of usage of asbestos, hexavalent chromium compounds and benzene (priority ranks 1, 2 and 3, respectively) as test cases.

POTENTIALLY CARCINOGENIC SUBSTANCES

Asbestos

FIGURE 7

Potential Health Effects on Humans

Asbestosis

Lung Cancer

Mesothelioma

Laryngeal Cancer

Digestive System Cancer

FIGURE 8

Exposure Limits

	<u>OSHA</u>		<u>NIOSH</u>
	<u>Regulation (Fibers/cc)</u>	<u>Proposed for Regulation (Fibers/cc)</u>	<u>Recommended (Fibers/cc)</u>
Time Weighted Average	-	-	0.1
Time Weighted Average	2.0	0.5	-
Ceiling	10	5	-

FIGURE 9

Summary of Asbestos Usage

<u>Production</u>	<u>Nonproduction</u>
Clutch Plates	Brake Linings
Brake Linings	Millboard
Gaskets	Asbestos Reinforced Paper
Insulators	Core & Mold Making Sealers
Adhesives	Safety Apparel
Sealers	Clutch Plates
Sound Absorbers	

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POTENTIALLY CARCINOGENIC SUBSTANCES

Asbestos

During the past several years, OSHA has reported evidence of a link between the inhalation of asbestos-containing dust and chronic respiratory disease (asbestosis), as well as several forms of cancer (Fig. 7). These include lung cancer, mesothelioma (cancer of the membranes lining the chest and abdominal cavities), and gastro-intestinal cancer.

The permissible exposure limit by OSHA is 2.0 fibers per cubic centimeter of ambient air. The National Institute for Occupational Safety and Health (NIOSH), an advisory group in The Department of Health and Human Services (formerly HEW) has recommended to OSHA that limits be tightened to as low as 0.1 f/cc in 1980, (Fig. 8). Industrial Hygiene and Toxicology has issued bulletins detailing controls. An EPA ban, under the Toxic Substances Control Act, on all non-critical uses may occur as early as 1985.

Asbestos is found in a variety of automotive components, and thus many occupational exposures are possible. The most critical exposure occurs during brake and clutch repair. A small number of Ford employees are potentially exposed due to repair of vehicles, manufacturing equipment and plants.

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POTENTIALLY CARCINOGENIC SUBSTANCES

Chromium Compounds

FIGURE 10

Potential Health Effects on Humans

	<u>Hexavalent Chromium Compounds</u>	<u>Other Chromium Compounds</u>
Respiratory Tract Irritation/Perforation of Mucous Membranes, Bronchitis	X	X
..	--	--

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PLAINTIFF'S
EXHIBIT
FD-482

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R001 1676

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CARCINOGENS IN THE WORKPLACE

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AB01 1077

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POTENTIALLY CARCINOGENIC SUBSTANCES

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May 27, 1980

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POTENTIALLY CARCINOGENIC SUBSTANCES

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Asbestos is found in a variety of automotive components, and thus many occupational exposures are possible. The most critical exposure occurs during brake and clutch repair. A small number of Ford employees are potentially exposed due to repair of vehicles, manufacturing equipment and plants.

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POTENTIALLY CARCINOGENIC SUBSTANCES

Chromium Compounds

Some trivalent and hexavalent chromium compounds have demonstrated potential health hazards to human organs and systems (Figure 10). Chromium in hexavalent combination with hydrogen, the alkali metals (e.g., sodium), ammonia and oxygen are considered noncarcinogenic. All other hexavalent combinations of chromium (e.g., lead and zinc chromates) are considered potentially carcinogenic. The primary concern for exposure is through inhalation, potentially causing lung cancer.

A number of Ford employees have potential exposure to these compounds by virtue of handling them primarily in paint making and application. Protective measures are employed so that regulated limits are not exceeded. The current statutory limits for all chromium compounds is 52 $\mu\text{g}/\text{m}^3$ although NIOSH has recommended lower levels (Figure 11).

The classes of materials included in Figure 12 are of current concern since the most critical sources of exposure are in paint manufacture and application.

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POTENTIALLY CARCINOGENIC SUBSTANCES

Benzene

Benzene is a potential leukemia producing agent. Excessive exposure may result in a number of other adverse health effects (Figure 13). Benzene may enter the body by inhalation and/or skin absorption.

At present, a small number of Company employees are potentially exposed to benzene in excess of one part of benzene per million parts of air and no employee is exposed in excess of 10 parts of benzene per million parts of air. These potential exposures result from the coke oven steel making processes, but employee protective measures are in effect. Permissible exposure limits allowed by regulatory agencies are summarized in Figure 14. The proposed standard was not upheld by the Court of Appeals because OSHA did not determine whether the benefits expected from the standard bear a reasonable relationship to the cost imposed. The case is now before the Supreme Court, which is expected to rule on it shortly.

The OSHA standard exempts employers who store, transport, distribute, disperse, sell, or use benzene as a portion of gasoline or other motor fuel after it has been discharged from a bulk terminal. This exemption was necessary since there is no known way of controlling benzene exposure among service station personnel, mechanics, or tank truck drivers. Employee Health Services has reported that no indication of excessive exposure exists for Ford employees as a result of handling gasoline.

Benzene occurs as an unintentional constituent in many materials used throughout the Company (Figure 15). Petroleum-related materials are of primary concern as they most likely contain benzene at levels that require consideration.

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SEARCH FOR POTENTIAL CARCINOGENS

Three Category I substances were examined to identify material specifications, parts and nonproduction uses. Existing data bases containing Product, Manufacturing and Purchasing information were found to be inadequate for complete identification of all uses of these substances. In the absence of one reliable system, the detailed steps in Figure 16 were undertaken.

For production materials, each design responsible PEO reviewed the material/usage list for completeness and established a list of parts and bulk materials thought to contain the subject substances. These lists were returned to Engineering Staff. E&RS is consolidating the lists to provide them, along with the approved source and material identifications, to Purchasing and Supply Staff for supplier contact to determine usage and substitutability. Nonproduction materials were identified by similar methods. The production asbestos list is with buyers; benzene and hexavalent chromium compounds are under PEO review.

MATERIALS AND TOXICOLOGY SYSTEM (MATS)

To overcome the deficiencies of manual and semi-computerized search methods, the Materials and Toxicology System (MATS), under development, will consolidate four systems: The CATALOG of Hazardous Materials (P&O Staff); the Engineering Material Approved Source List (E&R Staff); the Nonproduction Material Approved Source List (Mfg. Staff); and the Environmental & Process Engineering Review System (Mfg. Staff).

These Systems can be linked with some manual effort to search for uses of potential carcinogens in Company products as follows and diagrammed in Figure 17:

1. Materials containing Category I chemical compounds can be identified in the CATALOG.
2. Similar materials and the specifications to which they are approved can be found in the Approved Source Lists.
3. For Production materials, parts lists can be obtained from the engineering release system via the Engineering Material Specification.
4. With the parts list, Purchasing can determine quantity used and Manufacturing Engineering can determine processing methods.

Other functions of MATS include Approved Source Lists for production and nonproduction materials, Michigan DNR Critical Materials usage reporting, CATALOG of Hazardous Materials for plant physicians and Hazardous Material Information Center, verification that a substance is on the Toxic Substances Control Act (TSCA) inventory, and listing of hazardous material usage and precautions for each plant.

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POTENTIAL CARCINOGEN SEARCH RESULTS

Partial listings of 111 asbestos, 126 chromium compounds and 7 benzene production and nonproduction applications (Appendices I, II and III, respectively) were examined.

These applications were classified as:

- A - Known substitute material available for application without major redesign;
- B - Known substitute material available for application with major redesign;
- C - No known substitute. Advanced Engineering Project required;

The number of applications in each group are shown in Figure 18.

Even in Group A, (known substitute without major redesign) extensive product or manufacturing engineering effort is required to implement a substitute material. A new material specification may be required and experimental parts must be fabricated and tested to arrive at a successful application. Purchasing must then establish sources for production as well as nonproduction requirements. Realistic timetables and budget provisions must be established by the responsible manufacturing and product engineering organizations. Broad block timing is proposed later in this paper for the three materials examined in detail.

ALTERNATIVE STRATEGIES FOR ELIMINATION/CONTROL OF POTENTIAL CARCINOGENS

Strategy alternatives were considered for the elimination and control of asbestos, hexavalent chromium compounds and benzene. The Task Force agreed that the Company should proceed now to eliminate Group A (known substitute without major redesign) by Job #1, 1985 where appropriate. Where elimination is not appropriate control exposure by design or process for specific applications. (Fig. 19)

For those applications requiring major redesign (Group B), the elimination timetable must reflect Company cycle plans on new plant construction or renovation plans. Finally, where no known feasible substitutes exist (Group C), advanced engineering will have to be completed before elimination strategies or timetables can be established. Individual timetables remain to be established for the balance of the eight prioritized substances.

9001 1587

GENERALIZED WORKPLAN

The foregoing strategy, even though having been tested only for asbestos, chromium compounds and benzene, are judged to be appropriate in concept for other carcinogens with timing adjusted to adapt to the realities associated with elimination.

A generalized workplan has been prepared on the basis of the evaluation of the substances referred to above. The workplan requires central program management, with action implementation by NAAO/DPO Product Engineering Offices, Purchasing activities, Vehicle activities, Manufacturing activities, and the Manufacturing and Supply Staffs. The workplan timing requires one year to define the uses of a potentially carcinogenic substance with elimination requiring two additional years for a substance having a known substitute with no major redesign required. For material substitutions requiring major redesign, the timing is consistent with new product phase V timing of 33 months for vehicle and 45 months for powertrain programs.

Four of the first five actions of the workplan (items 2 - 5) have been completed for asbestos, hexavalent chromium compounds, and benzene. The sixth and seventh actions have been initiated for production materials and are expected to be completed by the end of July (asbestos), August (chromium compounds) and September (benzene). Classifying the substances should be completed in the first quarter of 1981. (Fig. 20)

Completing the actions by these dates requires Corporate direction that the elimination/control of these substances in vehicle, component, plant renovation and new construction programs is a mandatory priority effort. Overall program management is essential to this effort.

May 27, 1980

PROPOSED CHEMICAL SUBSTANCES CONTROL

Personnel and Organization Staff has completed an analysis of the requirements for chemical substances control.

It was concluded that designation of a Program Manager would be the least costly and disruptive means for improving coordination among involved activities and would help to surface crucial issues. The Program Manager would have a small staff to assist in collection of data, preparation of reports, bulletins, liaison and other assigned functions (computer systems). Organizationally, an E&SES location was recommended. (Fig. 21)

In view of budget constraints, it has been agreed that the existing Compliance and Liaison Department would perform the program management function. The Department Manager should be responsible for implementing control strategies and coordinating Company response to potential and promulgated toxic substance regulation. Initial assignments include revising Directive B-101 to clarify responsibilities and expand operations' role, assuring that Operating Components and Staffs issue facing documents to B-101, establishing a financial measurement of the compliance effort, assuming development direction and control for the computer information system and implementing the workplan as directed. Although additional budget is not now requested, the transfer of a currently budgeted MR employe from Engineering Staff to ESES with the MATS computer development budget component has been mutually arranged.

The ongoing responsibilities of the Compliance and Liaison Department Manager will be to coordinate the product/facility/manufacturing/health/environment response of the Company to changing regulations. This will include comments to government agencies regarding proposed regulation, forecasting/ regulatory impact, direction and control of the information systems required, and compliance assurance.

It is recommended that the Carcinogen in the Workplace Task Force be discontinued and that the Engineering and Research and the Manufacturing and Supply Subcommittees name as a joint working group a Hazardous Substances Control Committee. This Committee should be composed of responsible executives from the areas shown on the facing page (Fig. 22). It is further recommended that the Committee be chaired by the E&SES representative.

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PROPOSED PRIORITY ACTIONS

Although a strategy and workplan are proposed in this paper and efforts have been started in these areas, there are considerable timing and feasibility issues in each of the identified applications. Without funding or directed prioritization over other engineering effort the work on the identified asbestos, hexavalent chromium compounds or benzene applications cannot proceed under present economic conditions. Nevertheless, a measured Company reaction is necessary to initiate orderly substitution programs with sufficient flexibility to adapt to engineering and economic limitations.

Achievement of the elimination or control of potential carcinogens requires a corporate commitment to foster an integrated and sustained effort throughout the Company over a number of years. To accomplish this, the following actions and responsibilities are recommended:
(Fig. 23):

1. Assign hazardous substance control program management responsibility to Environmental and Safety Engineering Staff. (Responsibility: Environmental & Safety Engineering Staff - ESES)
2. Establish a Hazardous Substance Control Committee chaired by Environmental and Safety Engineering Staff. The Task Force would be discontinued. (Responsibility: ESES)
3. Revise Directive B-101 (Occupational Safety and Health and Control of Hazardous Materials) to reflect adjusted responsibilities for line and staff. No new Policy is required, the matter is covered under Policy C-3, Standards of Corporate Conduct. (Responsibility: ESES Program Manager)
4. Adopt as the Company potential carcinogen listing, the 36 current OSHA-regulated and proposed Category I substances used in automotive production. Establish the top eight priorities proposed by the Task Force as Company priorities. Direct that the listing be updated semiannually. (Responsibility: P&O Staff)
5. Complete strategies and timetables for the eight prioritized potential carcinogens for review and approval by the subcommittees. (Responsibility: ESES Program Manager)
6. Continue the development of MATS by Environmental & Safety Engineering Staff. A budget and headcount transfer from Engineering Staff has been agreed to. (Responsibility: ESES Program Manager)

The Company has demonstrated a commitment to protect workers while seeking to eliminate specific substances. Directions on the use of and protection for numerous substances have been issued. Workers are protected by restricting exposure and by special clothing and engineered safeguards designed to keep exposure within known permissible limits. Specific recommendations for eliminating asbestos, hexavalent chromium compounds and benzene follow:

7. Proceed with the elimination of Group A (known substitutes without major redesign) no later than Job #1, 1985 where appropriate as determined by the Hazardous Substance Control Committee. (Responsibility: PEO's, BMD's, Purchasing)
8. Include Group B (known substitutes with major redesign) elimination actions in Phase V of vehicle and powertrain programs and in new plant and renovation projects where appropriate as determined by the Hazardous Substance Control Committee. (Responsibility: ESES Program Manager, Product Planning, Vehicle Engineering, Manufacturing Staff)
9. Recommend advanced program funding to develop designs and/or substitutes for new production and nonproduction parts and materials to identify feasibility, reliability, cost and weight implications of alternative materials/designs for Group C applications (no known substitute, advanced engineering required). (Responsibility: PEO's, BMD's, Technical Planning, Scientific Research Staff)

The implementation of the above actions and responsibilities should be reviewed periodically by the Engineering and Research and Manufacturing and Supply Subcommittees to provide a forum for discussion, Corporate overview and endorsement of appropriate funding and prioritization of efforts.

Vertical line indicates revision at subcommittee direction.

EXHIBIT I

OSHA CATEGORY I SUBSTANCES WITH AUTOMOTIVE IMPACT^{1/2/}

<u>Regulated as Carcinogens</u>	<u>Potential for Regulations as Carcinogens</u>
Acrylonitrile	Acetamide
Arsenic (inorganic)	Benzidine Sulfate
(1) Asbestos, including:	(7) Beryllium oxides & inorganic salts
Amosite	(4) Cadmium oxides & inorganic salts
Anthophyllite	Carbon tetrachloride
Chrysotile	Chloroform
Crocidolite	(2) Chromium, hexavalent
Serpentine	Diethylamine, N-Nitroso
(3) Benzene	p-Dioxane
Benzidine	Ethane, 1,2-Dibromo-
(5) Coke Oven emissions, including:	Ethane, 1, 1, 1-Trichloro-2, 2-bis (p-chlorophenyl)
Benz (e) acephenanthrylene	(8) Ethylene, Trichloro-
Benz (a) anthracene	Hematite
Benz (a) anthracene, 7, 12-Dimethyl-	Hydrazine
Benz (a) anthracene, 7-Methyl-	Hydrazine Sulfate
Benz (a) anthracene,	Lead Acetate
7, 8, 12-Trimethyl-	Lead Naphthanate
Benzo (rst) pentaphene	Nickel oxides & salts
Benzo (c) phenanthrene, 5-Methyl	Polychlorinated biphenyls
Benzo (a) pyrene	Polyethylene glycol monostearate
Dibenz (a, h) acridine	Sulfuric acid, Dimethyl ester
Dibenz (a, j) acridine	Tannic acid
Dibenz (a, h) anthracene	Tannin
Dibenzo (b, def) chrysene	o-Toluidine
Dichlorobenzidine	Urea, Thio-
Dimethylamine, N-Nitroso-	
1-Naphthylamine	
2-Naphthylamine	
(6) Vinyl Chloride	

1/ MVMA Information Bulletin, September 28, 1978

2/ Parenthetical numbers refer to Task Force priorities.

Note: Candidate substance list is expected to issue from OSHA July, 1980.

Prioritized candidate substance list is expected to issue from OSHA Sept., 1980

May 27, 1980

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CARCINOGEN SEARCHMaterials and Toxicology System (MATS)

To overcome the deficiencies of manual and semi-computerized search methods, the Materials and Toxicology System (MATS), under development, will consolidate four materials approval systems into one common data base. The four systems are: the CATALOG of Hazardous Materials (P&O Staff) containing Company materials, their toxicological evaluation for worker/consumer protection and the chemical composition, the Engineering Material Approved Source List (E&RS) containing the material specification title and the materials approved to that specification; the Nonproduction Material Approved Source List (Manufacturing Staff) containing the nonproduction material standard and the approved materials; and the Environmental & Process Review System (Manufacturing Staff) containing the waste disposal, treatability, and facility engineering cautions on all materials approved to Engineering Specifications and Manufacturing Standards.

Carcinogen Search Strategy

Developing the links between the above systems will, in the future, provide a method for locating Category I potential carcinogens in nonproduction materials and production parts and bulk materials. The search methodology is numbered on the facing page to correspond to the following search steps:

1. The Chemical Abstracts Service numbers of the Category I substance and their compounds are identified by I&T. The system will then generate a list of materials which contain those chemicals.
2. Utilizing the NAAO supplier code, the specification number and the product name, the system will then identify other Category I containing materials and specifications.
3. The Engineering Specification can then be passed to the North American Engineering Product Information System (NAEPIS) which contains the engineering notices from all of the product engineering offices. The NAEPIS system will then produce a cross-reference list of all parts which use that materials.
4. The list of production parts can then be matched to Purchasing's Procurement system to determine current sources to be queried for control and elimination of carcinogens. The same list can be matched to the AAD Process Sheet system to determine where and how the part or material is handled in AAD.

Functions

A function of MATS is to maintain and produce the Approve Source List for nonproduction and production materials including the toxicology and environmental clearances for use by Purchasing. The system also produces the CATALOG of Hazardous Materials as either a full companywide print or as a plant specific print. The CATALOG is used by Hazardous Material Information Center and plant physicians for verification that the substances are on the TSCA inventory and is required to be furnished to the UAW under the current contract. The system is also available to the plants Hazardous Material Information Center to be searched by supplier or specification for complete medical, handling, shipping, waste treatment and disposal instructions on a material.

The system also produces the Michigan DNR Critical Materials report for the consumption of materials which contain a Michigan defined "critical component" e.g., chromium.

Affected Activities

All Corporate Staffs concerned with materials/toxicological/environment controls are currently involved in using/developing the system. All NAAO/DPO plants are planned to have access to the system by third quarter 1980.

May 27, 1980

Group A — Known Substitute Material Available Without Major RedesignProduction Materials

<u>Specification</u>	<u>Material</u>	<u>Basic Part No.</u>	<u>Part</u>
<u>Light Truck</u>			
ESF-M8G55-A	Gasket	7086	Trans. Ext. Gasket
ESW-M8G109-B	Gasket	4035	Carrier Gasket
—	Deadener	350038	Econ. PDV Box Assy.
—	Sealers	350038	Econ. PDV Box Assy.
—	—	9900000	Courier Box Assy.
<u>Body</u>			
ESB-M2G58-C	Adhesive	—	—
ESB-M2G171-AB	Adhesive	—	Primer for Adhesive
ESB-M2G188-A	Adhesive	—	—
ESB-M3G95	Tape	—	—
ESB-M4G1-B	Sealer	—	—
ESB-M4G31-A	Sealer	—	—
ESB-M4G32-A	Sealer	—	—
ESB-M4G40-A	Sealer	—	—
ESB-M4G58-B	Sealer	—	—
ESB-M4G101-A	Sealer	—	—
ESB-M4G108-A	Sealer	—	—
ESB-M4G109-A	Sealer	—	—
ESB-M4G110-A	Sealer	—	—
ESB-M4G126-A	Sealer	—	—
ESB-M4G137-A/B	Sealer	—	—
ESB-M4G139-B	Sealer	—	—
ESB-M4G141-A	Sealer	—	—
ESB-M4G145-A/C	Sealer	—	—
ESB-M4G147-B	Sealer	—	—
ESB-M4G161-A/C	Sealer	—	—
ESB-M4G162-A	Sealer	—	—
ESB-M4G172-A	Sealer	—	—
ESB-M4G174-A	Sealer	—	—
ESB-M4G175-A	Sealer	—	—
ESB-M4G177-A/B	Sealer	—	—

8031 1693

Group A -- Known Substitute Material Available Without Major Redesign (cont'd.)

Nonproduction Materials

<u>Specification</u>	<u>Material</u>
M-10G11	Asphalt Saturated Asbestos Roofing Felts - 15 lb.
M-10G12	Asphalt Saturated Asbestos Roofing Felts - 30 lb.
M-10G15	Asphalt Saturated and Coated Asbestos Roofing Felts - 20 lb.
M-10G16	Asphalt Saturated and Coated Asbestos Roofing Felts - 50 lb.
M-99G59A	Asbestos Powder
M-99G82A	Hard Asbestos Millboard
M-99G84A	Asbestos Filament Reinforced Paper
M-4R29A	Mold Sealer

8001 1694

5/27/80

MATERIALS CONTAINING ASBESTOS

- 5 -

Group C -- No Known Substitute. Advanced Engineering Project Required.Production Materials

<u>Specification</u>	<u>Material</u>	<u>Basic Part No.</u>	<u>Part</u>
<u>Light Truck</u>			
ES-C8AA-2B282-A	—	2021	Lining Front Wheel Brake Outer
ES-D20A-2B072-BB			
ES-C8AA-2B282-A	—	2022	Lining Front Wheel Brake Inner
ES-D20A-2B072-BB			
Vendor Print	—	2019	Shoe and Lining Inner
Vendor Print	—	2018	Shoe and Lining Outer
ES-EOTA-2B120-AA	—	2018	Shoe and Lining Outer
ES-D6TA-2B118-AA	—	2022	Lining Front Wheel Brake Inner
ES-C8TA-2B282-A			
ES-C8TA-2210-D	—	2209	RR Brake Shoe Lining
ES-C8TA-2010-C	—	2284/5	RR Brake Shoe Lining
ES-D8TA-7550-A	—	7550	Driven Member Clutch
—	—	4797	Clutch Plate
—	—	4A325	Clutch Plate
—	—	2598	Parking Brake Lining
<u>Heavy Truck</u>			
—	—	2010/11	Hydraulic Brakes - Front
—	—	2209/10	Hydraulic Brakes - Rear
—	—	2598	Parking Brake
—	—	2010/11	Air Brake Assy. - Front (Wedge)
—	—	2010/11	Air Brake Assy. - Front (S-Cam)
—	—	2209/10	Air Brake Assy. - Rear (S-Cam)
—	—	2875	Air Brake Compressor
—	—	8A616	Fan Clutch Assy.
—	—	8A627	Clutch and Bracket Assy.
—	—	5230	Muffler Assy.
—	—	7A596	Clutch Disc Assy.
—	—	7550	
—	—	7E434	Torque Limiting Brake Assy.
<u>Chassis</u>			
ESE-M8G149-A	Gasket	5F263	Exhaust Manifold Gasket
—	—	2284	Rear Brake Shoes
		2285	

A801 1695

MATERIALS CONTAINING HEXAVALENT CHROMIUM COMPOUNDS^{1/}

- 1 -

Group A — Known Substitute Material Available Without Major Redesign

Nonproduction Materials

<u>Specification No.</u>	<u>Title</u>
M5B40	Metal Cleaner for M-99J26
M-5B165A	Fingerprint Remover
M-5B220A(F)	Paint Stripping - Organic Additive
M-5J30	Yellow Marking Paint for Creosoted Floors
M5J68A	Enamel, Semigloss, Yellow Corridor Accent
M5J75	Maintenance Paint - Zinc Chromate Primer
M-5J79A	Medium Green (Maintenance Paint)
M-5J84	Yellow Road Marking Paint
M5J99N	Coatings, Administration Offices and Employee Facilities
M-5J105A	Diamond Phosphorescent Pink Enamel
M-314	Alert Orange (Maintenance Paint)
M-325	Target Yellow (Maintenance Paint)
M-332	Seal Brown (Maintenance Paint)
M-400A	Primer, Red Oxide
	Air Paint NR-73
	Also Kote ZSD-NA
	Alert Orange Enamel
	Alkyd M332 85-Y-95
	Alkyd M472 85-R-122
	APS93 Paint and Resin Remover
	Brown Air Dry Primer
	C168 Corrosion Inhibitor C2041
	Cellite 535
	Chrome Yellow Medium
	Cooling Water TRT Chem. CR 401
	Copper NAD Acrylic Enamel
	CWT 204
	CWT 404
	D-Smut
	Dearborn 517

^{1/} Hexavalent chromium combinations with hydrogen, alkali metals, ammonia and oxygen excluded.

R001 1696

Group A -- Known Substitute Material Available Without Major Redesign (cont'd.)

Nonproduction Materials

Specification No.

Title

Pl. Color Cone/Pine Green - MMCA
 Pl. Color Conc/Lt. Sand
 Quick Dry Yellow Traf. Marking Paint
 Red Enamel
 Safety Orange Aquapon 902176H
 Safetylite 75 Traffic Yellow
 Seal Brown Enamel
 Strontium Chromate - Pig Yell 32
 Tangerine NAD Enamel 44-3108
 Target Yellow Enamel
 Tractor Enamel #3132AM
 Traffic Paint for Creosoted Floor
 Valencia Orange
 Valencia Orange Red 104
 Vulcan Cooling Water Treatment
 W and B Grinding Coolant E-55
 X-2777 Regal Yellow Light
 X2552 Rex Orange
 X2865 Strontium Yellow
 Yellow K831-742
 Yellow Iron Oxide Ylo 1789
 Yellow NAD Acrylic Enamel
 Yellow Road Marking Paint TP702
 Yellow Safety Enamel STP
 Yellow Truck Enamel

1/ Hexavalent chromium combinations with hydrogen, alkali metals, ammonia and oxygen excluded.

Group C — No Known Substitute. Advanced Engineering Project Required

Production Materials

<u>Specification No.</u>	<u>Title</u>
ESF-M1F10-A	Leather, Chrome Tan - Vegetable Retan
ESB-M99G109-A	Ceramic Coating, Glass Decorative
ESA-M2J52-A	Enamel, Air Dry Asphaltum, Chassis Black
ESN-M2J114-A	Enamel, Standard and Low Bake, Tractor Quality
ESB-M2J214-A	Enamel, Baking, Clear, Unanodized Aluminum - Interior
ESN-M6J96-A	Primer, Air Dry or Baking, For Export
ESN-M6J96-B	Primer, Air Dry or Baking, For Export
ESB-M6J119-B	Primer Surfacer, Taupe, Epoxy, Low Bake
ESB-M6J120-C	Primer Surfacer, Low Bake Epoxy, Exempt Solvent Taupe (10% Reactive Solvents)
ESB-M32J104-A ^{2/}	Baking Enamel, Reflow Acrylic - Exterior Quality
ESB-M32J104-B	Enamel, Baking Exempt Solvent (10% Reactive Solvents) Reflow Acrylic Exterior Quality
ESB-M32J105-C1 ^{2/}	Paint, Enamel, Acrylic Basecoat for Basecoat/Clearcoat Wet-on-Wet (10% Reactive Solvents)
ESB-M50J100-A ^{2/}	Paint, Enamel, Acrylic Baking (NAD), Exterior Passenger Car Quality
ESB-M50J100-B	Enamel, Acrylic Baking - Non-Aqueous Dispersion (NAD), Exterior Body Quality
ESB-M50J105-A ^{2/}	Paint, Enamel, Acrylic Baking, Non-Aqueous Dispersion (NAD)
ESB-M50J106-A ^{2/}	Paint, Enamel, Acrylic Baking, Non-Aqueous Dispersion (NAD), Exterior
ESW-M62J12-A ^{2/}	Paint, Water Dispersible, Black
ESA-M62J16-A	Water Dispersible Black Paint
ESB-M64J12-B	Primer, Waterborne Electrocoat - Black - Low Solids Type
ESB-M64J13-B	Primer, Waterborne Electrocoat - Black - Medium Solids Type
ESB-M64J13-C	Primer, Waterborne Electrocoat - Black - High Solids Type
ESB-M99J248-A	Paint, Color Coat for Acrylonitrile - Butadiene - Styrene - First Surface Exterior

Nonproduction Materials

Chromium Acetylacetonate
SSK102
WS 164
WS 64

^{1/} Hexavalent chromium combinations with hydrogen, alkali metals, ammonia and oxygen excluded.

MATERIALS CONTAINING BENZENE^{1/}

Nonproduction Materials

Specification No. Title

Group A — Known Substitute Materials Available Without Major Redesign

Sno-Sol 184C

Group B — Known Substitute Materials Available With Major Redesign

Isol 2429, 2429 Naphtha

Production Materials

Group C — No Known Substitute. Advanced Engineering Project Required

Z00003290	10SOL2429 2429 Naphtha
ESF-M10C1-A	GP1140 Carburetor Fluid
ESE-M99C21-A	Hydraulic Tappets Oil
X3512	Sunfleet Super C 10W Oil
ESR-M99P4-B	Underbody Coating/Daubert AC6908

MEMO: The OSHA standard exempts employers who store, transport, distribute, disperse, sell, or use benzene as a portion of gasoline or other motor fuel after it has been discharged from a bulk terminal. The following fuels are so identified:

M-4C20A	#2 Fuel Oil, Arco Heating Oil
ESE-M4C50-B	Indolene High Octane III Gasoline
ESE-M4C51-A	Indolene Motor Fuel No. 5
ESE-M4C56-B	Indolene High Octane Motor Fuel 30
XMS08	Certified MS-08
Z00002232	Amoco Premium Pb-Free Gasoline
ESE-M4C45-A	Regular Gasoline
ESE-M4C89-A	Lead Free Gasoline
ESE-M4C91-A	Cetron Gasoline

^{1/} Materials known to contain benzene at levels $\geq$ 0.1%

3001 1699