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EXHIBIT

PLAINTIFF'S EXHIBIT

FD 859

Engineering and Research Subcommittee
Review of Toxic and Hazardous Substances

December 6, 1978

Prepared by:

Stationary Source
Environmental Control
Environmental and Safety
Engineering Staff

8003 0956

PRODUCED BY FORD
SCF-FORD-1639

Federal Laws of Concern to Ford
(Toxic/Hazardous Substances)

- . Occupational Safety and Health Act (OSHA) - 1970 (Administered by: Occupational Safety and Health Administration, U.S. Department of Labor)
- . Hazardous Materials Transportation Act (HMTA) - 1976 (Administered by: U.S. Department of Transportation)
- . Toxic Substances Control Act (TSCA) - 1976 (Administered by: U.S. Environmental Protection Agency)
- . Resource Conservation and Recovery Act (RCRA) - 1976 (Administered by: U.S. Environmental Protection Agency)
- . Clean Air Act and Clean Water Act Amendments - 1977/1978 (Administered by: U.S. Environmental Protection Agency)
- . Consumer Product Safety Act (CPSA) - 1972 (Administered by: Consumer Product Safety Commission)
- . Federal Hazardous Substances Act (FHSA) - 1960 (Administered by: Consumer Product Safety Commission)
- . Poison Prevention Packaging Act (PPPA) - 1970 (Administered by: Consumer Product Safety Commission)

Summary and Overview - Toxic/Hazardous Materials Control

Several pieces of complex and highly technical legislation have the potential for a significant effect on Company operations. Government requirements designed to protect both the external and internal working environments, air, water and land, and the introduction and continued use of various materials - both new and existing - have impacted both the Company's products and manufacturing operations. With incidents such as the PBB-feed mix-up in Michigan, PCB-contamination of the Hudson River, the Love Canal "dump" in New York State, public concern has been and will likely continue to be focused on the control of hazardous and toxic materials in the workplace and the environment.

What Laws Are Of Concern to Ford

Listed on the facing page are various statutes which address the control of hazardous and toxic materials on the federal level, and are of greatest concern to Ford. The principal federal agency charged with the implementation and administration of each is also identified.

A few other federal laws and numerous state laws and regulations also address many of the same issues. It has been our experience that some conflicting requirements and much duplication of effort now exist due to both the overlapping jurisdictions at the federal level, as well as uncoordinated federal/state relationships.

Responsible Company Activities
(Toxic/Hazardous Substances)

- . OSHA, and other federal, state, and local requirements affecting employee safety and health -- Personnel and Organization Staff, Employee Health Services Department
- . HMTA, and other transportation-related requirements -- Supply Staff, Transportation and Traffic Office
- . TSCA --Environmental and Safety Engineering Staff, Stationary Source Environmental Control Office
- . Clean Air/Water Acts, RCRA, and related state and local requirements -- Environmental and Safety Engineering Staff, Stationary Source Environmental Control Office.
- . CPSA, FHSA, and PPPA -- Environmental and Safety Engineering Staff, Automotive Safety Office; Personnel and Organization Staff; Ford Parts and Service Division.

Principal Functions

- . Identifying emerging regulatory issues that require Company action.
- . Developing and implementing programs to assure compliance by operating components.
- . Arranging for technical representation on behalf of the Company with federal, state, and local regulatory agencies.
- . Directing the presentation of Company positions on emerging issues before government bodies.
- . Coordinating interpretation of regulations and requests for information to assist Company components.
- . Auditing Company facilities for compliance with applicable requirements.

Supporting Staffs and Activities

- . Manufacturing Staff
- . Engineering and Research Staff
- . Office of the General Counsel
- . Labor Relations Staff
- . Public Affairs
- . Car Engineering

Responsible Company Activities

In his March 1, 1977 letter, Mr. R. J. Hampson assigned compliance assurance responsibilities to various activities within Ford, in response to growing toxic and hazardous substances control demands being placed on Company interests at all levels. A copy of Mr. Hampson's letter is included as Appendix I to this paper. A summary of delineated responsibilities may be found on the facing page.

Responsibility for regulatory environmental control matters applicable to plants and facilities (such as air and water pollution control) had previously been assigned to Environmental and Safety Engineering Staff, Stationary Source Environmental Control Office. Operating management retains direct responsibility for maintaining compliance by affected facilities, as well as materials used and products produced. Hazardous and toxic materials-related tasks and responsibilities within Car Engineering were assigned in Mr. R. B. Alexander's letter of July 28, 1977, a copy of which may be found in Appendix II.

What Are The Issues/What Is Being Done

- A. Toxic Substances Control Act - Only two chemical substances have been the focus of early regulatory activity under TSCA. They are: chlorofluorocarbons (CFCs), a refrigerant/blowing agent/propellant/solvent used in a variety of manufacturing processes and products such as automotive air conditioners, flexible foams, and aerosols; and polychlorinated biphenyls (PCBs), widely used as a dielectric heat transfer fluid in electric equipment such as transformers and capacitors. Numerous other chemical substances are now under scrutiny by EPA and are likely to be the subject of increased regulatory activity in the next few years. On November 25, 1978, EPA Administrator Douglas Costle released such a "hit list" of priority pollutants and categories believed to pose health or environmental threats. They are listed below.

acrylonitrile, arsenic, asbestos, benzene, beryllium, cadmium, chlorinated solvents, chlorofluorocarbons, chromates, coke oven emissions, diethylstilbestrol (DES), dibromochloropropane (DBCP), ethylene dibromide, ethylene oxide, lead, mercury, nitrosamines, ozone, polybrominated biphenyls (PBBs), polychlorinated biphenyls (PCBs), radiation, sulfur dioxide, vinyl chloride and toxic wastes.

- PCBs: Though found in virtually every one of the Company's facilities, it is fortunate that their use at Ford historically has been restricted to "closed systems." Examples include sealed transformers, capacitors, and fluorescent lamp ballasts. EPA now requires burdensome labeling, containment, disposal, and recordkeeping involving such equipment. Existing PCB-containing electrical equipment will probably be "grandfathered" throughout its useful life and permitted to remain in service. All new equipment purchased by Ford will contain PCB substitute fluids, at additional cost. Limited availability of EPA-certified chemical waste landfills (for PCB solid wastes), and controlled high temperature incinerators (for PCB liquids) remain a problem. Many of our plants must stockpile such wastes for the time being. This is a national problem, and is not unique to Ford.

. CFCs: Although these widely used materials are not in themselves toxic, certain scientific circles predict that depletion of stratospheric ozone is resulting from CFC emissions, and that such depletion could lead to an increase in skin cancer. EPA Phase I regulations, now in place, deal with aerosol propellant applications. "Essential use exemptions" were granted for plastic mold release agents and for electrical contact cleaning.

EPA Phase II regulations are now being developed to address non-aerosol uses such as foam blowing, air conditioning, and refrigeration. Possible early restrictions on the use of R-11 and R-12 foam blowing agents could affect the availability of deep molded seating, door padding, crash pads, sun visors, headrests, etc. Increased foam density could have associated vehicle weight and fuel economy implications. No substitute has yet been found for R-11 used in the reaction injection molded (RIM) soft front end manufactured at Utica for the 1979 Mustang/Capri and 1980 Thunderbird.

Automotive air conditioning will likely receive greater attention as other CFC emission sources are gradually controlled. A significant reduction in refrigerant leakage and initial system charge may ultimately be required, at great expense. It may also be required that equipment be provided by dealers to collect CFC refrigerant during A/C servicing. Refrigerant reprocessing facilities are not now available. Alternative non-toxic refrigerants which possess the necessary thermodynamic properties have not been developed to date. Phase II regulations, if any, are not expected until mid-1979 at the earliest.

. Notification of Substantial Risk: A Bulletin was distributed throughout the Company on August 4, 1978. It is designed to implement Section 8(e) of TSCA which requires the prompt submittal to EPA of information, obtained by any person, which reasonably supports the conclusion that a chemical substance or mixture manufactured, processed or distributed in commerce presents a "substantial risk of injury to health or the environment." A "Notice to All Employees" was attached to the Bulletin for posting at each plant, facility, laboratory, office, or other place of work. We are not aware of any substantial risk information presently in the Company's possession which would require the submittal of a report to EPA. (A comparable provision to TSCA Section 8(e) appears in Section 15 of the Consumer Product Safety Act.)

Criteria Air Pollutants

- | | |
|-------------------------------------|----------------------------|
| . Suspended particulate | . Oxides of nitrogen (NOx) |
| . Sulfur dioxide (SO ₂) | . Hydrocarbons (HC) |
| . Carbon monoxide (CO) | . Photochemical Oxidants |
| | . Lead (recently added) |

Hazardous Air Pollutants

- . asbestos
- . beryllium
- . vinyl chloride
- . mercury

- Inventory Reporting/Premanufacture Notification and Testing: EPA expects to publish an Initial Inventory listing some 70,000+ known chemical substances next spring. Processors and users of chemical substances will be given 210 days to add to the Initial Inventory to insure exemption from TSCA premanufacture notification requirements. After the Final Inventory is published in late 1979 or early 1980, EPA must be notified at least 90 days before manufacturing a "new" chemical substance, or initiating a "significant new use" of an existing chemical substance. Extensive production and use information, and test data relating to health and environmental effects, must accompany the notice. EPA is now developing detailed guidelines and test protocols outlining required animal and bacteriological tests which will be required in many cases. Because Ford is primarily a chemical substances "processor and user" (not a "manufacturer"), only an indirect impact is likely. Lead times for the introduction of new materials may be extended. And industry as a whole may produce fewer new chemicals because of greatly increased costs associated with their introduction.

B. Clean Air and Water Act Amendments

A new emphasis addressing the control of hazardous/toxic air and water pollutants has emerged under recent amendments to the Clean Air and Clean Water Acts. Until implementing regulations are developed by EPA, ultimate effects on Company operations cannot be accurately predicted.

- Air: On the facing page you will find listed traditional "criteria air pollutants" and "hazardous air pollutants" which are currently subject to very stringent controls. A new category of pollutants is now emerging. Broadly referred to as "non-criteria air pollutants," such materials may be subject to controls in the future. Under a new Michigan DNR policy, a new source permit applicant must demonstrate that emissions are "non-harmful" before the permit will be granted.

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ENVIRONMENTAL PROTECTION
AGENCY

(FRL 849-3)

PUBLICATION OF TOXIC POLLUTANT LIST

Pursuant to section 307(a)(1) of the Federal Water Pollution Control Act as amended by section 53(a) of the Clean Water Act of 1977 (Pub. L. 95-217), the Administrator is required to publish the list of toxic pollutants consisting of those listed in Table 1 of Committee Print No. 95-30 of the House of Representatives Committee on Public Works and Transportation no later than 30 days after the enactment of the Act. Nine of the 65 listed pollutants (aldrin/dieldrin, benzidine, cyanide, cadmium, DDT, endrin, mercury, PCBs, and toxaphene) were previously listed as toxic pollutants by the Agency (38 FR 24324, September 7, 1973) and toxic pollutant effluent standards have been promulgated for six of these (42 FR 2588, January 12, 1977, and 42 FR 6532, February 2, 1977).

The list of 65 toxic pollutants was developed originally by a multi-disciplinary task force of scientists. Following submission to the Environmental Protection Agency of the conclusions of that task force, the Agency has received no data to indicate that any of these pollutants should be removed from the list. This list has been judicially recognized and accepted by the Federal District Court of the District of Columbia in *NRDC v. Train*, 8, E.R.C. 2120 (1976) and it has been explicitly required by Congress.

The listing of a pollutant pursuant to section 307(a)(1) imposes no direct economic burden. The list does, however, form a basis for the development of effluent limitations for categories or classes of point sources pursuant to section 301(b)(2)(A) and 304(b)(2) of the Act, or section 307(a)(2).

This list has been subjected to administrative, judicial, and legislative review. From time to time the Administrator may revise the list and is authorized to add or remove pollutants taking into account the toxicity of the pollutant, its persistence, degradability, the usual or potential presence of the affected organisms in any waters, the importance of the affected organisms, and the nature and extent of the effect of the toxic pollutant on such organisms.

The Administrator anticipates that, in the near future, he will propose adding pollutants to this list. To assist the Administrator in the list revision process, public comment is invited and should be directed to Kenneth M. Mackenthum, Director, Criteria and Standards Division (WH-585), 401 M Street SW., Washington, D.C. 20460, telephone 202-755-0100. Petitions for modification of this list should include sufficient information to support the proposed modification.

The list of toxic pollutants is:

1. Acenaphthene.
2. Acrolein.
3. Acrylonitrile.
4. Aldrin/Dieldrin.¹
5. Antimony and compounds.²
6. Arsenic and compounds.
7. Asbestos.
8. Benzene.
9. Benzidine.³
10. Beryllium and compounds.
11. Cadmium and compounds.
12. Carbon tetrachloride.
13. Chlordane (technical mixture and metabolites).
14. Chlorinated benzenes (other than dichlorobenzenes).
15. Chlorinated ethanes (including 1,2-dichloroethane, 1,1,1-trichloroethane, and hexachloroethane).
16. Chloroalkyl ethers (chloromethyl, chloroethyl, and mixed ethers).
17. Chlorinated naphthalene.
18. Chlorinated phenols (other than those listed elsewhere, includes trichlorophenols and chlorinated cresols).
19. Chloroform.
20. 2-chlorophenol.
21. Chromium and compounds.
22. Copper and compounds.
23. Cyanides.
24. DDT and metabolites.⁴
25. Dichlorobenzenes (1,2-, 1,3-, and 1,4-dichlorobenzenes).
26. Dichlorobenzidine.
27. Dichloroethylenes (1,1-, and 1,2-dichloroethylene).
28. 2,4-dichlorophenol.
29. Dichloropropane and dichloropropene.
30. 2,4-dimethylphenol.
31. Dinitrotoluene.
32. Diphenylhydrazine.
33. Endosulfan and metabolites.
34. Endrin and metabolites.⁵
35. Ethylbenzene.
36. Fluoranthene.
37. Haloethers (other than those listed elsewhere, includes chlorophenylphenyl ethers, bromophenylphenyl ether, bis(dichloroisopropyl) ether, bis-(chloroethoxy) methane and polychlorinated diphenyl ethers).
38. Halomethanes (other than those listed elsewhere, includes methylene chloride, methylchloride, methylbromide, bromoform, dichlorobromomethane, trichlorofluoromethane, dichlorodifluoromethane).
39. Heptachlor and metabolites.
40. Hexachlorobutadiene.
41. Hexachlorocyclohexane (all isomers).
42. Hexachlorocyclopentadiene.
43. Isophorone.
44. Lead and compounds.
45. Mercury and compounds.
46. Naphthalene.
47. Nickel and compounds.
48. Nitrobenzene.
49. Nitrophenols (including 2,4-dinitrophenol dinitrocresol).

50. Nitrosamines.
51. Pentachlorophenol.
52. Phenol.
53. Phthalate esters.
54. Polychlorinated biphenyls (PCBs).⁶
55. Polynuclear aromatic hydrocarbons (including benzanthracenes, benzopyrenes, benzofluoranthene, chrysene, dibenzanthracenes and indenopyrenes).
56. Selenium and compounds.
57. Silver and compounds.
58. 2,3,7,8 - tetrachlorodibenzo - p - dioxin (TCDD).
59. Tetrachloroethylene.
60. Thallium and compounds.
61. Toluene.
62. Toxaphene.⁷
63. Trichloroethylene.
64. Vinyl chloride.
65. Zinc and compounds.

¹Effluent standard promulgated (40 CFR Part 139).

²The term "compounds" shall include organic and inorganic compounds.

Dated: January 25, 1978.

SWIFT T. DAVIS,
Acting Assistant Administrator
for Water and Hazardous Materials

(EPR Doc. 78-2557 Filed 1-30-78 8:45 am)

Water: Recent Clean Water Act amendments clearly shift the emphasis of federal water pollution control programs to so-called toxic pollutants. A list of 65 "toxic pollutants" and categories may be found on the facing page. More restrictive effluent limitations and pretreatment standards are expected. Substantially increased costs may also be expected in effecting control of these pollutants, which include heavy metals such as copper, zinc, chromium, lead, and nickel. Compliance by existing sources must be achieved within three years from the date of promulgation of industry-specific technology-based pretreatment standards, the first of which is expected to be promulgated in March 1979. New source standards require immediate compliance upon startup. All Company manufacturing facilities discharging other than sanitary wastes will be affected.

Just last October, Congress again amended the Clean Water Act to enable implementation by EPA of a hazardous substances spill program covering 271 materials previously designated. The standard for establishing "harmful quantity" of spilled hazardous substances into water has been relaxed, and new language now exempts discharges covered under NPDES permits. Mandatory reporting will be required and civil penalties of up to \$5,000 assessed for all hazardous substances spills to U.S. waters. Such requirements are currently in place for oil spills only.

- C. Resource Conservation and Recovery Act (RCRA): As part of a Congressional mandate calling for improved solid waste management at all levels of industry and government, a comprehensive regulatory program to control the handling and disposal of hazardous wastes is under development by EPA. EPA is now in the process of identifying wastes it considers hazardous, which generally include those which are flammable, explosive, caustic, corrosive, pathological, bioaccumulative, carcinogenic or toxic. Regulations applicable to waste generators, transporters, and disposal site operators should be in effect some time in 1980. Comprehensive industrial waste surveys, including detailed physical and chemical analyses of plant wastes, will eventually be required by all states to enable completion of a cradle-to-grave hazardous waste manifest to accompany each shipment from point of generation to point of disposal. EPA has not met Congressionally mandated time constraints for issuance of required regulations, and is involved in numerous lawsuits by environmental groups, states, and industry associations. Expected impact on Company operations is great.
- D. Hazardous Materials Transportation Act (HMTA): Apart from the terms "toxic pollutants" and "hazardous substances", which refer to the Clean Water Act, another term applies to materials regulated by the Department of Transportation. These are "hazardous materials," when transported by air, water, rail, or highway. The impact of these requirements is both domestic and international in scope. Severe penalties are specified for noncompliance. Included are specifications for packaging and labeling, vehicle placarding, and shipping manifests. Training is required of all persons having responsibility for initiating, preparing, and transporting hazardous materials for shipment. This has resulted in the designation of a Hazardous Materials Transportation Coordinator at each Ford facility. A similar "Dangerous Goods Code" was recently proposed in Canada.

- E. Occupational Safety and Health (OSHA): Recently promulgated standards having potential impact on Ford include acrylonitrile (10/03/78), inorganic arsenic (5/05/78) and lead (11/14/78). As of this date, control measures are sufficient to contain airborne concentrations of acrylonitrile within acceptable limits. Under the new OSHA standard for lead, the Permissible Exposure Limit (PEL) is to be reduced to 50 micrograms per cubic meter, time-weighted average (TWA), by July 1, 1979. If this exposure level cannot be met, detailed written compliance plans must be submitted to OSHA and updated periodically with efforts made to reduce exposure by engineering and work practice controls. Stringent monitoring, medical, training, recordkeeping, and housekeeping requirements must be met for any lead exposure above a specified "action level" of 30 micrograms per cubic meter. After February 1, 1980, the standard requires compliance to be achieved without regard to the use of respirators. Past experience indicates that this standard, as well as the arsenic standard, cannot be achieved by the Company within the time allowed. For both the arsenic and lead standards, a variance from OSHA will therefore probably be sought to permit respiratory protection as a method of control until changes can be made in materials and/or operations. Car Engineering will separately discuss the product implications of the new lead standard in a separate presentation. A more detailed synopsis of the lead standard may be found in Appendix III.

Past standards which continue to be addressed are asbestos, coke oven emissions, vinyl chloride and 13 carcinogens. Surveillance is being done at plants using materials containing asbestos. Substitution of non-asbestos containing materials is being encouraged to the extent feasible. Medical surveillance for approximately 450 employees is continuing as required by the coke oven emissions standard. Respiratory protective devices are used to meet the standard while work practices and engineering controls continue to be developed. Vinyl chloride is controlled to below action level requirements at Mt. Clemens Vinyl, which operates as a "non-regulated" plant. To the best of our knowledge, standards for the 13 chemical carcinogens are of no present concern to the Company.

OSHA recently proposed a generic carcinogen standard to classify all chemicals into four categories of potential occupational carcinogenicity. Category 1 designation would result in an emergency temporary standard and potential ban or zero exposure limit. If promulgated unchanged, this standard could affect the use of a number of materials used within the Company. Comments were submitted on this standard through MVMA, and a letter was sent by the Ford Medical Director to the Secretary of Health, Education, and Welfare pointing out numerous scientific errors.

OSHA standards for chromates remain unchanged at 53 micrograms per cubic meter and appear unlikely to be tightened in the near term. Workplace levels of chromates at under 10 micrograms per cubic meter place very limited demand for process changes in our manufacturing facilities.

What Are Our Long Term Needs and Responsibilities

- Hazardous Materials Catalog/Data Management System - A comprehensive master file of materials in use within the Company, and their component constituent chemical compositions is being developed by Employee Health Services Department. As a condition of doing business with Ford, vendors will be required to complete Material Safety and Health Data Sheets on materials they supply. The system is presently used to address OSHA and DOT-related concerns including warning labels, protective measures, and shipping names. It is now being expanded to enable compliance with present and anticipated state and federal reporting requirements, including new materials introduction. Distribution is to Company medical, safety, engineering, and other personnel requiring access to hazardous/toxic materials information. Procedures are now being prepared.
- Procedures for Materials Introduction - Draft procedures to govern the introduction of new production and non-production materials are being developed. Activities will have to confirm that materials they wish to use appear on the EPA Inventory, or if not, that premanufacture notification to EPA has been filed. Material Safety and Health Data Sheets must be received from suppliers before purchase notifications are released.
- Engineering and Research Staff Testing - Chemical Sciences is setting up an in-house facility to do Ames Test assays to better understand the technical problems involved in characterizing the biological activity of unregulated emissions. Routine Ames testing, and any required animal tests, are expected to be done by contracting with outside laboratories. Animal toxicity studies of sodium azide in air bag inflators are being coordinated by Employee Health Services. Chemical Sciences has worked with the analytical chemistry involved in characterizing the gaseous and airborne products following air bag deployment. Work is also progressing to develop analytical methods for measuring concentrations of toxic chemicals in air and water, as well as laboratory studies of pilot wastewater treatment processes.

Adequacy of Actions Taken/Advanced Programs and Research

The 1979 Advanced Budget for toxic substances projects totals \$1.8 million. The projects have been prioritized by the ad hoc Toxic Substances Committee, as detailed in Appendix IV. Although final spending levels have not been approved, all areas of concern have been addressed.

- Asbestos-free Friction Materials - A copy of the Company's updated Asbestos Plan may be found in Appendix V. An Asbestos Plan presentation was made to the Advanced Review Committee on February 9, 1978. The emphasis is on programs to prepare the Company for a staged tightening of asbestos standards, in recognition of high costs of worker protection and environmental controls. The unique properties of asbestos fiber have challenged substitution efforts in products with high asbestos content receiving heavy duty service. Caution must be exercised in introducing new materials to critical drivetrain and brake components. Although products such as friction materials containing asbestos will continue to be produced, selective removal of asbestos as a product constituent appears to be the future trend as insurance and legal costs continue to escalate. New materials and processes may provide improved levels of performance and reliability. Asbestos will likely be replaced by several materials - not by a single material for all product lines. Non-asbestos fiber blends will be given expanded evaluation.

- . Arsenic/Lead-free Solder - New airborne arsenic and lead standards have been promulgated by OSHA to further limit worker exposure. Use of lead body solder which contains arsenic as an essential ingredient will be affected. Although employees now wear respirators, current practices will not be permitted after December 31, 1979 during solder grinding unless a variance is granted. The entire question of arsenic appears moot in light of the new lead regulations (see Appendix VI). Car Engineering will address the body solder issue in a separate presentation.
- . Automotive A/C Systems - Three programs relating to possible EPA Phase II chlorofluorocarbon regulations have been proposed by Climate Control Division. They are structured to provide contingency plans should usage of R-12 refrigerant be restricted. Details of the programs and objectives may be found in Appendix VII. They are:
 - Develop an A/C system which will reduce total system R-12 leakage 75%.
 - Investigate alternate fluorocarbon A/C systems which would be more environmentally acceptable than R-12.
 - Investigate A/C systems which utilize nonfluorocarbon refrigerants which could replace R-12 systems.

Approximately 75 possible alternate refrigerants have been reviewed to date without finding a completely acceptable replacement for R-12. R-22 and R-22/142b systems have been built and tested which give satisfactory A/C performance. Toxicity of R-22 and flammability of R-142b are major open issues.

- . Solvents and Cleaners - Investigations were made of possible substitutes for chlorofluorocarbons used in degreasing operations in the manufacture of typical automotive parts such as odometer rolls and voltage regulator contact points. Laboratory studies show that there may be suitable substitutes, but they are slower drying and/or more odorous.

Appendix (Selected Background Information)

- I. Mr. R. J. Hampson letter of March 1, 1977.
- II. Mr. R. B. Alexander letter of July 28, 1977.
- III. Synopsis of Occupational Exposure to Lead - Final Standard -- Employee Health Services.
- IV. 1979 Toxic Substances Projects Priority Ranking -- Ad Hoc Toxic Substances Committee
- V. Engineering Asbestos Plan Update -- Vehicle Materials Engineering
- VI. Assessment of Arsenic in Body Solder -- Vehicle Materials Engineering
- VII. Chlorofluorocarbon - Automotive A/C Status -- Climate Control Division



Executive Vice President
Corporate Staffs

Chairman of the Board
President
Executive Vice Presidents
Vice Presidents
Division General Managers
Persons Designated by the Above

March 1, 1977

Subject: Occupational Safety and Health and Control of Hazardous Materials

Passage of the Occupational Safety and Health Act of 1970, the Hazardous Materials Transportation Act of 1975, and the Toxic Substances Control Act of 1976 has established the need for clear definition of compliance assurance responsibilities in the Company. Accordingly, the following assignments of responsibility are made:

I. Occupational Safety and Health Act

The Employee Health Services Department, Personnel and Organization Staff, is assigned responsibility for directing a continuing program to assure compliance with the Occupational Safety and Health Act and with other federal, state and local regulations affecting employee safety and health. The Department will:

- Identify emerging regulatory issues that require Company action.
- Recommend safety and health objectives for new Company programs and facilities.
- Develop and implement programs to assure compliance by Company operating components with the Act and regulations adopted thereunder.
- Arrange for technical representation on behalf of the Company with federal, state and local governmental regulatory agencies.
- Direct the presentation of Company positions on emerging occupational safety and health issues before government bodies.
- Highlight employee safety and health issues that require corporate management attention.
- Conduct on-going audits of employee working conditions.

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Dr. D. L. Block, Medical Director, is designated Company spokesman on employee safety and health matters. In this capacity, Dr. Block will represent, or designate representation for, the Company before governmental bodies concerned with promulgation or enforcement of employee safety and health regulations. Dr. Block also will continue as Chairman of the Safety and Health Standards and Regulations Study Group, whose membership includes corporate representatives of functional areas affected by safety and health regulations.

In support of the Employee Health Services Department, with respect to carrying out these responsibilities, Manufacturing Staff will direct facilities aspects of the Company noise control and hearing conservation program. The Staff also will make available its special technical abilities in other areas regulated by the Act as needed.

II. Hazardous Materials Transportation Act

The Executive Director, Supply Staff, is assigned responsibility for assuring Company compliance with the Hazardous Materials Transportation Act. Supply Staff will:

- Identify emerging regulatory issues that require Company action.
- Develop and implement programs to assure compliance by Company operating components with the Act and regulations adopted thereunder.
- Direct the presentation of Company positions on hazardous materials transportation issues before government bodies.
- Coordinate interpretation of regulations and requests for information to assist Company components in understanding and responding to the Act.
- Audit for compliance with hazardous materials transportation regulations.

In support of Supply Staff, with respect to carrying out these responsibilities:

- o Manufacturing Staff will publish appropriate packaging standards to achieve safe transportation of hazardous materials shipped by the Company.
- o The Employee Health Services Department will identify and recommend appropriate labeling for materials considered hazardous under the Act.

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III. Toxic Substances Control

The Vice President - Environmental and Safety Engineering, is assigned responsibility for assuring Company compliance with the Toxic Substances Control Act. He will:

- Be responsible for submissions of information and Company policy positions to the government.
- Forecast potential regulatory restrictions to aid in forward planning by manufacturing and product development activities.
- Develop and implement programs to assure compliance by Company operating components with the Act and regulations adopted thereunder.
- Coordinate interpretation of regulations and requests for information to assist Company components in understanding and responding to the Act.

In support of the Environmental and Safety Engineering Staff, with respect to carrying out these responsibilities:

- o The Medical Director, Employee Health Services Department, will:
 - . Formulate and present medical, toxicologic and related scientific data to governmental agencies.
 - . Conduct or oversee all medical, toxicologic and industrial hygiene studies required under the Act.
 - . Interpret to affected Company activities, on behalf of the Vice President - Environmental and Safety Engineering Staff, medical, toxicologic and industrial hygiene implications of proposed regulations.
 - . Evaluate employee working conditions and identify needed changes in work practices, processes, facilities or substances used in order to comply with pending regulations related to employee health.
 - . Audit the employee work environment as required.

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- o Engineering and Research Staff will control the introduction of new materials into Company product offerings and will assure that such materials are authorized for use only after toxicity studies required by the Act have been completed and results properly approved. The Staff also will monitor advanced engineering plans and programs to identify changes required to meet Environmental and Safety Engineering Staff regulations forecasts.
- o Manufacturing Staff will control the introduction of new non-production materials into Company facilities to assure compliance with the Act. The Staff will issue directives and procedures and audit performance of line operations to assure that use of non-production materials conforms to the Act.

IV. General

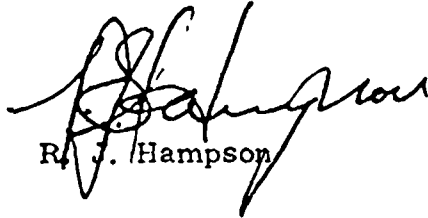
A number of Central Staffs have similar responsibilities related to safety and health, hazardous materials transportation and toxic substances control regulations. These include:

- o Labor Relations Staff will evaluate the labor relations impact of proposed governmental regulations, Company positions regarding them and proposed Company actions for compliance as required. The Staff also will coordinate relationships with labor organizations representing Company employees on health and safety matters pertinent to agreements negotiated with those organizations and reconcile collective bargaining obligations with government regulations or proposed Company actions.
- o Manufacturing Staff will evaluate the technical feasibility and in-plant cost implications of proposed regulations with the assistance of affected line operations. Where changes in manufacturing processes or facilities are identified as the preferred means of achieving compliance, the Staff will assist operating components in developing cost efficient engineering solutions to compliance problems. The Staff will conduct audits of facilities and equipment to assure full adherence to corporate guidelines and directives.
- o The Office of the General Counsel will continue to be responsible for providing legal advice to all staffs that have responsibility as to the matters covered in this communication, including giving advice as to the meaning and interpretation of the relevant statutes and regulations. The Office of the General Counsel will also provide advice as to the preparation of all relevant certification and other documents and will provide legal representation of the Company in all proceedings before the Occupational Safety and Health Review Commission and other governmental agencies charged with responsibilities under the particular statute.

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- o Public Affairs will advise and assist Central Staff representatives responsible for presenting Company views on regulatory matters to legislators, public officials, governmental agencies, etc., in accordance with provisions of Ford Motor Company Policy Letter C-2, "Governmental Relationships and Civic Affairs."
- o The Research activity, Engineering and Research Staff, will undertake such projects as may be required to develop new materials, manufacturing processes and advanced work environmental measurement devices to meet projected regulatory requirements.
- o Supply Staff will assure that goods for production or other uses are procured and transported in accordance with controls established to ensure compliance with occupational safety and health, hazardous materials transportation and toxic substances control regulations.
- o Operating management at all levels remains responsible for keeping assigned facilities and materials used therein in compliance with federal, state, and local occupational safety and health, hazardous materials transportation and toxic substances control regulations. Operating management also remains responsible for assuring that products offered for sale by the Company comply with toxic substances control regulations, as well as with all other regulations then in effect.

Future directives, procedures and advisory materials relating to occupational safety and health, hazardous materials transportation and toxic substances control will be issued by the responsible activities as identified above.



R. J. Hampson

8003 0973

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Vice President
Car Product Development Group

July 28, 1977

To: Mr. H. P. Freers
Mr. C. L. Knighton

cc: Mr. J. A. Capolongo Mr. H. L. Misch
Mr. L. M. Chicoine Mr. H. C. MacDonald
Mr. W. D. Compton Mr. H. A. Nickol
Mr. J. G. Duff Mr. L. R. Ross
Mr. J. T. Eby Mr. F. G. Secrest
Mr. P. D. Fadow Mr. P. J. Sherry
Mr. G. A. Ferris Mr. D. E. Smith, Jr.
Mr. S. M. Frey Mr. D. M. Sparling
Mr. R. J. Hampson Mr. J. D. Velte
Mr. R. I. Huston Mr. L. C. Veraldi

Subject: Toxic Substances and Hazardous Materials

Federal regulations to be promulgated this year regarding the use of toxic/hazardous materials will affect our product. The most cost-effective and timely approach to compliance with laws in this area requires an orderly approach in order to:

- . identify Company usage of (proposed) regulated material
- . survey users on impact of standard from material supplier to scrapping of vehicles
- . assess economic impacts
- . investigate substitutes
- . establish plans consistent with engineering timing to comply using current materials or find cost effective substitutes

Overall responsibility is delegated to Vehicle Materials Development and Planning who will also interact with TRPO and with DPO engineering groups as required. I am asking you to designate one or more coordinators in your offices to help generate inputs and to insure that whatever plans are established are consistent with your needs. For your information, a guideline set of Engineering Tasks for Product-Related Regulated Materials is included overleaf.


R. B. Alexander

8003 0974

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ENGINEERING TASKS FOR PRODUCT-RELATED REGULATED MATERIALS

I. Gather Information

1. Be aware of all Company, industry, state, and federal sources for regulation information.
2. Attend agency hearings in support of Stationary Source Environmental Control Office (SSECO) and Employee Health Services (EHS) on regulated substances when necessary.
3. Determine production components affected by regulations.
4. Monitor Advanced Engineering Programs to identify changes required to meet standards.
5. Track supplier and Company R&D efforts to find feasible substitutes for regulated substances.

II. Inform

1. Disseminate information and procedures on regulated materials to PEO's relative to engineering.
2. Appoint and educate material control people in the PEO's to become responsible for RMTA Procedures and new information and regulations concerning RMTA.
3. Interface between industry and Ford Laboratory facilities in the adoption of improved sampling techniques and methods.
4. Correlate results among those laboratories supplying data to Ford
5. Clarify vehicle materials plans, policies, and procedures for suppliers, consistent with Corporate toxic/hazardous substance objectives.

III. Plan

1. Establish engineering procedures.
2. Evaluate supplier usage, compliance, availability, and alternative materials.
3. Establish timing and facilities necessary to meet state, federal, supplier and Company deadlines.
4. Develop contingency plans in anticipation of emergency or permanent standards.
5. Co-ordinate design, specifications and testing of substitutes for regulated materials or altered formulations.
6. Assess product implications and financial impact of alternatives.
7. Obtain program authorization for required product changes.

SYNOPSIS OF OCCUPATIONAL EXPOSURE TO LEADFinal Standard

(Effective 2/1/79)

8003 0976

Permissible Exposure Limit (PEL)

- o No greater than 50 ug/m^3 as a TWA. For longer than an 8-hour day, the limit in $\text{ug/m}^3 = 400 \div \text{hours worked}$. (Effective 7/1/79.) For example, a 10-hour work day would require no greater exposure than 40 ug/m^3 TWA.
- o Action level: 30 ug/m^3 TWA. (Irrespective of respirator use.)

Monitoring - Air

- o If there is any indication (after an initial determination) that an employee is exposed to lead at or above the action level, full-shift (at least 7 continuous hours) monitoring shall be conducted -- at least one sample for each shift, for each job classification in each work area.
- o Exposure greater than action level but less than PEL -- monitor at least every 6 months.
- o Exposure greater than PEL -- monitor at least quarterly.
- o Employees shall be notified of the results of their monitoring within 5 working days. If exposure is greater than the PEL, irrespective of respirator use, employee shall also be notified of corrective action that is or will be taken to reduce exposure.

Compliance

- o Engineering and work practice controls shall be used. Where these do not reduce exposure below the PEL they shall be supplemented with respirators; however, failure to achieve exposure levels without regard to respirators by the implementation dates listed below is sufficient to establish a violation of the standard.

Implementation Schedule

<u>Industry</u>	<u>Compliance Dates</u>		
	<u>200 ug/m³</u>	<u>100 ug/m³</u>	<u>50 ug/m³</u>
Primary lead production	2/1/79	2/1/82	2/1/89
Secondary lead production	2/1/79	2/1/82	2/1/84
Lead acid battery manufacturing	2/1/79	2/1/81	2/1/84
Nonferrous foundries	2/1/79	2/1/80	2/1/81
Lead pigment manufacturing	2/1/79	2/1/82	2/1/84
All other industries	2/1/79	--	2/1/80

- o Written program to reduce employee exposure shall include:
 - . process description
 - . plans for controls
 - . technology considered to meet PEL
 - . air monitoring data

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- . implementation schedule
- . work practice program
- . administrative control schedule
- . other relevant information

Personal Protective Equipment

- o Appropriate respirators from those designated by OSHA shall be made available, at no cost to the employee, where required or when an employee requests a respirator.
- o No employee shall be required to wear a respirator longer than 4.4 hours per day after the dates for compliance with the interim levels.
- o Protective coveralls, gloves, etc., at no cost to the employee, shall be provided if exposure is at or above the PEL or where possibility of skin or eye irritation exists.
- o Proper cleaning, maintenance, and, in the case of contaminated clothes, labeling, of protective equipment shall be furnished by employer.

Housekeeping -- Hygiene -- Facilities

- o All surfaces shall be kept as free as practicable from lead, preferably by vacuuming.
- o No food, tobacco, cosmetics, etc., shall be allowed in areas where PEL is exceeded or skin or clothing may come in contact with lead.
- o Appropriate change rooms, lunch rooms, showers, and lavatories shall be provided and maintained (construction plans by 9/1/79 and construction of these facilities by 2/1/80).

Medical

A medical surveillance program, at no cost to employees, shall be instituted for all employees exposed above the action level for more than 30 days per year. The program shall include:

- o Blood lead and zinc protoporphyrin (ZPP) sampling every 6 months, but at least every 2 months if blood lead is at or over 40 ug%, and at least monthly for employees who shall be temporarily removed from exposure due to excessive blood lead levels.
- o Medical examinations:
 - . At least annually for employees having had a blood lead level at or over 40 ug% in the last 12 months.
 - . Prior to assignment to an area having lead present greater than the action level.
 - . If an employee has signs or symptoms of lead intoxication.

Medical (continued)

- o Medical examinations (continued):
 - . is appropriate for employees removed from exposure for medical reasons.
- o Medical examinations shall include:
 - . work and medical history
 - . physical exam
 - . blood pressure
 - . blood sample for multiple analyses
 - . urinalysis
 - . any other tests deemed necessary by sound medical practices
- o Employees shall be notified in writing if their blood level exceeds 40 ug% or otherwise requires temporary medical removal from exposure.
- o Multiple physician review is allowed for under this standard, at employer cost, and employees shall be notified of such a right if an employer-designated physician conducts the initial examinations.
 - . If the employee chooses to seek a second physician's opinion and his/her findings differ from those of the initial physician, the employer and employee shall assure that efforts are made to quickly resolve the disagreement.
 - . If a quick resolution is not possible, a third physician shall be designated by the first two physicians.
 - . The employer shall act consistently with the findings of the third physician unless employer and employee reach an agreement consistent with any of the three physicians.
- o Written medical opinion shall be furnished to employees regarding:
 - . physician's opinion as to any increased risk to the employee due to lead
 - . any recommended special protective measures
 - . any recommended limitations to respirator usage
 - . results of blood lead tests
- o The practice of prophylactic chelation is forbidden (use of drugs to lower blood lead level).

8003 0978

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Medical Removal Protection

- o Temporary medical removal due to elevated blood lead and return of an employee to work after two consecutive blood sampling tests at or below the removal level shall be dictated as indicated below.

	<u>Air Level</u> (ug/m ³)	<u>Blood Lead Removal</u> (ug%)	<u>Blood Lead Return</u> (ug%)
1st Year	100	80	60
2nd Year	50	70	50
3rd and 4th Years	--	60	40

Fifth year and thereafter, if average blood lead levels measured over 6 months is at or above 50 ug%, removal must take place until level falls to 40 ug% or below.

- o Employees removed from exposure shall maintain the earnings and seniority as though they hadn't been removed.

Employee Information and Training

Each employer shall institute a training program for all affected employees within 180 days from the effective date of this standard and at least annually thereafter, to include:

- . information in this standard and appendices
- . nature of operations which could result in exposure to lead
- . respirator training
- . purpose of medical surveillance
- . engineering and work practice controls
- . contents of compliance plan
- . instructions not to use chelating agents routinely

Signs

Where the PEL is exceeded, the following shall be posted:

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

Recordkeeping

Complete record for the times indicated below shall be kept:

- o Exposure monitoring -- longer of 40 years or duration of employment + 20 years.
- o Medical surveillance -- longer of 40 years or duration of employment + 20 years.
- o Medical removals -- at least duration of employment.

8003 0979

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Effective Dates

- o Standard effective 2/1/79.
- o Initial determination (observations, calculations and limited monitoring to represent greatest lead exposure) -- no later than 30 days after 2/1/79 (3/3/79).
- o Initial monitoring (detailed monitoring protocol as indicated under "Monitoring -- Air" above) -- no later than 90 days after 2/1/79 (5/2/79).
- o Initial biological monitoring -- no later than 7/31/79.
- o Initial training and education -- no later than 7/31/79.
- o Hygiene and lunchroom -- no later than 2/1/80.
- o Respiratory protection -- depending on level of exposure.
 - . 2/1/79 if TWA is greater than 200 ug/m³.
 - . 7/1/79 if TWA is greater than 50 ug/m³ but less than 200 ug/m³.
 - . 9/1/79 -- powered air-purifying respirators, if necessary.
- o Written compliance plans -- 6 months (for the Company) up to 1 year (for other industries) depending on information needed.
- o PEL is effective 150 days from effective date (7/1/79).

Employee Health Services
Personnel and Organization Staff
November 29, 1978

8003 0980

PRODUCED BY FORD

PRIORITY RANKING
1979 ADVANCED ENGINEERING AND RESEARCH TOXIC SUBSTANCES PROJECTS

<u>Project Title/Objective</u>	<u>Office Project Number</u>	<u>Location Code</u>	<u>Present Proposed Budget</u> (\$000)	
Reduced A/C R-12 Leakage	CCDA12	CCD	\$ 133.4	Priority I
Reduced Leakage A/C R-12 System	FAFO7	CCD	300.0	
Plastic Body Solders	R7443	RES	175.0 ^{a/}	
			\$ 608.4	
R-12 Charge Reduction	FAFO6	CCD	\$ 122.0	Priority II
Friction Materials and System	R6120	RES	309.8	
Anal. Meth. & Inst. - Toxic Substance	R1736	RES	54.9	
Asbestos Free Brake Lining	SC55	PCPE	40.0	
Alternate Fluorocarbon A/C	FAFO9	CCD	153.0	
			\$ 679.7	
Toxic Substances	R7660	RES	\$ 277.0	Priority III
Non-Fluorocarbon A/C Systems	FAFO8	CCD	130.0	
Environmental Effects of Graphite Fibers	R7491	RES	121.8	
			\$ 528.8	
TOTAL TOXIC SUBSTANCES			<u>\$1816.9</u>	

a/ Replacement project for R7442.

October 27, 1978

8003 0981

PRODUCED BY FORD

ENGINEERING ASBESTOS PLAN UPDATEPurpose

To provide a current evaluation on the asbestos regulation, usage and future trends to supplement the Vehicle Materials Engineering Asbestos Plan established August 26, 1977.

Regulation

Although a .5 fiber/cc standard was proposed by OSHA on October 9, 1975, no measures have been taken to lower the present 2 fiber/cc permissible exposure limit. The following pressures are contributing to further regulation in 1979:

- Hearings have concluded after 44 days of testimony on OSHA's Generic Policy to regulate all carcinogens. By law, OSHA must act within 60 days of the close of the record, but that deadline seldom has been met with past standards. Final rules to set guidelines for all carcinogens, e.g., asbestos, could easily be issued before the end of the year.
- Concurrently, extensive media coverage will expedite the asbestos standard below the current 2 fiber/cc level. Medical authorities have taken the position that a safe level cannot be identified.
- The completion of the Cotton Dust Standard set a precedent for protection of employees exposed to airborne carcinogens.
- The British have adopted an approach aimed at reducing asbestos exposure to the lowest attainable level with a 2 fiber/cc maximum ceiling, for excursions. Further action is pending on the standard until reports are published by the Advisory Committee. Compliance is enforced under the Health and Safety at Work Act.

Program Development

The Asbestos Plan, as delivered to the Advanced Review Committee, February 9, 1978, emphasized programs to prepare the Company for a staged tightening of the standard. Progress of these programs and recommendations are detailed below:

<u>Programs</u>	<u>Status</u>	<u>Recommendations</u>
• VMD&P and NAAO Purchasing monitoring supplier compliance and engineering programs.	As of August 26, 1977 - • Suppliers reaching compliance to 2 fiber/cc level with active programs to meet lower levels. • Engineering programs in initial stage of development of alternative materials. Raybestos-Manhattan R&D Review, 9/27-28/78.	VMD&P and NAAO Purchasing to monitor suppliers progress of achieving efficient environmental controls. VMD&P and Engineering to track R&D efforts and manufacturing feasibility of substitutes.

8003 0982

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Projects	Status	Recommendations
. NAAO Purchasing monitoring costs of asbestos containing components and engineering conducting comparisons with alternative materials.	Analysis limited to raw asbestos fiber.	NAAO Purchasing to evaluate the cost of the final product on a directional basis on engineering determined substitutes.
. Advanced Engineering Programs funded for 1978 in Chassis and Transmission and Axle to assess substitutes.		
Transmission	As of 8/78, \$47,000 spent on feasibility programs for non-asbestos clutch facings. The following non-asbestos funds for 1979 will be incorporated into forward model allocations: \$100,000 C-6 Auto-Job 1, '80 \$300,000 FIOD-Auto-Job 1, '81 \$100,000 Man. MTX-Job 1, '81	Transmission to continue an active program on non-asbestos replacements for production implementation.
Chassis \$114,000	Funding cancelled for calendar year 1978. Lack of supplier submissions. Budget for 1979 recommended at \$40,000 for advanced projects on non-asbestos.	Chassis to support transition to non-asbestos friction materials by evaluating supplier R&D submissions.
. Research support of Engineering in parallel projects.	Yearly allowance for the Machining and Wear Department, \$312,000. The non-asbestos project, not separately funded, does not incorporate the full time effort of one employee.	E&R Staff to reassess the flat budget planned for 1979 to sustain future supplier submissions, lawsuit inquiries and ICBA requests from Engineering.

8003 0983

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Usage

The transition to non-asbestos products is keyed to the rapid escalating costs associated with the use of asbestos and reaches beyond the purchase price to include expenses such as....regular medical check-ups, long term recordkeeping, fiber level monitoring and special work practices, as well as rapidly increasing insurance and legal costs.

The basic factor in the overall strategy for asbestos elimination is the caution that must be exercised in introducing new materials to critical drivetrain and brake components. The unique properties of asbestos fiber have slowed efforts towards substitution in products with high asbestos content receiving heavy duty service, e.g. friction brake components. Supplier submissions in these areas have been limited to evaluation by Scientific Research, with no level of success reported.

Future Trends

- Selective removal of asbestos as a product constituent appears to be the future trend where asbestos is not critical to product acceptance and performance. This is supported by the reduced demand for asbestos fiber imports, since 1973. The new approaches, materials and processes, required to achieve the transition to non-asbestos usage may provide improved levels of performance and reliability.
- Products such as friction materials, where there is difficulty in duplicating the attributes of asbestos and where there are no economically feasible alternatives, will continue to be produced.
- Asbestos will be replaced by several materials - not by a single material for all product lines. This is not unexpected due to the present use of asbestos from very short filler fiber grades to textile grade fibers and yarns. Non-asbestos fiber blends will be given expanded evaluation.
- High costs of worker protection and environmental control in regulated, industrialized nations like the United States will encourage hazardous and polluting industries to export their factories to non-regulating Third World Nations, e.g., Mexico, Taiwan, Brazil and South Korea. The U.S. Government will initiate monitoring of exporting hazards to other countries and will pressure world financial institutions to restrict funding to such concerns.

Vehicle Materials Engineering
October, 1978

8003 0984

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BACKGROUND

OSHA has promulgated an airborne arsenic standard limiting exposure of workers to 10 ug/m³ on an 8-hour, time-weighted average sample. This new regulation will affect Ford's use of lead body solder which contains arsenic as an essential ingredient. Airborne arsenic levels may reach 700 ug/m³ during grinding of the solder. Employees now wear respirators, but under the new regulations, current practices will not be adequate. The timing for implementation of the standard is:

	<u>Ford Program</u>
• August 1, 1978 - Respirator use for employees exposed above 500 ug/m ³ .	Presently complying
• No later than September 15, 1978 - Completion on initial monitoring.	Program Launched
• October 1, 1978 - Complete establishment of regulated areas.	Lead grinding booth designated as regulated area since inception of lead control program.
- Respirator use for employees exposed above 50 ug/m ³ .	
- Completion of initial training.	
- Notification of use to the government.	
• December 1, 1978 - Respirator use over 10 ug/m ³	All assembly plants have been informed.
- Completion of initial medical	
- Completion of compliance plan	
• July 1, 1979 - Completion of lunch rooms and hygiene facilities.	No formal plan but OGC contacted on advisability of requesting a variance.
• December 31, 1979 - Completion of engineering controls.	Compliance unlikely
- Respirator use no longer acceptable.	

The presence of arsenic in lead body solder is essential to its successful use. The tin arsenide phase promotes a fine grain size necessary for good spreadability. Alternative alloys that minimize the amount of arsenic or eliminate arsenic entirely are a possibility, but research and development for such alloys may be wasted if the expected lead standard precludes the use of lead body solder. If airborne concentrations of arsenic/lead cannot be controlled to the standard, the most attractive alternative may be plastic body solder. Ford has considered this substitution in the past, but costs and facilities have prevented application. The most recent plastic body solder program was cancelled because of cost for implementation and possible toxicity of the amines in the formulation.

RECOMMENDATION

- Establish a task force to determine if and how Ford can meet the new airborne arsenic standard. Task force members shall be:
 - Automotive Assembly Division
 - Body and Electrical Product Engineering
 - Industrial Hygiene and Technology
 - Chemical Sciences Laboratory
 - Manufacturing Processes Laboratory
 - Office of the General Counsel *
 - Vehicle Materials Engineering
 - Begin design studies to eliminate need for body solder.
 - Reactivate the plastic body solder program to find acceptable replacement for the lead-arsenic solder.
- * OGC involvement will be required to interpret the standard and to petition for relief from the standard if necessary.

Vehicle Materials Engineering
October, 1978

8003 0985

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Chlorofluorocarbon - Automotive A/C Status

The three programs relating to fluorocarbon regulation issues total \$513,000 (18% of the total climate control/heat exchanger effort) and are structured to provide contingency plans to meet anticipated Federal regulations affecting usage of R-12 refrigerant. The largest program, Reduced Leakage R-12 System, is to meet initial regulations which are expected to require improved containment of refrigerant with the still longer term objective being the complete elimination of fluorocarbon refrigerants.

Objectives

- . Develop an A/C system which will reduce total system R-12 leakage 75% (from 0.8 to 0.2 lbs./yr.).
- . Investigate alternate fluorocarbon A/C systems which would be more environmentally acceptable than R-12.
- . Investigate A/C systems which utilize non-fluorocarbon refrigerants which could replace R-12 systems.

Status

- . A controlled fleet test of 18 vehicles (6 baseline, 6 with nylon lines and 6 with metal lines) will have completed one year in service by 12/78 with an average of 16,000 Mi./vehicle. No leaks have been reported to date and leak measurements will be completed in December, 1978.
- . Design of a reduced leakage system (nylon lines, quick connect fittings and improved compressor shaft seal) was completed and is now being installed in a vehicle for test. The objective of a 75% system leakage reduction is expected to be achieved.
- . Approximately 75 possible alternate refrigerants have been reviewed to date without finding a completely acceptable replacement for R-12.
- . R-22 and R-22/142b systems have been built and tested which gave satisfactory A/C performance. Toxicity of R-22 and flammability of R-142b are major open issues.
- . The ROVAC (air cycle) has been evaluated in a Granada and results showed it was unacceptable in cooling performance and horsepower consumption.
- . Work is in progress on a Garrett Corporation proposal for an air cycle system for automotive application.

Future Plans

The current advanced programs address the spectrum of potential Federal regulation scenarios of voluntary containment, economic regulation and banning the use of R-12.

Climate Control Division

October 1978

PRODUCED BY FORD

8003 0986