GM Saginaw Casting Complex

RCRA Facility Investigation

Final Order

June 2, 1995

USEPA ID No.: MID 041 793 340

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2000 PENNSYLVANIA AVENUE, N.W.

WASHINGTON, D.C. 20006-1882

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[redacted]AGO
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BRUSSELS
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MEXICO CITY CORRESPONDENT
JAUREGUI, NAVARRETE, NADER Y ROJAS

LLOYD S. GUERCI
202-778-0637

M E M O R A N D U M

May 26, 1995

TO: Jeffrey N. Braun, Esquire
G. Keith West/Jean Caufield
Joseph Toth

FROM: Lloyd S. Guerci

RE: RCRA §3008(h) Order to GM SMCO

Enclosed please find EPA's letter of May 24, 1995 transmitting the final order, with attachments. The copy that EPA sent to me is faint and I am sending that one to Jeff. Others copies, which I had made, are no better. I am also sending a copy of a disk obtained from EPA to each of you.

I enjoyed working with each of you on this matter.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO IL 60604-3590

MAY 24 1995

REPLY TO THE ATTENTION OF

SENT BY OVERNIGHT MAIL

Lloyd Guerci, Esq.
Mayer, Brown & Platt
2000 Pennsylvania Ave., N.W.
Washington, D.C. 20006-1882

Re: In the Matter of General Motors Corp.,
U.S. EPA Docket No. V-W-003-95

Dear Mr. Guerci:

As Jeff Braun requested, I am sending you the enclosed hard copies of the final versions of the UAO (signed by William Muno) and the RFI, CMS, and IM Scopes of Work. Also enclosed is a disk containing these documents.

As I told Jeff Braun, we are prepared to file the modified UAO with attachments tomorrow, but we trust that GM will be prepared to file a stipulation regarding waiver of its response and hearing rights at the same time. Please send me a copy of this stipulation as soon as possible, so that I can review it. In addition, at the time that I actually file the modified UAO, I intend to submit a letter to the Regional Hearing Clerk, with a copy to the Regional Hearing Officer, stating that the Petitioner is withdrawing the initial order filed on January 10, 1995.

After you have reviewed the enclosed documents, please telephone me at (312) 886-7167 so that we can discuss the stipulation and the logistics of filing the documents.

Sincerely,

Jacqueline Kline
Asst. Regional Counsel

Enclosures

cc: Sue Brauer, Office of RCRA

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RCRA SECTION 3008(h) UNILATERAL ADMINISTRATIVE ORDER
MODIFIED INITIAL ORDER
GENERAL MOTORS CORPORATION
MID 041 793 340

U.S. EPA DOCKET NO.: V-W-003-95

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

IN THE MATTER OF: GENERAL MOTORS CORPORATION CHEVROLET CASTINGS & PARTS PLANT NODULAR IRON FOUNDRY GREY IRON FOUNDRY 2100 VETERANS MEMORIAL PARKWAY SAGINAW, MICHIGAN 48601 U.S. EPA ID NO. MID 041 793 340 RESPONDENT	ADMINISTRATIVE ORDER U.S. EPA DOCKET NO.: V-W-003-95 Proceeding under Section 3008(h) of the Resource Conservation and Recovery Act of 1976, as amended, 42 U.S.C. §6928(h).

I. JURISDICTION

This ADMINISTRATIVE ORDER (Order) is issued pursuant to the authority vested in the Administrator of the United States Environmental Protection Agency (U.S. EPA) by Section 3008(h) of the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act of 1976 (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. §6928(h). The authority vested in the Administrator has been delegated to the Regional Administrators by U.S. EPA Delegation Nos. 8-31 and 8-32 (dated May 11, 1994), by U.S. EPA OSWER Directive 9940.3, "Criteria for Elimination of Headquarters' Concurrence on Selected RCRA §3008(h) Orders" (dated June 26, 1987), and by U.S. EPA OSWER memorandum, "Headquarters' Review of Section 3008(h) Orders" (dated January 22, 1988), and has been further delegated to the Director of the Waste Management Division (Petitioner) by Region V Delegation Nos. 8-31 and 8-32, dated August 8, 1987.

This Order is issued to General Motors Corporation (Respondent), the owner and operator of a facility at 2100 Veterans Memorial Parkway and 1629 North

Washington Avenue, Saginaw, Michigan 48601 (the Facility). It is based upon the administrative record compiled by U.S. EPA, which is incorporated herein by reference. The index for the administrative record is Attachment V of this Order. The record is available for review by Respondent and the public at U.S. EPA's offices at 77 West Jackson Boulevard, Chicago, Illinois 60604.

On October 30, 1986, U.S. EPA granted Michigan authorization to operate a hazardous waste program in lieu of the Federal hazardous waste program, pursuant to Section 3006(b) of RCRA, 42 U.S.C. §6926(b). The State, however, does not have authority to enforce RCRA section 3008(h).

II. DEFINITIONS

Unless otherwise expressly provided herein, terms used in this Order which are defined in RCRA or in regulations promulgated under RCRA shall have the definitions given to them in RCRA or in such regulations.

1. Acceptable, in the phrase "In a manner acceptable to U.S. EPA . . .", shall mean that submittals or completed work meet the terms and conditions of this Order, attachments, scopes of work, approved workplans and/or U.S. EPA's written comments and guidance documents (as provided herein), and are of the quality and thoroughness reasonably required by U.S. EPA.

2. Additional work shall mean any activity or requirement that is not expressly required by this Order or its attachments but is determined by U.S. EPA to be necessary to fulfill the purposes of this Order as presented in Section IV: Statement of Purpose and Section IX.C.

3. Administrative record shall mean the record compiled and maintained by U.S. EPA supporting this Order. For information on the contents of the Administrative Record see "Guidance on Administrative Records for RCRA

3008(h) Actions," OSWER Directive 9940.4, July 6, 1989 and 40 CFR 24.03.

4. Area of Concern shall mean any area of the Facility under the control or ownership of the owner or operator where a release to the environment of hazardous waste or hazardous constituents has occurred, is suspected to have occurred, or may occur, regardless of the frequency or duration of the release.

5. CERCLA shall mean the Comprehensive Environmental Response Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§9601, et seq.

6. Chemicals of Potential Concern are chemicals that are potentially site-related and whose data are of sufficient quality for use in a quantitative risk assessment.

7. Comply or compliance shall be used interchangeably and shall mean the performance of work that is approvable by U.S. EPA and that is performed in the manner and within the time periods specified in this Order or any modification thereof, its attachments or any modification thereof, or written U.S. EPA directives under this Order. Respondent must meet both the quality and timeliness components of a particular requirement to be considered in compliance with the terms and conditions of this Order.

8. Contractor shall include any contractor, subcontractor, consultant or laboratory retained to conduct or monitor any portion of the work performed pursuant to this Order.

9. Corrective measures shall mean those measures or actions necessary to control, prevent, or mitigate the release or potential release of hazardous waste or hazardous constituents into the environment.

10. Corrective measures study or CMS shall mean the investigation and evaluation of potential remedies which, consistent with Section VII.

Work to be Performed, will protect human health and/or the environment from the release or potential release of hazardous waste or hazard constituents that pose a threat to human health or the environment into the environment from the Facility. The CMS requirements are detailed in the CMS Scope of Work included as Attachment III.

11. Data Quality Objectives shall mean qualitative and/or quantitative statements expressing acceptable levels of uncertainty. The Data Quality Objective process is designed to collect data that are scientifically valid, defensible, and of known precision and accuracy relative to the use for which the data are obtained.

12. Day shall mean a calendar day unless expressly stated to be a business day. Business day shall mean a day other than a Saturday, Sunday or Federal Holiday. In computing any period of time under this Order, where the last day would fall on a Saturday, Sunday, or Federal Holiday, the period shall run until the end of the next business day.

13. EPA or U.S. EPA shall mean the United States Environmental Protection Agency, and any successor Departments or Agencies of the United States.

14. Facility (when not capitalized) shall mean all contiguous property under the control of the owner and/or operator. Facility (when capitalized) shall mean all property under the control of Respondent that is located at, or contiguous to the property located at, 2100 Veterans Memorial Parkway and at 1629 North Washington Avenue, Saginaw, Michigan; the Facility shall include, but not be limited to, the property in Saginaw, Michigan, where Respondent's Nodular Iron, Grey Iron, and Chevrolet Casting and Parts Plants are or were located.

15. Hazardous constituents shall mean those constituents listed in Appendix VIII to 40 CFR Part 261 or any constituent identified in Appendix IX to 40 CFR Part 264.

16. Hazardous waste management unit (HWMU) is a contiguous area of land on or in which hazardous waste is placed, or the largest area in which there is significant likelihood of mixing hazardous waste constituents in the same area. Examples of hazardous waste management units include a surface impoundment, a waste pile, a land treatment area, a landfill cell, an incinerator, a tank and its associated piping and underlying containment system, and a container storage area. A container alone does not constitute a hazardous waste management unit, the hazardous waste management unit may include containers and the land or pad upon which they are placed.

17. Innovative treatment technologies shall mean those technologies for treatment of soil, sediment, sludge, and debris other than incineration or solidification/stabilization and those technologies for treatment of groundwater contamination that are alternatives to pumping with conventional treatments like air stripping and UV oxidation.

18. Interim measures or IM shall mean those actions, which can be initiated in advance of implementation of the final corrective action for a facility, to achieve the goal of stabilization. Interim measures initiate cleanup at a facility and control or eliminate the release or potential release of hazardous wastes or hazardous constituents at or from a facility.

19. Off-site, when used in relation to a facility, means all areas which are not on-site.

20. On-site means the same or geographically contiguous property which may be divided by public or private right-of-way, provided the entrance and exit between the properties is at a cross-roads intersection, and access is by crossing as opposed to going along, the right-of-way. Non-contiguous properties owned by the same person but connected by a right-of-way which that person controls and to which the public does not have access, is also considered on-site property.

21. Performance or QA/QC audit shall refer to U.S. EPA's inspections or audits of laboratories used by the Respondent and/or Respondent's contractor(s) to evaluate samples collected or required pursuant to this Order.

22. Person means an individual, trust, firm, joint stock company, Federal Agency, corporation (including a government corporation), partnership, association, State, municipality, commission, political subdivision of a State, or any interstate body.

23. Receptors shall mean those humans, animals, or plants and their habitats which are or may be affected by releases of hazardous waste or hazardous constituents from or at the Facility.

24. RCRA Facility Investigation or RFI shall mean, consistent with Section VII. Work to be Performed, the investigation and characterization of the source or sources of contamination and the nature, extent, direction, rate, movement, and concentration of the source or sources of contamination and releases of hazardous waste, including hazardous constituents, that have been or are likely to be released into the environment from the Facility. The activities required for the RFI

pursuant to this Order are detailed in the RFI Scope of Work included as Attachment II.

25. Respondent shall mean General Motors Corporation.

26. Scope of work or SOW shall mean the outline of work Respondent must use, consistent with Section VII. Work to be Performed, to develop all workplans and reports required by this Order as set forth in this Order and its Attachments II, III, and IV. All SOW Attachments and modifications or amendments thereto are incorporated into this Order and are an enforceable part of this Order.

27. Solid Waste Management Unit or SWMU shall mean any discernable unit at which solid wastes have been placed at any time irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area where solid wastes have been routinely and systematically released. The SWMU definition includes, but is not limited to: containers, surface impoundments, waste piles, land treatment units, landfills, incinerators, and underground injection wells, including those units defined as "regulated units" under RCRA; recycling units, wastewater treatment units and other units which EPA has generally exempted from standards applicable to hazardous waste management units.

28. Stabilization shall mean the goal or philosophy of controlling or abating immediate threats to human health and/or the environment through preventing or minimizing the spread of contaminants while long-term corrective measures alternatives are being evaluated. Stabilization shall be consistent with the objectives of, and contribute to the

performance of, any long-term remedy which may be required at the Facility (to the extent foreseeable).

29. Submittal shall include any workplan, eport, progress report, or any other written document Respondent is required by this order to send to U.S. EPA.

30. Violations of this Order shall mean those actions or omissions, failures or refusals to act by Respondent that result in a failure to meet the terms and conditions of this Order or its attachments.

31. Work or obligation shall mean any activity Respondent must perform to comply with the requirements of this Order and its attachments.

32. Workplan shall mean the detailed plans prepared by Respondent to satisfy the requirements of the corresponding Scope of Work. The requirements for each workplan are presented in Section VII: Work to be Performed and Attachments II, III, and IV.

III. PARTIES BOUND

A. This Order shall apply to and be binding upon Respondent General Motors Corporation and its officers, directors, employees, agents, successors and assigns, trustees, receivers, and up all persons, including but not limited to contractors and consultants, acting on behalf of Respondent.

B. No change in ownership or corporate or partnership status relating to the Facility will in any way alter Respondent's responsibility under this Order. Any conveyance of title, easement, or other interest in the Facility, or a portion of the Facility, shall not affect Respondent's obligations under this Order. Respondent will be responsible for and liable for any failure to carry out all activities required of Respondent by the terms and conditions of

the Order, regardless of Respondent's use of employees, agents, contractors, or consultants to perform any such tasks.

C. Respondent shall provide a copy of this Order to all contractors, laboratories, and consultants retained to conduct or monitor any portion of the work performed pursuant to this Order within one (1) week of the effective date of this Order or date of such retention (if retention is after the effective date of this Order), and shall condition all such contracts on compliance with the terms of this Order.

D. Respondent shall give notice of this Order to any successor in interest prior to transfer of ownership or operation of the Facility or a portion thereof and shall notify U.S. EPA in writing no later than thirty (30) days prior to such scheduled transfer.

IV. STATEMENT OF PURPOSE

In issuing this Order, the objective of U.S. EPA is for Respondent, as U.S. EPA determines is necessary to protect human health or the environment: (1) to perform a RCRA Facility Investigation (RFI) to provide background information pertinent to the Facility and releases of hazardous wastes or hazardous constituents, and to determine and to develop the data necessary to determine, the nature and extent of releases of hazardous waste or hazardous constituents at or from the Facility; (2) to perform a Corrective Measures Study (CMS) to identify and evaluate alternative corrective action measures necessary to prevent, mitigate and/or remediate any releases of hazardous wastes or hazardous constituents at or from the Facility that pose a threat to human health or the environment; (3) to perform Interim Measures (IM) at the Facility to relieve immediate threats to human health or the environment from releases of hazardous wastes or hazardous constituents at or from the Facility

or to perform stabilization in circumstances where if not undertaken prior to U.S. EPA's estimated date of selection of corrective measures based on a RFI/CMS, there will be further adverse impact to human health or the environment from releases of hazardous wastes or hazardous constituents at issue at or from the Facility; and (4) to perform any other additional work, as defined in this Order, necessary to correct or evaluate actual or potential threats to human health and/or the environment resulting from the release or potential release of hazardous waste or hazardous constituents at or from the Facility.

V. FINDINGS OF FACT

U.S. EPA makes the following findings of fact:

A. Respondent General Motors Corporation is a company doing business in the State of Michigan, incorporated under the laws of the State of Delaware and is a person as defined in Section 1004(15) of RCRA, 42 U.S.C. §6903(15) and 40 CFR 260.10.

B. Respondent owned and operated the Facility as a hazardous waste management facility on and after November 19, 1980, the applicable date which renders owners and operators of hazardous waste treatment, storage, or disposal facilities subject to interim status requirements or the requirement to have a permit under Sections 3004 and 3005 of RCRA, 42 U.S.C. §§6924 and 6925. On and after November 19, 1980, Respondent engaged in treatment, storage and/or disposal of hazardous waste at the Facility, subject to interim status requirements, 40 CFR Part 265.

C. Pursuant to Section 3010 of RCRA, 42 U.S.C. §6930, Respondent notified U.S. EPA of its hazardous waste activities. Respondent's Notification of Hazardous Waste Activity (EPA Form 8700-12) was received by

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U.S. EPA on or about August 15, 1980 and included on one form information for three plants at the Facility. The notification was signed as follows: on July 18, 1980 by T.V. Lincoln, Plant Manager, Nodular Iron Casting; July 21, 1980 by B.N. Eichborn, Plant Manager, Grey Iron Casting; July 18, 1980 by G. Brian Buskirk, Plant Manager, Saginaw Parts Plant. In the notification, Respondent marked boxes to show these hazardous waste activities were going on at the Facility, which it owned: "Generation" and "Treat/Store/Dispose". Respondent described hazardous wastes handled at the Facility using the following EPA hazardous waste numbers set forth at 40 CFR 261 Subparts C or D:

1. from non-specific sources as F001;

2. from commercial chemical products which may be hazardous wastes as U013, U226, P008, P012, P022, P026, P090, P092, P098, P105, P106, U002, U012, U031, U044, U056, U057, U070, U077, U080, U112, U122, U123, U125, U131, U134, U144, U151, U154, U159, U161, U169, U188, U204, U219, U220;

3. non-listed hazardous wastes exhibiting characteristics as D001 Ignitable, D002 Corrosive, D003 Reactive, and D000 Toxic.

The notification included a note indicating that, except for waste codes U013 and U226, the commercial chemical product waste codes pertained to wastes generated in Facility laboratories.

D. On or about November 18, 1980, Respondent submitted to U.S. EPA, pursuant to Section 3005 of RCRA, 42 U.S.C. §6925, Part A of its RCRA permit application dated November 17, 1980, and signed by Robert D. Lund (Vice President, General Motors Corp. General Manager, Chevrolet Motor Div.). According to this Part A permit application, the Facility would conduct these hazardous waste management activities each year: store in containers 84,000

pounds of spent halogenated solvents used in degreasing (F001); store in containers 13,100 pounds of ignitable waste (D001); store in a waste pile, then treat in a unit (other than a tank, surface impoundment, or incinerator) 17,280 tons of ignitable and reactive waste (D001 and D003); and store in containers 19,200 pounds of corrosive waste (D002). F001, D001, D003, and D002 are hazardous wastes derined at 40 CFR 261.31, 40 CFR 261.21, 40 CFR 261.23, and 40 CFR 261.22, respectively. In its Part A permit application, Respondent also stated that at the Facility it accumulated calcium carbide slag in a waste pile daily and soaked the waste pile with water to decompose any unreacted calcium carbide.

E. By letter dated April 4, 1983, Mr. C.E. Calhoun, Staff Engineer of the Environmental Management Systems, Manufacturing Facilities, Research & Development, Chevrolet Motor Division, General Motors Corporation informed U.S. EPA that the Saginaw Parts Plant had been scheduled to phase out its manufacturing operations by August 1, 1983, with subsequent closure of the waste storage facility by September 30, 1983. The April 4, 1983 letter identifies the waste storage facility at the Parts Plant as a 15' by 15' enclosed storage pad for 55 gallon drums containing waste chloroethane and paint thinners.

F. By letter dated June 28, 1983, Mr. Norman Carter, Chief Metallurgist, General Motors Corporation notified U.S. EPA that on February 4, 1983, General Motors Corporation Plants - Chevrolet Saginaw Casting (i.e., Modular Iron Casting and Grey Iron Casting Plants) and Parts Plants were legally consolidated with the Central Foundry Division - General Motors Corporation. By letter dated November 21, 1994, Raymond Ilkka, General Supervisor, Environmental Activities, General Motors Corporation notified U.S.

EPA that the Saginaw Grey Iron Plant officially changed its name to Saginaw Metal Casting Operations.

G. Respondent submitted a revised Part A permit application by letter dated February 7, 1985. The application was signed February 7, 1985, by M.B. Hamilton, Plant Manager, Nodular Iron Plant. In this revised Part A permit application, the owner and operator of the Facility was identified as GM Central Foundry Division Nodular Iron Plant, and the nature of business was limited to Nodular Iron Plant activities. According to the revised Part A, Respondent's Facility would treat an estimated 10,000 tons per year or gallons per day of reactive hazardous waste (D003) in a tank.

H. The Michigan Department of Natural Resources (MDNR) issued Respondent a Michigan Act 64 (the Michigan Hazardous Waste Management Act) operating license on October 11, 1982, which was scheduled to expire on October 11, 1986. The Act 64 operating license authorized G.M.C. - Chevrolet Saginaw Metal Castings and Parts Plant to operate a calcium carbide treatment facility at 2100 Veterans Memorial Parkway, Saginaw, Michigan.

I. A November 1988 "Closure Plan for Interim Status Hazardous Waste Container Storage Area, Saginaw Grey Iron Casting Plant" prepared by RMT Inc. (Respondent's consultant) states, "The Chevrolet Parts Plant Manufacturing and Machining Plant has been closed and the Nodular Iron Foundry is in the process of closing" (p. 1).

J. According to Respondent's answer to a RCRA Section 3007 request for information, "This plant, CFD Saginaw Nodular Iron was permanently closed and ceased production on December 22, 1987 and is presently involved with a RCRA-ACT-64 Closure Plan approved by the Michigan Department of Natural Resources" (page 3, correspondence from William Hudson, Environmental Coordinator,

Saginaw Nodular Iron to The United States Environmental Protection Agency dated May 3, 1989).

K. Records on file at U.S. EPA's Region 5 offices include copies of Michigan Department of Natural Resources Uniform Hazardous Waste Manifests (and predecessor forms, including Michigan Industrial Waste Disposal Manifests). The table below contains an example (from the collection of manifests) of the solid and/or hazardous wastes shipped off-site by Respondent from 1980 to 1989.

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Year of shipment	Waste Description	Waste Classification
1989	waste petroleum naphtha	D001
1989	waste gasoline	D001
1989	waste methylene chloride	F002
1989	1,1,1-trichloroethane	F002
1989	waste ethyl solution	D001
1989	haz. waste liquid solution	D004
1989	waste paint related material	D001
1988	waste compound cleaning liquid	D002
1988	PCB[1] soil and debris	non-RCRA code
1988	waste oxidizer	D001
1986	waste oil	non-RCRA code
1986	waste compound cleaning liquid corrosive material	F002
1986	waste compound cleaning liquid corrosive material	F004
1986	waste 1,1,1-trichloroethane	F001
1986	waste paint related material	F003
1986	waste paint thinner	D001
1986	1,1,1 Trichloroethane VC sludge and sand	F001
1984	waste solidified phenol formaldehyde resin	not classified
1983	waste grease	not classified
1983	waste solidified urea formaldehyde resin	not classified
1983	waste isocyanates	D003
1983	waste phosphoric acid solution	D002
1983	waste glacial acetic acid	D002
1983	waste sodium hydroxide	D002
1983	zinc sludge	non-RCRA code
1983	waste # 6 fuel oil and sludge	non-RCRA code
1983	waste acid (waste catalyst)	D002
1980	Triaryl Phosphate Ester hydraulic fluid (for reclaim)	not classified

[1] polychlorinated biphenyl (PCB)

Multiple shipments of the waste types are represented above only once. F002, F003, and F004 are hazardous wastes identified in 40 CFR 261.31. D004 is a hazardous waste identified in 40 CFR 261.24 for the characteristic of toxicity (Arsenic).

L. On June 21, 1994, U.S. EPA received a printout from the Michigan Department of Natural Resources identifying manifests for shipments from Respondent's Facility, for the period from January 1, 1990 to June 10, 1994.

The summary identifies shipments of these waste codes (a manifest number and date of shipment are included parenthetically as an example for each waste code): D001 and F003 (AR0483127, 08/11/93); F001 (AR0483129, 02/2_ 94); F002 (IL5094160, 01/08/91); D003 (IL4727302, 04/06/93); F005 (IL3013352, 06/17/91); D005 (MI2199602, 02/19/1991); D002 (MI2303858, 05/06/91); D029 (MI3056453, 11/10/93); and, D009 (MI1555216, 10/16/91). F005 is a hazardous waste identified at 40 CFR 261.31. D005, D009, and D029 are hazardous wastes identified at 40 CFR 261.24 for the characteristic of toxicity (Barium, Mercury, and 1,1-Dichloroethylene, respectively).

M. On April 12, 1983, U.S. EPA issued a notice of noncompliance to General Motors Corporation. The notice of noncompliance noted violation of the PCB marking requirements of 40 CFR Part 761 and stated the requirement to undertake a drain, refill, and test program to ensure that hydraulic systems will be reduced to less than 50 ppm PCBs by July 1, 1984. Respondent's subsequent drain, refill, and test program and the extent of PCB contamination in hydraulic fluids at the Facility are documented in Respondent's reply (dated July 9, 1992) to the Information Request Pursuant to Section 308 of the Clean Water Act Section 308, 33 U.S.C. §1318 (issued by Dale S. Bryson of U.S. EPA on May 7, 1992).

N. Respondent's Facility includes:

(1) Physical Layout of the Facility The physical location of the plants and regulated units at the Facility was included in Respondent's November 17, 1980 Part A permit application. The Saginaw Parts Plant was located at the southern portion of the Facility, bordered by Sixth Street to the west, Washington Avenue to the south, and the C&O Railroad right-of-way to the north.

(See Figures 1 and 2.) The Grey Iron Castings Plant is located east of the former Parts Plant, north of Washington Avenue, west of State Highway 13 and generally in the southern portion of the Facility. (See Figures 1 and 3.) The Nodular Iron Castings Plant was located east of State Highway 13, north of a C&O Railroad right-of-way, southwest of the Buena Vista Wastewater Treatment Plant on Hack Road, south of the City of Saginaw Wastewater Treatment Plant, and generally in the center of the Facility. (See Figures 1 and 4.) Respondent's landfill occupies the northern- and eastern-most portions of the Facility. (See Figures 1 and 5.) The total land area of the Facility is 652.162 acres, according to the November 17, 1980 Part A permit application. (If the current calculations of total land area differ from this number of acres, then the definition of Facility in Section II of this Order shall prevail.)

(2) Manufacturing Activities at the Facility

(a) Manufacturing Activities from the Part A for the Entire Facility

The November 17, 1980 Part A permit application states,

"The Chevrolet Metal Casting Plants in Saginaw produce grey and nodular iron castings used in the automotive industry. The specific process involves the melting of iron and steel scrap with coke, limestone, dolomite and fluorspar in water cooled cupolas to make molten iron. This is poured into green sand molds with or without cores for the manufacture of the above castings. The Chevrolet Parts Plant Manufacturing and Machining Plant produces water pumps, oil pumps, and flywheel ring gears as major components. Machining is performed on cast iron, aluminum, and steel" (EPA Form 3510-1, Reverse side).

(b) Manufacturing Activities from Waste Characterization Studies for the Facility

Additional information relating to manufacturing activities at Respondent's Facility is provided in the Waste Characterization Study(ies) of Foundry Process Solid Wastes performed annually by Respondent's contractors. Figure 6 is a typical schematic materials and process flow diagram for the industry in general (p. 2, RMT, Inc. Waste Characterization Study for Foundry Process Solid Wastes, General Motors Corporation, Central Foundry Division, Saginaw Nodular and Grey Iron Casting Plants, January 1984, Revised February 1984).

(c) Manufacturing Activities from Nodular Iron Plant Waste Characterization Studies

As discussed in the January 1986 Waste Characterization Study for Foundry Process Solid Wastes, three types of cores are produced at the Nodular Iron Plant: Hot Box, Shell, and Oil Sand. Shell sand core making involves use of a phenol-formaldehyde-based resin, water, hexamethylene-tetramine, and temperature manipulations. Preparation of the sand mixes for hot box cores is similar to that for shell sand. Oil sand core ingredients include linseed oil, iron oxide, cereal, flour, water, and sand; the cores are baked to harden them. Core wastes include uncured sweepings or spill sand and scrap cores. Core wastes are typically conveyed and sluiced to the wastewater treatment system, but may also be transported to the metals reclamation residuals pile (pages 16, 17, 30 and 31). Molding sand mixes contain sand, bentonite, seacoal, and cereal

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binders. Wastes from the molding area are taken to the metals reclamation residuals pile (p. 17). The metals reclamation residuals pile also receives the mixture of slag, metal, and refractories from dropping the cupola bottom. The cupola air emission control system water is used as cupola slag quench water before being piped to the wastewater treatment plant. Quenched cupola slag is trucked to the quenched slag piles near the plant (p. 18). Subsequent to the removal of molten metal from the cupola, calcium carbide is added to the molten metal in a ladle, and the calcium carbide desulfurization slag is drawn off for transportation to the hazardous waste treatment unit and ultimately, land-disposal in the on-site landfill (pp. 18-19). The molten metal is poured into molds, cooled, and conveyed to a shakeout area where mold and core sand is removed and sluiced to the wastewater treatment system (p. 20). Cooled parts are shot-blasted, cleaned, and inspected. All wastes from the shot-blasting, cleaning, and inspection are sluiced to the wastewater treatment system (p. 20).

Table 1 summarizes Shake Extraction of Solid Waste with Water (ASTM D3987-81) test results for samples (p. 48). Sampled wastes were analyzed only for arsenic, barium, cadmium, total chromium, copper, total cyanide, fluoride, lead, mercury, phenols, selenium, silver, total organic carbon, chemical oxygen demand, zinc, and pH in 1986. Wastes that are sluiced to the wastewater treatment system were sampled after treatment (at least by the classifiers). Although results for the composite waste sample from the core room

are not included in Table 1, the report indicates that this sample leached phenols at 19.1 mg/l (p. 48). Note that ASTM D3987-81 states that it has not been tested for applicability to organic substances and volatile matter (p. 33 in Appendix J). PCB analyses were conducted on composite samples of select wastes. "A sample of the lagoon sludge had only 0.32 ppm PCB's as Arochlor #1242" (p. 48). (All page citations in the preceding 2 paragraphs refer to the 1986 study report.)

The July 1987 Nodular Iron Waste Characterization Study for Foundry Process Solid Wastes identified these hazardous constituents (as defined in Section II of this Order) in the wastes: PCB (Aroclor 1242), arsenic, barium, fluoride, lead, mercury, selenium, zinc, cyanide, and phenols (Table 4-3).

(d) Manufacturing Activities from a Nodular Iron Plant closure plan

The November 6, 1985, closure plan for the Saginaw Nodular Iron Plant hazardous waste treatment pile describes manufacturing operations in the Nodular Iron Plant's portion of Respondent's Facility:

> "The CFD-Saginaw Nodular Iron P[illegible] manufactures nodular iron castings, such as differer[illegible] cases, camshafts, and knuckles for automobile parts. [illegible]ng the manufacturing process, one hazardous waste, c[illegible]m carbide desulfurization slag, is generat[illegible] and is treated on-site.
>
> The Nodular Iron Plant adds calcium carbide to remove sulfur from molten iron. This step is necessary to make nodular cast iron with appropriate metallurgical properties. The desulfurization slag formed as a reaction by-product contains about 1% to 3% unreacted calcium carbide.
>
> When the unspent calcium carbide in this slag comes in contact with water, a reaction produces a combustible gas

(acetylene). Thus, the slag is classified as a reactive hazardous waste under 40 CFR Part 261 Subpart C. The treatment technique used at this facility involves the elimination of acetylene gas generating capacity from the calcium carbide desulfurization slag to render it non-hazardous according to 40 CFR 261 Subpart C. This is accomplished by spraying the waste with water in a waste pile and allowing the acetylene to dissipate into the atmosphere" (RMT, Inc., page 1).

(e) Manufacturing Activities from Grey Iron Casting Plant Waste Studies

An annual "Waste Characterization Study for Foundry Process Solid Wastes" was also conducted at the Grey Iron Casting Plant for Respondent by RMT, Inc. The information in this paragraph was extracted from the June 1986 report. As at the Nodular Iron Casting Plant, a variety of ingredients are mixed to produce core-making and molding sands.

"Four types of core wastes are produced in the Grey Iron Plant. About 41% is hot box core waste, about 29% is isocure core waste, about 29% is oil sand core waste, and the remaining 1% is shell core waste. All core preparation is performed in one area.

In the production of hot box cores, prepared sand goes directly to the machines; however, because of the shorter bench life of hot mixes, sand temperature is critical and the sand is kept at 70° to 90°F by control of incoming new sand, water additions, mixing time, and water-cooled hoppers.

The isocure core making process (also called the 'cold box' system in the foundry industry) uses a two-part resin which contains phenol formaldehyde and methylene diphenyl diisocyanate. Triethylamine is used as a catalyst (instead of heat) to harden the core.

Production of oil sand cores is essentially manual. Ingredients are measured by volume or weight, and different castings require different blends of core oil (linseed oil), iron oxide, cer[e]al flour, water, and sand. Oil cores are baked in ovens at between 200°C to 250°C to cure (harden) them.

The hot coating system for shell sand cores employs a flake resin, most commonly a phenol-formaldehyde based resin along with hexamethlene-tetramine as a hardening agent. New sand is heated to about 230°F to 250°C and mixed for a preset period of time. At these temperatures, only the outer shell of the core is cured. Temperature is kept constant, and materials are added by volume or weight according to a recipe. After mixing, a predetermined amount of water and hexamethylene-tetramine are added to blend the ingredients and cool the mixture.

Scrap conveyors take away scrap cores, excess or spill sand, and any other sand waste. At the Grey Iron Plant, the core wastes are taken directly to the core waste pile to the north of the plant" (pp. 15-16).

"Molding sand mixes consist primarily of beach or lake sand, mixed with various ratios of bentonite clay, seacoal, cereal binders, and water. . . . Wastes from the molding area, consisting mainly of floor sweepings, are taken to the metals reclamation pile" (p. 16).

"A wet cupola emission control system is employed to maintain air quality. Slag from the cupolas is quenched in a tank below the cupolas. Water from the cupola emission control system is used as the cupola quench water, which is then piped to the wastewater treatment plant. In the Grey Iron Plant, slag is dragged out of the quenched tank and transported to a storage hopper by a conveyor belt. The quenched slag is then trucked to the quenched slag piles near the plant.

About once a week, the bottom of each cupola is dropped. This mixture of slag, metal, and refractories is hauled to the metals reclamation equipment east of the Grey Iron Plant" (p. 17).

After pouring the molten metal into the molds, the molding line goes into a cooling area, then on to the shakeout process. The shakeout process includes separation of the product castings from the flasks, sprues and runners, and mold and core sand. Sprues and runners are placed in overhead buckets and returned to remelt bins. Excess mold and core sand that is not recycled is sluiced to the wastewater treatment system at the Nodular Iron Plant (p. 18). The product castings are shot-blast, cleaned, and inspected;

wastes from these processes are sluiced to the wastewater treatment system (p. 19).

"The metals reclamation residuals pile (sometimes called the Hatchet Pile) previously received wastes from both the Grey Iron and Nodular Iron Plants. However, the Nodular Iron Plant has begun its own reclamation piles; thus, only wastes from the Grey Iron Plant are presently being processed and disposed in the 'Hatchet Pile'. Waste material destined for metals reclamation is segregated from the other foundry wastes until Hatchet, Inc., a metals reclamation company, has extracted ferrous metals from the material. The metal is later sold back to the foundry. The residual materials are then transported to the metals reclamation residuals pile" (p. 22).

Table 2 summarizes ASTM D3987-81 test results for solid waste samples. Table 3 summarizes total PCB analysis test results for solid waste samples. Tables 2 and 3 are from the June 1986 Waste Characterization Study for the Grey Iron Plant. The February 1989 Annual Sampling of Solid Wastes for Michigan Public Act 641 Disposal Designation report documents detection of barium, cadmium, chromium, copper, lead, zinc (Table 5-1), arsenic (Table 5-2), toluene, benzene, 1,1,1-trichloroethane, PCBs, formaldehyde, arsenic, beryllium, cadmium, chromium, cobalt, copper, cyanide, lead, lithium, nickel, and phenols (Table 5-3) in solid wastes from the Facility. (These are hazardous constituents, as defined in Section II of this Order.)

(f) Manufacturing Activities from Grey Iron Response to RCRA §3007 Request

By letter dated May 26, 1989, G.B. Mauch, Plant Manager of the Saginaw Grey Iron Plant, provided (on behalf of Respondent) a reply to U.S. EPA's April 24, 1989 request for information pursuant to RCRA Section 3007. Respondent's reply indicated that

calcium carbide desulfurization slag was produced at the Grey Iron Plant during 1978 through 1986. The slag was collected in gondolas from the desulfurizing ladle, and the gondolas were transported by truck to the Nodular Iron Plant calcium carbide treatment bunker, where calcium carbide slag was saturated daily with water to render it non-hazardous. Respondent's reply identified the use of 1,1,1 trichloroethane (F001) in the Grey Iron Plant's maintenance repair part degreasers, which were being switched over to Safety Kleen solvents (D001). Also, "[i]n 1988, the plant installed a 1,1,1 Trichloroethane solvent [F002] eradication system for polystyrene removal from core assemblies" (p. 5). The triethylamine used in the core making process was identified as a D001 and D002 hazardous waste (p. 6). Finally, Respondent's reply identified sodium hydroxide (as a D002 waste) used to clean core box patterns so that repairs could be made on them, and metal cleaner (as a D001 waste) used in the maintenance cleaning of the core boxes.

(g) Manufacturing Activities from a Grey Iron Plar Response to a Clean Water Act (CWA) Section 308 Request

By letter dated July 9, 1992 and addressed to Mr. Dale Bryson, Director of the Water Division in U.S. EPA's Region V, Robert H. Harvey, Plant Manager provided (on behalf of Respondent) a narrative reply to a Clean Water Act Section 308 Information Request. Respondent's reply included the following information.

"The Recycle (process) Water System in use at the Saginaw Grey Iron Plant is utilized basically for:

--slag quenching
--melting emission control
--process equipment dust collection/air wash

Recycle water is pumped from the Secondary Lagoon (28 acres - 68 million gallons capacity) through the Recycle Pump House via a 36" underground water line to a reservoir (25 million gallons) located adjacent to the Saginaw Grey Iron Plant. Recycle water is pumped from the reservoir throughout the entire plant to 106 emission units, dust collectors and air washes in order to collect potential particulate emissions. In addition, recycle water is used to quench slag generated by the cupola melting facilities. All water and particulate passing through the above units is collected in one of eleven basement pump pits for transfer to Pump House #4. The water and collected particulate is pumped from Pump House #4 (16,425 gpm capacity) back to the property occupied by the Secondary Lagoon via an overhead trestle system. The water and collected particulate is released to one of two classifier units that permit the large suspended solids (classified sand) to drop out of the water carrier (48,000 tons/year capacity). The classified sand is raked from the classifier and accumulated in the classified sand pile.

The water, with smaller suspended and dissolved solids, flows over the classifier weir through a flume system where additions of both TSP (Triple Super Phosphate, aka calcium phosphate monobasic) and a polymer are made. The TSP combines with the free zinc to form a non-leachable zinc phosphate and the polymer is added to draw the small particulate into a unit of sufficient size to drop out of suspension. A thorough mixing of the water and additives is completed in the mixing tank following the additions. From the mix tank, the water is pumped to one of four Primary Lagoons (10,000 cubic yards each), where the suspended solids settle out as sludge. The water flows from the Primary Lagoon back to the Secondary Lagoon for continued reuse. The sludge from the Primary Lagoon is dewatered, tested and disposed of in the adjacent Type III Landfill.

In order to maintain the dissolved solids in the Recycle Water System at an acceptable level, some water from the Secondary Lagoon is processed through the Waste Water Treatment Plant for blow-down (disposal) to the City of Saginaw POTW. This water is pumped from the Secondary Lagoon to a biological holding tank (750,000 gallon capacity) for phenol destruction. Depending on the level of water in the Secondary Lagoon (how much water needs to be reduced from the Secondary Lagoon and the level of dissolved solids in the recycle water), the cycle time and flow through the Waste Water Treatment Plant can be from 72,000

gpd to 576,000 gpd. After the biological processing, the water passes through a clarifier, to one of three filter presses (to remove the biological waste) to one of three ion exchangers, for removal of lead, zinc, copper, etc. prior to blow-down. The biological waste (filter cake) is disposed of in the adjacent landfill.

The desired level of water and dissolved solids is maintained through new water additions. These additions may be through purchased water from the City of Saginaw, rain water accumulation, City of Saginaw water used in the plant disposed of to the Recycle Water System, or from the leachate system installed in the adjacent landfill. The amount of rainfall, plant disposal of City of Saginaw water and the level of dissolved solids control the need and amount of water purchased directly from the City of Saginaw as an addition to the Recycle Water System" (pages 3 and 4).

(3) Saginaw Nodular Iron Casting Plant HWMUs, SWMUs, and AOCs

(a) According to Respondent's May 3, 1989 correspondence (from William Hudson, Environmental Coordinator, Saginaw Nodular Iron to The United States Environmental Protection Agency, Ref: Section 3007 Information Request), the Nodular Iron Casting Plant at Respondent's Facility generated calcium carbide slag, spent solvents, and waste oil.

(i) Respondent generated calcium carbide desulfurization slag, a characteristic hazardous waste (D003) and described its treatment as follows:

"Water treatment, by flooding the slag with large volumes of water in an open bunker in order to render it non-reactive, was chosen as the most effective and practicable method. Its impacts on the surrounding air and water were considered and appeared to be manageable. Water treatment of the slag in open bunkers also allows for landfilling the reacted non-hazardous slag as a solid waste on site. In terms of regulatory compliance and general orderliness of the slag treatment operation, the open bunker water treatment method is superior to the previously used practice of accumulating the slag in waste piles and letting it re-act with rainwater" (p. 1).

(ii) Respondent generated spent cleaning and degreasing solvents (such as 1,1,1-Trichloroethane, a listed hazardous waste (F001) and mineral spirits as a RCRA waste minimization substitute for 1,1,1-Trichloroethane) and described their generation as follows:

"This class of waste results from the . . . degreasing and general cleaning of metal parts" (p. 2).

(iii) Respondent generated spent paint solvents (D001), a mixture of mineral spirits and lacquer, in its Paint Shop.

(b) As stated in the November 17, 1980 Part A permit application, hazardous waste management units at the Nodular Iron Casting Plant include the "Present Calcium Carbide slag treatment area" (north of the Nodular Iron Casting Plant, 15 feet by 20 feet, used to treat/store D003 and D001), "Future Calcium Carbide slag treatment area", (east of the Nodular Iron Casting Plant, 20 feet by 120 feet, used to treat/store D003 and D001), "Container Storage Area"-indoors unit (south of the Nodular Iron Casting Plant, 10 feet by 10 feet, used to store F001), and "Container Storage Area"-outdoors unit (south of the Nodular Iron Casting Plant, 10 feet by 10 feet, used to store D001).

(c) On June 22, 1994, Sue Brauer and Angela Hahn discussed the plan location of the indoors and outdoors container storage areas (HWMUs), concluding that (i) the container storage area-outdoors unit is east of the Paint Storage Building and was used to store D001, and (ii) the container storage area-indoors unit is in the Nodular Iron Oil Storage Building (an L-shaped structure) and included the hazardous waste control storage tank identified in

correspondence from Cheryl Howe of MDNR to William Hudson of GM in an April 3, 1989 letter (June 22, 1994 record of conversation between Sue Brauer of U.S. EPA and Angela Hahn of MDNR and June 22, 1994 letter with enclosures from Angela Hahn to Sue Brauer).

(d) A 6,000 gallon underground storage tank at the Nodular Iron Oil Storage Build[illegible] was/is used to store waste oil, making it a solid waste management unit (undated "Flammable and Oil Quench Fluid Storage Saginaw Nodular Iron Plant"; letter dated March 20, 1986 regarding "Notification for Underground Storage Tanks", from Jack V. Findley, Sr. Environmental Coordinator, GMC; and undated draft "RCRA Facility Assessment for GMC Central Foundry, Saginaw, Michigan, MID 041 793 340").

(e) According to a March 7, 1984 Air Quality Division activity report prepared by Michael R. Jury of the Michigan Department of Natural Resources, fuel stored in the Nodular Iron Power Plant west fuel tank contained 160 ppm carbon tetrachloride, 60 ppm 1,1,1-trichloroethane, 30 ppm benzene, and 33 ppm toluene. PCBs (150 ppm Arocnlor 1260) were detected in Respondent's sample of sludge from the bottom of the west tank, but not in the sample of sludge from the bottom of the west tank taken by the Michigan Department of Natural Resources. These sample results indicate that the fuel had been mixed with solid waste, making the tank a solid waste management unit.

(f) According to a March 7, 1984 Air Quality Division activity report prepared by Michael R. Jury, fuel stored in the Nodular Iron Power Plant north fuel tank contained 160 ppm carbon

tetrachloride, 50 ppm 1,1,1-trichloroethylene, 22 ppm benzene, and 21 ppm toluene. These sample results indicate that the fuel had been mixed with solid waste, making the tank a solid waste management unit.

(g) The waste piles identified in the "Waste Characterization Study of Foundry Process Solid Wastes" for the Nodular Iron Casting Plant (RMT, Inc., January 1986; submitted with Respondent's May 3, 1989 response to a Section 3007 of RCRA information request), including the metals reclamation residuals pile (which received uncured core wastes containing phenols, formaldehyde resins, molding sands, and cupola slag, metal and refractories from cupola bottom-drop) and quenched cupola slag piles are solid waste management units. These waste piles are identified in Figures 7a and 7b.

(h) A February 20, 1985 letter from Jack V. Findley, Senior Environmental Engineer, Nodular Iron Plant, General Motors Corporation, to Brenda Brouillet of the Michigan Department of Natural Resources states, "it may be possible that the fallout came from the calcium carbide treatment area, as you suggested, due to a fugitive dust problem at the time" in response to an inquiry concerning fugitive dust fallout on autos in the hourly parking lot. Fugitive dust emissions and fallout of untreated calcium carbide desulfurization slag constitute releases of hazardous waste, making the hourly parking lot and other receiving lands areas of concern.

(4) Grey Iron Casting Plant HWMUs, SWMUs, and AOCs

(a) According to a May 19, 1981, closure plan, hazardous waste management units at the Grey Iron Casting Plant included a storage unit of used Chlorathene VG (spent 1,1,1, Trichloroethane which meets the listing description of F001), used caustic solution, paint residues, and thinners in 55-gallon drums.

(b) By letter dated November 7, 1988, J.S. Toth, Superintendent of the Plant Engineering Department at Saginaw Grey Iron Plant on behalf of Respondent, submitted a closure plan ("Closure Plan for Interim Status Hazardous Waste Container Storage Area, Saginaw Grey Iron Casting Plant, General Motors Corporation, Saginaw, Michigan" November 1988, RMT, Inc.) for the container storage area located at the Central Foundry Division, Saginaw Grey Iron Plant, MID 041 793 340. The hazardous waste container storage area, a HWMU, is located in the northwest corner of the Oil Building at the Saginaw Grey Iron Plant. According to the closure plan, this HWMU stored hazardous wastes identified as F001, F002, F005, D001, and D002. Constituents identified in these hazardous wastes are summarized here. Hazardous wastes identified by Respondent as F001 contained 1,1,1-Trichloroethane, 1,2-dichloroethylene, 1,1-dichloroethylene, 1,1-dichloroethane, chloroethane, and vinyl chloride (p. 10). Hazardous wastes identified by Respondent as F002 contained dichloromethane (p. 10) and chlorinated hydrocarbon (not otherwise specified) (Appendix B). Hazardous waste identified by Respondent as F005 contained toluene (p. 10); chromium, lead, mercury, copper, zinc (Burmah sample #7327, sample

received 4-30-86); barium, chromium, zinc (Waste Compliance Services sample #042487-2, (S-9512)); toluene (CLOW sample 95935, received 8-9-85)); and, total cyanide (CLOW samples 88813 and 88814, received 2/20/85) (spent paint solvent analyses in Appendix B). Hazardous waste identified by Respondent as D001 contains xylene (p. 10, present in FC-47 metal cleaner). Appendix B includes several D001 wastestreams: Part 1 resin, hot box resin, and metal cleaner FC-47-GI. Appendix B identifies these detected constituents in D001 ("Part I"): barium, chromium, copper, and zinc (Waste Compliance Services, sample #32870045, received 7-29-87). These constituents were detected in D001 (Part 1): chromium, copper, zinc, bromoform, and 1,4-Dichlorobenzene (no lab identified, Sample 8010209, sample received 1-7-88). These constituents were detected in D001 (Hot Box): lead, chloroform, 1,1-Dichloroethane, 1,2-Dichloroethane, Trichloroethane, Toluene, 1,4-Dichlorobenzene (no lab identified, Sample 8010210, sample received 1-7-88). Hazardous wastes identified by Respondent as D002 were also identified as D008, toxic for chromium in Appendix B. Appendix B identifies these detected constituents in the D002 (spent corrosive cleaner): barium, total chromium, lead, zinc, and total cyanide (CLOW, sample 88811, received 2/20/85).

(c) By letter dated May 26, 1989 to the attention of Andrew Tschampa of U.S. EPA, G.B. Mauch, Plant Manager of Saginaw Grey Iron Plant, replied on behalf of Respondent to a RCRA Section 3007 request for information. Respondent's reply identified these solid wastes generated by Respondent: slag, core butts sand,

metals reclamation sand, classified sand, and lagoon sludge. Part of the description of solid wastes is excerpted below.

"The core butt sand is all the scrap cores, refractory coatings, and unused core sand produced by the core making process. This sand has not been subjected to molten iron in the casting process. This sand is taken to storage in the yard . . . .

The metals reclamation sand consists of miscellaneous foundry molding sand, casting cleaning sand, cupola bottom drops, miscellaneous cleanup, spent refractories, and residual iron. . . . . " (p. 2).

The locations of these waste piles are provided in Figures 8a and 8b. Each waste pile is a SWMU. Respondent's reply to the RCRA Section 3007 request also identified these hazardous wastes generated at the Grey Iron Plant by Respondent: calcium carbide slag (D003), 1,1,1 Trichloroethane (F001 and F002), Paint solvents (F005), Sodium Hydroxide (D002), Core resins Part I and II (D001), Mineral spirits (D001), Metal cleaner (D001), Triethylamine (D001 and D002). The description of hazardous wastes is provided, in part, below.

"The calcium carbide slag is a reactive (D003) hazardous waste that is generated during the desulfurization of cast iron. The slag is collected in gons from the desulfurizing ladle. The gons were transported by truck to the Nodular Iron Plant calcium carbide treatment bunker, where calcium carbide slag was saturated daily with water to render it non-hazardous. [. . .] Calcium carbide slag was produced at the Grey Iron Plant during 1978 through 1986. The plant does not now and has not since July, 1986, produced calcium carbide slag.

Respondent's reply indicates that other hazardous wastes, 1,1,1 trichloroethane (F001 and F002), paint solvents (F005), sodium hydroxide (D002), core resins part I and II (D001), mineral spirits (D001), metal cleaner (D001), and triethylamine (D001 and

0002), were each accumulated in drums and transported to the Oil House for storage prior to transportation off-site. The physical location of the accumulation points is not specifically identified in Respondent's reply, but these accumulation points would be SWMUs.

(d) By letter dated July 9, 1992 and addressed to Mr. Dale Bryson, Director of the Water Division in U.S. EPA's Region V, Robert H. Harvey, Plant Manager of the Grey Iron Casting Plant, provided (on behalf of Respondent) a narrative reply to a Clean Water Act Section 308 Information Request regarding the Grey Iron Casting Plant.

Respondent's reply included the following information:

"GMPT-GI [General Motors Powertrain - Grey Iron] is unaware of any regulatory definition of 'solid waste unit' in either the Clean Water Act or other statutes and must therefore object to this question as vague, unreasonable and beyond the scope of §308 of the Clean Water Act. Because of our unfamiliarity with this term, we are unable to certify the accuracy or completeness of any identification of solid waste units and are therefore unable to provide the requested information. However, it is our understanding that the focus of this request for information is possible sources of PCB contamination in Saginaw Bay. Therefore, without waiving the objections stated above or any other relevant objections, we are providing the following information on the PCB storage at GMPT-GI:

RCRA and PCB Storage Area
This is a 17 x 20 foot area located in the corner of the oil house which has been in use from 1979 to the present. It is used for accumulation and storage of both PCB and RCRA wastes. It has a capacity of about 40 drums of waste. The floor is a curbed concrete slab 9 inches thick.

PCB Storage CDL
This is a 10 x 12 foot area which has a curbed concrete floor and is a separately locked room inside the building. This area was used from 1974 to 1983 for storage of drums of PCB hydraulic fluid and transformer fluid.

PCB Storage Electric Shop
This is a 5 x 5 foot welded steel box with a locked caged top which has been used from 1979 to the present for holding drums of accumulated PCB ballast, caps, and cleanup waste.
. . .

In addition, and again without waiving the objections stated above or any other relevant objections, GMPT-GI is providing the following information on lagoon #1: "This is one of four lagoons, each of which is 700 ft. x 100 ft. x 5 ft. deep. It has been in use from 1978 to the present for collecting and dewatering foundry sand prior to landfill disposal. The lagoon is clay lined and has a drainage system for dewatering" (p. 2).

Respondent enclosed with its narrative response documents detailing PCB-contaminated hydraulic fluid leaks and leak response activities. In these documents (pages marked PTG-104101 through PTG-104116), spills are reported for multiple locations at the Grey Iron Plant, and the drummed solid wastes that resulted from the various spill clean-ups are stated to have been taken to a PCB storage area identified in these documents as "CDP" (e.g., p. 104113), "PCB holding area, north side of C.D.P." (p. 104114) or "back of C.D.P." (p. 104108). Each of the PCB storage areas described above is a SWMU, and lagoon 1 (at a minimum) is a SWMU. Also, Respondent's reply referred to at least one tank used to store PCB-contaminated phosphate ester hydraulic fluid from the 1983 drain, refill, and test program described in subparagraph IV.M. on page 14 of this Order. Each such tank is a SWMU.

(5) Chevrolet Parts Plant Manufacturing and Machining Plant HWMUs, SWMUs, & AOCs

(a) According to a May 19, 1981, closure plan prepared by David C. Ruhland, Project Engineer, hazardous waste management units at the Parts Plant included a container storage area for

used chlorathene VG, paint residues, and thinners in 55-gallon drums.

(6) Other HWMUs, SWMUs, & AOCs at the Facility

(a) The Recycle (process) Water System described above in subparagraph IV.N.(2)(g) is a SWMU, as is the predecessor Wastewater Treatment Plant described in this paragraph. (The recycle water system includes components of the wastewater treatment plant.) According to the September 24, 1981 NPDES permit application, Respondent treated a flow of as much as 51.6 million gallons per day of general process water (from dust collection systems, cupola emission systems, slag quenchers and sand sluice systems) in its waste water treatment system. Respondent described the waste water treatment system as composed of two classifiers (each of 88,817 gallon capacity), two mix tanks (each with 161,568 gallons capacity for treatment with Hercules 1123 Polymer (flocculent)), four primary lagoons (each of 2,450,448 gallons capacity with two in use at any one time), and one secondary lagoon of 72,705,600 gallons capacity. Effluent from the secondary lagoon was discharged through outfall 002 to the Saginaw River.

(b) Respondent owns and operates an on-site landfill which was licensed as a Type III Michigan Public Act 641 landfill. On May 18, 1984, this on-site landfill received truckloads of untreated calcium carbide slag (D003 hazardous waste), making the on-site landfill a HWMU. Mr. Jack Findley of the Nodular Iron Plant confirmed that untreated calcium carbide slag was being

dumped in the landfill and attributed this to the fact that, due to the addition of a third shift, more slag was being generated than could be treated (MDNR Air Quality Division Activity Report dated May 25, 1984). An October 14, 1982 "Report on Inspection to Determine Compliance with the PCB Disposal and Marking Regulations" prepared by MDNR staff states, "Nodular owns and operates a Class III Landfill (Crow Island) at the intersection of Hack Road and Outer Drive in Buena Vista Township (Section 5, T12N, R5E)" . . . . "Approximately 50 of the available 94 acres were reportedly in use" (p. 4). This on-site landfill is identified in Figures 1b, 5, 7a, and 7b.

(c) The MDNR received information from anonymous individuals concerning the alleged disposal of drums at the Facility by Respondent in July or August of 1968 and "in the late sixties". The locations of the alleged drum disposal areas of concern are indicated in Figures 9a and 9b.

(d) As stated in the October 14, 1982 "Report on Inspection to Determine Compliance with the PCB Disposal and Marking Regulations" (PCB Inspection #73102, performed by MDNR's Water Quality Division), "The PCB storage area is in the Casting Development Plant (CDP) north of the Grey Iron Casting Plant. This storage area is used by both plants, however, disposal manifests only list c ource . 4). As this area was used to manage spill clean-up wastes (see subparagrapn IV.N.(4)(d) of this Order), it is a SWMU.

(e) The October 14, 1982 "Report on Inspection to Determine Compliance with the PCB Disposal and Marking Regulations" for Respondent's Facility included PCB analyses for many solid waste streams. The data is excerpted below from page 4 of the report.

Waste oil	2.0 ppm	09-23-79
Cupola Slag	0.04 ppm	01-15-80
Cured core oil sand	0.014 ppm	01-29-80
Cured core shell resin	0.027 ppm	01-29-80
Uncured core shell resin	0.020 ppm	01-29-80
Isocure core sand	ND	02-12-80
Molding sand	0.016 ppm	02-12-80
Blast residue	0.026 ppm	02-12-80
Black sand hatchet	0.103 ppm	02-19-80
Classifier sand	0.033 ppm	02-19-80
Lagoon floating slag	0.105 ppm	02-19-80

The units in which the above wastes were managed are SWMUs.

(f) Respondent provided a notification to MDNR for in-use underground storage tanks by letter dated March 20, 1986 and signed by Jack V. Findley, Sr. Environmental Coordinator, for the Central Foundry Division, Saginaw Nodular Iron Plant. The notification form was signed by M.B. Hamilton, Plant Manager on March 21, 1986. As stated in a March 17, 1994 MDNR interoffice communication from Rhonda Klann of ERD to Angela Hahn of WMD (enclosure to April 13, 1994 letter from Angela Hahn of MDNR to Sue Brauer of U.S. EPA),

"There are 5 areas of contamination associated with underground storage tank systems: Annex Building Area, 10,000 gallon gasoline; Oil House, 10,000 gallon gasoline, 10,000 gallon pattern spray, and 10,000 gallon diesel fuel; Service Garage, 10,000 gallon gasoline; Tank #6, 5,000 gallon diesel fuel; and Tank #10, 8,000 gallon diesel fuel tank. Contamination has not been delineated at these areas. A groundwater purge system had operated at the Annex Building, Oil House, and Service Garage Area, however, a lack of downgradient monitoring wells has prevented the MDNR from determining that these areas have been remediated.

GM recently discovered PNA contamina near the railroad at the No. 1 and No. 2 pumphouse. T. ontamination was found as part of the investig on fc Tank 10, but GM has i icated the contamination i t re ted to Tank 10."

The 5 areas of contamination described above are areas of concern.

(7) Description of Geologic Conditions and Aquifers

Study conclusions from a "FINAL REPORT Hydrogeological Investigation for Solid Waste Residue Disposal Study, Chevrolet - Saginaw Metal Casting Plants" prepared by Keck Consulting Services, Inc. that may be relevant for the Facility include:

(a) The site is underlain by fill material and by clay and clay tills that range in depth from 68 feet to 95 feet;

(b) Underlying the clay and clay till is the Saginaw formation which is a usable sandstone aquifer; and

(c) On a regional basis, groundwater flow is to the north-northwest and generally conforms to the surface topography (p. 55, undated excerpt).

This study was conducted to evaluate the hydrogeology at on-site solid waste disposal units.

(8) Description of Hydrologic Setting

(a) The Facility occupies land on the south, southeast, and east bank of the Saginaw River downstream (north) of the confluence of the Tittabawassee, Shiawassee, and Cass Rivers and north of central Saginaw. The Saginaw River discharges into Saginaw Bay of Lake Huron approximately sixteen miles downstream from the Facility (Figure 6, "Saginaw and Pine Rivers In-Place Pollutants Study Final Report" by Eastern Michigan Planning and Development Region, December 1983) and is used for recreational purposes.

(b) The Saginaw River acts like an estuary in that at times it may stop flowing or even flow upstream. This occurs because the surface of the river is at the same elevation as Saginaw Bay and reacts to the stage of the Bay. The Bay stage may fluctuate several feet within a few hours because of seiches caused by winds and pressure changes over Lake Huron (p. 2, "General Motors Corporation, Chevrolet Metal Casting Plants, Saginaw, Michigan, Investigation and Evaluation Report", April 1972, U.S. EPA, Region V, Michigan District Office, Grosse Ile, Michigan).

(c) Surface water bodies (man-made drains) border the Facility on the north side of Respondent's on-site landfill, on the west side of Crow Island Road, and along the west side of Outer Drive. An additional ditch or drain is located parallel to the east-west Consumers Power right of way south and west of the Nodular Iron Casting Plant and approximately perpendicular to Outer Drive. The ditches or drains just described apparently flow to the Saginaw River. A third ditch is shown on Respondent's drawing 5A-27432 (obtained by Sue Brauer of U.S. EPA during a July 19, 1994 Facility visit) running north-south from the C&O railroad toward the Saginaw River between the Facility's river dock and the mill water pump house.

(d) Respondent's National Pollution Discharge Elimination System (NPDES) permit applications and stormwater discharge permit application (enclosed in Respondent's July 9, 1992 reply to an Information Request Pursuant to Section 308 of the Clean Water Act) identify outfalls from the Facility to surface water bodies.

3. Documented Releases of Hazardous Wastes or Hazardous Constituents from the Facility.

(1) An MDNR Environmental Response Division Activity Report dated October 23, 1987 documents communication between Ms. Rhonda Klann of MDNR and Mr. Bob Offenborn of Respondent's Grey Iron Plant. Mr. Offenborn provided information obtained during construction activities in the basement of the Grey Iron Plant: oil seeped into holes drilled through the basement floor for installation of footings, and test results on the oil indicated the presence of total PCBs at 4,300 ppm and 6,050 ppm. Correspondence from J.S. Toth on behalf of Respondent to Ms. Rhonda Klann of MDNR dated October 4, 1989, regarding "PCB Cleanup Basement, Saginaw Grey Iron Plant," (enclosed in Respondent's July 9, 1992 reply to an Information Request Pursuant to Section 308 of the Clean Water Act, p. 104358) provides an estimate that 500 yards of PCB contaminated soil remain at the site.

(2) Mr. G.E. Calhoun on behalf of Respondent was notified in a letter dated October 14, 1971 from F.B. Frost, Chief Engineer of the Michigan Water Resources Commission (MWRC) that an analysis of a sample obtained from the Nodular Iron Foundry wastewater discharge on October 5, 1971 indicated the presence of significant amounts of PCB. MWRC requested that Respondent take immediate steps to inventory use of PCB-containing products and take corrective measures to eliminate possible losses to the waters of the State.

(3) Quantitative laboratory analyses of the composite water samples collected at the Chevrolet Metal Casting Plants of Saginaw during

the surveys of April 3 and 4, 1972 and April 4 and 5, 1972, are Appendix B to the April 1972 Investigation and Evaluation Report on Respondent's Chevrolet Metal Castings Plants prepared by the U.S. EPA Grosse Ile office. According to the analyses, concentrations of cyanide, phenols, and polychlorinated biphenyls in pond effluent exceeded Facility intake concentrations, documenting a net increase of these constituents in the wastewater discharge from the Facility to the Saginaw River. Pond effluent from the Nodular Iron plant (discharged from outfall 002) contained 0.06 and 0.21 mg/l phenols and 0.3 and 0.6 mg/l zinc. Polychlorinated biphenyls were reported at 1320 and 1500 parts per trillion for wastewater discharges from the Nodular Iron Plant and 5800 parts per trillion for wastewater discharges from the Grey Iron Plant (at outfall 001).

(4) An MDNR report of an industrial wastewater survey performed during one twenty-four hour period starting January 8, 1979 includes a comparison of survey results to the Facility's permit (MI0001139) and monthly operating report. The report states that daily maximum concentration net total iron concentration was exceeded and the daily average loading for suspended solids was also not met during the January 1979 survey. Table 3 of the MDNR report summarizes information from the Facility's January 1979 monthly operating report, which provided a monthly average and monthly maximum PCB discharge concentration of 0.3392 ug/L. Similarly, an MDNR report of an industrial wastewater survey performed during one twenty-four hour period starting December 4, 1979 includes a

comparison of survey results to the Facility's permit (MI0001139) and monthly operating report. Table 3 of the MDNR report summarizes information from the Facility's December 1979 monthly operating report, which provided a monthly average and monthly maximum PCB discharge concentration of 0.1316 ug/L.

(5) By letter dated October 3, 1991, Terry L. Walkington of MDNR informed Respondent that MDNR had confirmed the presence of contaminants in four sump discharges to the Outfall 002 ditch to the Saginaw River. MDNR states that these contaminants seep into the ditch sediments and from there into groundwater. An attached wastewater sampling survey documents the detection of hazardous waste constituents (1,1,1-trichloroethane, trichloroethene, polychlorinated biphenyl (Aroclor 1260), 1,2,4-trichlorobenzene, antimony, arsenic, cadmium, chromium, lead, and nickel) in sump discharges to Outfall 002 (Nodular Iron Plant north west sump, north east sump, south east sump, and south west sump).

(6) On and about October 31, 1984, Respondent's contractor, CLOW Hydro Research Services of Pontiac, Michigan collected groundwater samples from monitoring wells around the on-site landfill. (Monitoring well locations are identified in Figure 5.) Analytical results for water samples from monitoring wells document the release of hazardous constituents into groundwater, as follows:

Constituent (units)	Groundwater Monitoring Well No. 4	No. 5	No. 6
Arsenic (mg/L)			0.006
Barium (mg/L)	0.3	0.3	0.8
Cadmium (mg/L)			0.03
Chromium (mg/L)			0.05
Mercury (mg/L)		0.0005	0.0006
Phenols (mg/L)		0.006	0.002

(7) On November 1, 1984, Respondent collected groundwater samples from monitoring wells around the on-site landfill. (Monitoring well locations are identified in Figure 5.) Analytical results for water samples from monitoring wells document the release of hazardous constituents into groundwater.

Constituent (units)	Groundwater Monitoring Well No. X	No. EE	No. 3	No. MM	No. NN
Barium (mg/L)	0.2		0.2		
Phenols (mg/L)	0.018	0.013	0.026	0.008	0.008

(8) On November 20, 1984, Respondent collected groundwater samples from monitoring well No. BB at its on-site landfill. (Monitoring well locations are identified in Figure 5.) Analytical results for water samples from the monitoring well (1.0 mg/L phenols and 0.1 mg/L barium) document the release of hazardous constituents into groundwater.

(9) On April 7, 1987, and January 21, 1987, the MDNR issued notices of violation (NOVs) to Respondent for violations of requirements of Respondent's Act 64 operating license and RCRA, including the following: fire and excessive smoke emissions (air releases) were observed at the calcium carbide treatment facility on April 1, 1987, and January 9, 1987, respectively. Leachate releases, runoff, and dumping from the calcium carbide slag (a hazardous waste) generation, transportation, and treatment areas of the

Facility to the land surface are documented in MDNR NOVs and associated inspection reports, as identified below by date of NOV. Among the conditions so documented are: fugitive dust emissions were observed during dumping of calcium carbide slag onto the treatment slab and were evident around the entire perimeter of the slab, and spills from a gondola of calcium carbide slag in transportation were not immediately cleaned up (June 22, 1984 NOV); piles of waste were placed outside the treatment containment area and fugitive emissions were evident around the entire perimeter of the treatment slab (October 5, 1984 NOV); the drain in the "bunker facility" (the calcium carbide treatment unit) failed and calcium carbide slag spilled to the floor during slagging operations and was not cleaned up, and diking allowed run-off to be discharged from the treatment pad (December 4, 1985 inspection report and December 17, 1985 NOV); calcium carbide slag was dumped from gondolas in the iron house and at a storage site adjacent to the treatment pad (October 10, 1985 NOV); uncovered gondolas of calcium carbide slag were left alongside the treatment pad and were subject to reaction due to the rain which fell on June 17, 1985 (June 25, 1985 NOV); on at least two occasions, nightly earthen dikes which are constructed to drain "the facility" (the calcium carbide treatment slab) to a manhole located on the apron of the treatment slab, broke open and the wastewater escaped the containment area (December 19, 1984 NOV); leachate and runoff from the calcium carbide treatment area could not be removed since the drain to the wastewater treatment plant

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was plugged and had been for some time according to the inspection log (June 27, 1983 NOV); and, carbide waste was found outside of the concrete slab area (August 25, 1982 NOV).

(10) By letter dated July 9, 1992 and addressed to Mr. Dale Bryson, Director of the Water Division in U.S. EPA's Region V, Respondent provided a narrative reply to a Clean Water Act Section 308 Information Request. Respondent's reply included the following information.

(a) In the enclosed documents (pages marked PTG-104101 through PTG-104116), spills of PCB-contaminated hydraulic fluid are reported for multiple locations at the Grey Iron Plant (the #1 Core Room, #3 Hotbox; 17 ML Drag Unit; #2 ML Cope MM; #8 Mold Line Cope Separator; #8 Mold Line BB Lowerator; #1 Hot box, #1 Core Room; #1 Hot Box, #1 Core Room; #15 Drag Hydraulic Room (drag mold machine); basement of #3A mold line, west core setter elevator pit; reclaim tank in the Oil House overfilled and run over; # 5 PT in #2 and 3 core room; #2 conv. drag mold machine basements; hydraulic line on #3 hot box in # 1 core room; #21 conv. cope hyd. unit; and, #2 core room, #5 PT).

(b) Respondent's reply also provides documentation of the actions taken (including installation of monitoring and purge wells) to remediate the seepage of PCB-contaminated oil into footing excavations in the basement of the Grey Iron Plant basement.

(c) Documents enclosed with Respondent's reply provided analyses for discharges from Facility outfall 002 and documented discharges of hazardous constituents, including (for example) methylene

chloride and trichloroethylene (PTG-103193) on sample date 8404C.. trichloroethylene (PTG 103195) on sample date 840403, and methylene chloride (PTG 103200) on sample date 840619.

(11) The Waste Characterization Studies for Foundry Process Solid Wastes (e.g., the 1984 - 1986 studies included in Respondent's response to the Section 3007 of RCRA information request) performed by Respondent documented the presence of water-leachable hazardous constituents in foundry process solid wastes. These solid wastes have been and are currently stored in uncontained waste piles (see Figures 7a, 7b, 8a, and 8b as well as October 7, 1994 site visit photolog) that are not designed, constructed, or operated to prevent releases and that do not have groundwater monitoring systems.

P. Some of the hazardous wastes or hazardous constituents identified above in Section V by hazardous waste code and/or by chemical name may pose a threat to the environment or to human health by ingestion, inhalation and/or absorption. Therefore, the presence of these hazardous wastes and/or constituents in soil, groundwater, and surface water at and near the Facility may pose a threat to human health and the environment.

(1) Hazardous wastes threatening human health are distinguished by identification pursuant to 40 CFR 261.24 for the characteristic of toxicity only, and, if identified as hazardous wastes in 40 CFR 261 Subpart D, are distinguished by the hazard codes E for toxicity characteristic waste, H for acute hazardous waste (all compounds with a P waste code have acute toxicity), and T for

toxic waste (all compounds identified with a U waste code are toxic).

(2) Respondent's waste characterization studies for foundry process solid wastes (regulated by Michigan Public Act 641) identified hazardous constituents in water extractions from the solid wastes that exceeded primary and secondary drinking water standards in effect at the time of the studies.

(3) Hazardous constituents listed in Section V of this Order that have been identified as pollutants (e.g., that are bioaccumulative chemicals of concern or potential bioaccumulative chemicals of concern) in a "Consolidated List of Great Lakes Critical Pollutants" (July 1993, U.S. EPA, Region V, Water Division) include: cadmium, chromium, mercury, PCBs, dibutyl phthalate, phenol, and toluene.

(a) The 1994 Michigan Fishing Guide includes a public health advisory, which states:

"The amounts of chemicals found in Michigan fish are not known to cause immediate sickness. However, the chemicals can collect in the body over time and there is concern they may eventually affect your health or that of your children. Exposure to chemical contaminants may interfere with children's normal growth and development. A woman may pass contaminants to her unborn child through the placenta or to a nursing child through breast milk. For these reasons, the Health Department advises extra caution for pregnant women, nursing mothers, women who intend to have children and children under age 15" (p. 25).

The public health advisory includes special consideration for the Tittabawassee and Saginaw Rivers:

"some fish, especially carp and catfish, from the Tittabawassee and Saginaw Rivers have been found to contain PCBs and dioxin. We strongly advise that no one eat any carp or catfish from the Saginaw River or the Tittabawassee River downstream from Midland.

We suggest that no one eat large quantities of any species from these rivers. . . ." (p. 25).

Specific public health fish consumption advisories are also given for Rainbow Trout, Brown Trout, and Lake Trout up to 26" in Saginaw Bay due to PCBs (and other contaminants) (p. 26).

(b) According to Dr. Lisa Williams of the United States Fish and Wildlife Service, PCB congeners with dioxin-like activity have been found in Arochlor mixtures (September 19, 1994 conversation record prepared by Sue Brauer of U.S. EPA). As stated in 1994 dioxin reassessment documents, the toxicity of dioxin-like compounds (including PCBs with 4 or more chlorine atoms with just 1 or no substitution in the ortho position, i.e., co-planar PCBs) are expressed as 2,3,7,8-TCDD equivalents. During a September 19, 1994 science briefing in U.S. EPA Region 5 offices, Dr. Linda Birnbaum of U.S. EPA's Office of Research and Development identified these effects of 2,3,7,8-TCDD (the most toxic of the dioxin family of compounds): death, wasting syndrome, thymic atropny, splenic atrophy, testicular atrophy, liver effects, hyperplasia, squamous metaplasia, chloracne, developmental/reproductive effects, carcinogenesis, immunosuppression, enzyme induction, and biochemical effects.

(c) According to Quality Criteria for Water 1986, bioconcentration values for cadmium in fresh water range from 164 to 4,190 for invertebrates and from 3 to 2,213 for fishes. Freshwater acute toxicity values range from 1.0 ug/L for rainbow trout to 28,000 ug/L for a mayfly, and chronic toxicity values range from 0.15 ug/L to 156 ug/L

(d) Mercury

(i) Water Quality Criteria 1986 provides acute sensitivities and chronic effects levels on the order of less than 1 ug/L (chronic exposures to methylmercury) to 1,000 ug/L mercury (acute value of mercury (II) for 1 species). A bioconcentration factor of 4,994 is available for mercury (II), but the bioconcentration factors for methylmercury range from 4,000 to 85,000.

(ii) There is increasing evidence that mercury in the environment is persistent and mercury can bioaccumulate in aquatic species and terrestrial species, and thereby become available in the human food chain. This form of environmental processing makes methyl mercury available for human exposure. The most important form of mercury in terms of toxicity is methyl mercury. Toxicity can occur through chronic oral exposure such as through methyl mercury contaminated fish. The major human health effects are neurotoxicity in adults and psychomotor retardation in infants exposed prenatally (Mangino, October 1994).

(e) According to the Quality Criteria for Water 1986, the available data for phenol indicate that acute and chronic toxicity to certain freshwater aquatic life species occurs at concentrations as low as 10,200 and 2,560 ug/L, respectively, and would occur at lower concentrations among species that are more sensitive than those tested.

(4) As noted by an Office of RCRA Toxicologist in a literature review (Mangino, October 1994), some of the constituents documented as releases in this Order (e.g., 2-4-dimethylphenol, 1,1,1-trichloroethane, 1,2,4-trichlorobenzene, methylene chloride, and trichloroethylene) cause adverse health effects in mammals (e.g., liver tumors and other liver disease). When the effects of direct human exposure to a given chemical are unknown, studies in mammalian species are used to assess potential human health effects.

(5) Concentrations of antimony causing toxicity to algae and the ambient water criteria for the protection of human health from the toxic properties of antimony ingested through water and contaminated aquatic organisms are on the order of hundreds of ug/L (Quality Criteria for Water 1986).

(6) As discussed in Quality Criteria for Water 1986, the aqueous chemistry of arsenic is complex, and relative toxicities of the various forms of arsenic vary from species to species. In humans, arsenic may cause neurotoxicity, lung tumors, and skin cancer (Mangino, October 1994).

(7) Water Quality Criteria 1986 provides acute sensitivities and chronic effects levels on the order of hundreds of ug/L of lead. Lead bioconcentration factors are available for a total of six species and range from 42 to 1700. According to Office of RCRA Toxicologist Mario Mangino (October 1994), exposure to lead in humans is a concern primarily because of its potential to induce neurological, neurobehavioral, and developmental effects.

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Children are much more sensitive to the effects of lead exposure than adults, and recent evidence indicates that the potential for adverse effects from lead exposure can begin at a very early age. The most sensitive effect of lead exposure in the adult population is a contribution to the development of hypertension.

(8) According to the Quality Criteria for Water 1986, the available data for trichloroethylene indicate that acute toxicity to freshwater aquatic life occurs at concentrations as low as 45,000 ug/L and would occur at lower concentrations among species that are more sensitive than those tested.

(9) At low levels, other hazardous constituents identified in Section V have adverse health effects (Mangino, October 1994).

Q. Pathways of Migration

Hazardous wastes or hazardous constituents may further migrate from the Facility into the environment by the following pathways:

(1) Due to the historic releases detailed in section V.Q.(9) above and ongoing management at the Facility of solid wastes, the entire Facility may be contaminated (e.g., by foundry air emissions and fugitive dust emissions during slag management). Hazardous wastes and constituents may be spread further, beyond the Facility boundaries, due to wind dispersal and past and ongoing waste management practices at the Facility.

(2) Surface water discharges from the Facility resulted in direct discharges to the Saginaw River, as described in Sections V.Q.(2), (3), (4), and (10)(c). Pages 33 to 48 of "Saginaw and Pine Rivers In-Place Pollutants Study Final Report" (December 1983, East

Central Michigan Planning and Development Region) discuss the concentration of PCBs and heavy metals in Saginaw River sediments and the relationship of these concentrations to outfalls of known former dischargers, including Respondent. The Saginaw River may act as a reservoir of hazardous constituents due to the binding of hazardous constituents to sediments.

(3) Releases of hazardous waste constituents from HWMUs, SWMUs, and/or AOCs may migrate through the subsurface to surface water which discharges to the Saginaw River and to ground water, which may eventually naturally discharge to the Saginaw River. Although discharge from outfall 002 to the Saginaw River is reportedly blocked, releases such as those described in Section V.O.(5) potentially could eventually reach the River (e.g., as a result of overland flow at flood stage or by ground water flow to surface water). Releases identified in Sections V.O.(1), (9), (10)(a)-(b), and (11) may potentially migrate along ground water and surface water pathways.

(4) Releases described in sections V.O.(6)-(8) may migrate from ground water to surface water or may remain in ground water and flow off-site.

(5) Sewer systems (e.g., stormwater, sanitary, process), utility conduits, and drainage tile lines may provide enhanced subsurface migration pathways both on-site and beyond Facility boundaries.

R. Receptors

Releases from the Facility may migrate toward receptors in the Saginaw River, including recreational users (both fishing and boating were observed on

July 19, 1994 by Sue Brauer of U.S. EPA), consumers of public drinking water supplies, and aquatic organisms and subsequent consumers of them (e.g., humans, bald eagles). Releases from the Facility may also migrate toward receptors at Crow Island State Game Area, located on the east bank of the Saginaw River approximately 2 miles north of the Facility. Urban, residential Saginaw borders the Facility to the south; children could conceivably bicycle to a broken Facility gate (on July 19, 1994, a Facility gate on Hack Road was observed to be broken) and gain access to the Facility, possibly exposing themselves to hazardous constituents. On-site deer could ingest hazardous constituents. Respondent identified 26 homes supplied with well water to the northwest of the intersection of Washington Road and Outer Drive (south of the Modular Iron Casting Plant and east of the Saginaw Grey Iron Casting Plant) in Respondent's November 17, 1980 Part A RCRA permit application.

VI. U.S. EPA'S CONCLUSIONS OF LAW AND DETERMINATIONS

Based on the Findings of Fact set out above and the Administrative Record, the Director of the Waste Management Division, U.S. EPA, Region V, has made the following conclusions of law and determinations:

A. Respondent is a "person" within the meaning of Section 1004(15) of RCRA, 42 U.S.C. §6903(15).

B. Respondent is the owner or operator of a facility that has operated and is operating under interim status subject to Section 3005(e) of RCRA, 42 U.S.C. §6925(e).

C. Certain wastes and waste constituents found at the Facility are hazardous wastes or hazardous constituents as defined by Section 1004(5) of RCRA, 42 U.S.C. §6903(5). These are also hazardous wastes or hazardous

constituents within the meaning of Section 3001 of RCRA, 42 U.S.C. §6921, and 40 CFR Part 261.

D. There is or has been a release of hazardous wastes or hazardous constituents into the environment from Respondent's Facility.

E. The actions required by this Order are necessary to protect human health and welfare and the environment.

VII. WORK TO BE PERFORMED

Pursuant to Section 3008(h) of RCRA, 42 U.S.C. §6928(h), Respondent is hereby ordered to perform the following acts in the manner and by the dates specified herein. All work undertaken pursuant to this Order shall be performed in a manner consistent with, at a minimum: the attached Scopes of Work and model Quality Assurance Project Plan (Attachment IV), unless Respondent demonstrates to U.S. EPA that specific facts, circumstances, or conditions at the Facility make one or more specified provisions of a Scope of Work or Attachment IV inapplicable to the Facility; the U.S. EPA-approved Interim Measures (IM) Workplan and Report, RCRA Facility Investigation (RFI) Workplan and Report, Corrective Measures Study (CMS) Workplan and Report, and all other Workplans; RCRA and its implementing regulations; and applicable portions of U.S. EPA guidance documents. Guidance may include, but is not limited to, documents listed in Attachment I to this Order, which are incorporated by reference as if fully set forth herein. Guidance shall be applied in accordance with applicable principles of law.

A. INTERIM MEASURES (IM) / STABILIZATION

Interim measures, including stabilization, may be required consistent with the provisions of the introductory paragraph of this Section (Section VII)

relating to the application of Scopes of Work, Attachment IV, and guidances, and with Section IV. Statement of Purpose.

(1) Respondent shall evaluate available data and assess the need for interim measures, including stabilization, in addition to those specifically required by this Order.

(2) Respondent shall submit a Description of Current Conditions Report to EPA in accordance with Section VII.B: Work to be Performed, RCRA Facility Investigation. The Description of Current Conditions Report shall contain an assessment of previously implemented interim measures. The assessment must evaluate other interim measures alternatives that could be implemented at the Facility and identify any new data needed for making decisions on stabilization. EPA will review the Description of Current Conditions Report and notify Respondent in writing of EPA's approval/disapproval or modification in accordance with Section IX of this Order: Agency Approvals/Additional Work. EPA shall determine if additional data or information shall be collected. EPA will review Respondent's data and assessment and other information available to EPA and, if appropriate, will select one or more appropriate interim measures which Respondent shall perform. If deemed appropriate by EPA, such selection may be deferred until additional data is collected.

(3) In the event Respondent identifies an immediate threat to human health and/or the environment, Respondent shall take the actions outlined in subparagraphs (a) and (b) below. In the event that Respondent, after the DOCC is submitted, receives a permit

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authorizing new releases of hazardous waste or hazardous ccnstituents, Respondent shall summarize such permit in the next monthly report. In the event Respondent discovers new releases of hazardous waste and/or hazardous constituents for which it has not received a permit, or discovers new SWMUs or HWMUs not previously identified, Respondent shall take the actions outlined below.

(a) Respondent shall notify the EPA Project Coordinator orally within 48 hours of identification or discovery and in writing within fourteen (14) days of such discovery summarizing the immediacy and magnitude of the potential threat(s) to human health and/or the environment.

(b) Within 30 days of receiving written request from EPA, Respondent shall submit to EPA an IM Workplan prepared in accordance with the IM Scope of Work (appended to Attachment II). The IM workplan shall identify interim measures which will mitigate the immediate threat or achieve stabilization. The IM workplan is subject to approval, disapproval, and modification by U.S. EPA in acc dance with Section IX of his Order. Where the cost of the IM, including stabilization, is reasonably estimated to exceed $125,000, Respondent shall be entitled to dispute resolution under Section IX. If EPA dete nes that immediate action is required, the EPA Project Coordinator may orally authorize Respondent to act prior to EPA's receipt of the IM Workplan.

(4) If EPA identifies an immediate threat to human health and/or the environment, discovers new releases of hazardous waste and/or

hazardous constituents, or discovers new SWMUs or HWMUs not previously identified, EPA will notify Respondent in writing. Within 30 days of receiving a written request from U.S. EPA, Respondent shall submit to EPA an IM Workplan in accordance with the IM Scope of Work (appended to Attachment II). The IM workplan shall identify interim measures which will mitigate the immediate threat or achieve stabilization. The IM workplan is subject to approval, disapproval, and modification by U.S. EPA in accordance with Section IX of this Order. Where the cost of the IM, including stabilization, is reasonably estimated to exceed $125,000, Respondent shall be entitled to dispute resolution under Section IX. If EPA determines that immediate action is required, the EPA Project Coordinator may orally require Respondent to act prior to Respondent's receipt of the EPA's written notification.

(5) All IM Workplans shall ensure that the interim measures are designed to mitigate immediate or potential threat(s) to human health and/or the environment and that the interim measures are consistent with the objectives of, and contribute to the performance of, any long-term remedy which may be required at the Facility (to the extent foreseeable).

(6) In accordance with Attachment II herein, each IM Workplan shall (unless specifically waived in writing by the U.S. EPA Project Coordinator) include the following sections:

Interim Measures Objectives
Public Involvement Plan
Data Collection Quality Assurance
Data Management
Design Plans and Specifications
Operation and Maintenance

Project Schedule
Interim Measure Construction Quality Assurance
Reporting Requirements

To the extent that the requirements for a Public Involvement Plan, Data Collection Quality Assurance, and Data Management have been addressed in approved RFI plans, the IM Workplan may incorporate by reference previously approved plans.

(7) Concurrent with the submission of an IM Workplan, Respondent shall submit to EPA a Health and Safety Plan in accordance with Appendix A to Attachment II of this Order.

(8) Following U.S. EPA approval of the IM Workplan, Respondent shall provide IM progress reports on the date specified in the U.S. EPA-approved IM Workplan.

(9) Respondent shall provide Interim Measures Reports to U.S. EPA for approval in accordance with the U.S. EPA-approved IM workplan (due date specified therein) and the Appendices to Attachment II. EPA will review the IM submittals and notify Respondent in writing of U.S. EPA's approval, disapproval, or modification in accordance with Section IX of this Order.

B. RCRA FACILITY INVESTIGATION (RFI)

Respondent shall perform the following actions at the Facility as provided by the provisions of the introductory paragraph of this Section (Section VII) relating to the application of Scopes of Work, Attachment IV, and guidances, and with Section IV. Statement of Purpose.

(1) Within forty-five (45) days of the effective date of this Order, Respondent shall submit to U.S. EPA a Description of Current Conditions Report for the Facility. The Description of Current

Conditions Report is subject to approval by U.S. EPA in accordance with Section IX: Agency Approvals/Proposed Contractor/Additional Work and shall be developed in a manner consistent with Task I in the RFI Scope of Work appended to this Order as Attachment II.

(2) Within one hundred twenty (120) days of the effective date of this Order, Respondent shall submit to U.S. EPA a workplan for a RCRA Facility Investigation (RFI Workplan). The RFI Workplan is subject to approval by EPA in accordance with Section IX: Agency Approvals/Proposed Contractor/Additional Work and shall be developed to describe how RFI tasks in Attachment II will be performed.

(3) The RFI Workplan shall detail the methodology Respondent shall use to: (i) gather data needed to make decisions on stabilization during the early phase of the RFI; (ii) identify and characterize all sources of contamination; (iii) define the degree and extent of contamination; (iv) characterize the potential pathways of contaminant migration; (v) identify actual or potential human and ecological receptors; and (vi) support the development of alternatives from which one or more corrective measures may be selected by U.S. EPA. Respondent shall conduct human health and ecological risk assessments to support the development of corrective measures alternatives. A specific schedule for implementation of all activities identified in Tasks II through VI (except task III. D, Health and Safety Plan) in the RFI Scope of Work (Attachment II) shall be included in the RFI Workplan. This schedule may include phases of investigation (e.g., investigation

of the Facility and investigation of off-site releases as separate phases), but all phases of the investigation must be scoped in sufficient detail to develop adequate data quality objectives for the quality assurance project plan.

(4) In accordance with the provisions of Attachment II herein, the RFI Workplan shall incorporate the following sections:

Project Management Plan (RFI Task III.A)
Quality Assurance Project Plan (Attachment IV to this Order, as referenced in RFI Task III.B)
Data Management Plan (RFI Task III.C)
Public Involvement Plan (RFI Task III.E)

(5) Concurrent with the submission of an RFI Workplan, Respondent shall submit to U.S. EPA a Health and Safety Plan in accordance with Task III.D of Attachment II of this Order. If workplans for both an IM and a RFI are required by this Order, Respondent may submit a single Health and Safety Plan that addresses the combined IM and RFI activities.

(6) Following U.S. EPA's approval of the RFI Workplan, Respondent shall submit monthly progress reports by the date specified in the U.S. EPA-approved schedule in the RFI Workplan.

(7) Respondent shall conduct an RFI consistent with the U.S. EPA-approved RFI Workplan.

(8) Respondent shall submit an RFI Report for approval in accordance with the EPA-approved RFI Workplan schedule. EPA will review the RFI Report and notify Respondent in writing of U.S. EPA's approval/disapproval, or modification in accordance with Section IX of this Order: Agency Approvals/Proposed Contractor/Additional

Work. If required, Respondent shall submit a revised RFI Report by the due date specified in U.S. EPA's written notice.

C. CORRECTIVE MEASURES STUDY (CMS)

Respondent shall perform the following actions at the Facility as provided by the provisions of the introductory paragraph of this Section (Section VII) relating to the application of the Scopes of Work, Attachment IV, and guidances, and with Section IV. Statement of Purpose.

(1) Within 10 (ten) days of Respondent's receipt of EPA's approval of the final RFI Report (or Respondent's receipt of a written request from EPA), Respondent shall submit a CMS Workplan to EPA. The CMS Workplan is subject to approval by U.S. EPA in accordance with Section IX: Agency Approvals/Proposed Contractor/Additional Work and shall be developed in a manner consistent with Section I of the CMS SOW (Attachment III to this Order) and to describe how Section II of the CMS SOW will be performed.

(a) The CMS Workplan shall provide, at a minimum, the elements identified in Section I of the CMS SOW.

(b) The CMS Workplan shall include, at a minimum, a summary of the proposed treatability study and conceptual design and a schedule for submitting the treatability study workplan or Respondent's justification for not proposing a treatability study. Respondent shall prepare treatability studies for all potential corrective measures that involve treatment except where Respondent can demonstrate to U.S. EPA's reasonable satisfaction that they are not needed.

(2) Following approval of the CMS Workplan, Respondent shall provide monthly progress reports in accordance with Section II[illegible] f the CMS SOW, Attachment III to this Order, and in accordance with the monthly due date specified in the U.S. EPA-approved CMS Workplan.

(3) Respondent shall c[illegible]uct a CMS consistent with the U.S. EPA-approved CMS Workplan and Section II of the CMS SOW, Attachment III to this Order

(4) Respondent shall submit a CMS report to U.S. EPA for approval in accordance with the U.S. [illegible]A-approved CMS Workplan schedule. The CMS Report shall contain, at a minimum, each of these elements:

Introduction and Corrective Action Objectives
Description of Current Conditions
Media Cleanup Stand[illegible]s
Identification, Scre[illegible]ing, and Development of Corrective Measures Alternatives
Evaluation of One or More Screened Corrective Measure Alternatives
Recommendation by Respondent for a Final Corrective Measure Alternative
Public Involvement Plan

U.S. EPA will review the CMS Report and notify Respondent in writing of U.S. EPA's approval, disapproval [illegible]r modification in accordance with Section IX: Agency Approvals/Proposed Contractor/Additional Work. Following the approval process detailed in Section IX of this Order, the CMS Report will be made available for public comment, as provided by Section X of this Order.

(5) In accordance with Section X: Public Participation, EPA will provide the public with an opportunity to submit written and/or oral comments and an opportunity for a public meeting regarding

EPA's proposed cleanup standards and the corrective action remedy initially selected by U.S. EPA for the Facility.

(6) Respondent shall prepare a revised CMS Report as required by U.S. EPA following the public comment period, as set forth in Section X of this Order. Respondent may be required to perform additional work (see Section IX of this Order) on the CMS prior to submitting a final CMS Report.

D. CORRECTIVE MEASURES IMPLEMENTATION (CMI)

After selection by EPA of one or more corrective measure(s), EPA may provide Respondent with an opportunity to negotiate an Administrative Order on Consent for implementation of such corrective measure(s). Nothing in this provision shall limit EPA's authority to require that the selected corrective measures be implemented by Respondent or to take any other appropriate legal action under RCRA, CERCLA, or any other legal authority, including issuance of a Unilateral Administrative Order or the filing of a civil action seeking a judicial order directing Respondent to implement the selected corrective measure(s).

VIII. QUALITY ASSURANCE

Throughout all sample collection and analysis activities, Respondent shall use U.S. EPA-approved quality assurance, quality control, and chain-of-custody procedures as specified in the approved Workplans. In addition, Respondent shall:

A. Ensure that the laboratories to be used in implementing the IM, RFI, and CMS workplans are selected prior to submittal of the respective workplan(s). After Respondent's submittal of the respective workplan(s),

Respondent shall not substitute the identified laboratory (or its location) without prior written approval by U.S. EPA.

B. Ensure that laboratories used by Respondent for analyses shall perform such analyses according to U.S. EPA methods included in "Test Methods for Evaluating Solid Waste" (SW-846, Third Edition - November 1986 and subsequent updates) or other methods deemed satisfactory to U.S. EPA. If methods other than U.S. EPA methods are to be used, Respondent shall submit all protocols to be used for analyses to U.S. EPA upon submittal of the respective workplans/QAPjPs.

C. Ensure that laboratories used by Respondent for analyses participate in a quality assurance/quality control program equivalent to that which is followed by U.S. EPA. As part of such a program, and upon request by U.S. EPA, such laboratories shall perform analyses of samples provided by U.S. EPA to demonstrate the quality of the analytical data.

D. Respondent shall identify in writing the laboratory to be used for the RFI to the U.S. EPA Project Coordinator within 60 days of this Order becoming final.

E. To the extent that existing data is submitted by Respondent within ninety (90) days of the effective date of this Order and is validated by EPA (using National Functional Guidelines), Respondent may use such validated existing data in completing the Investigation Analysis and Reports (Tasks V and VI of the RFI SOW, Attachment II of this Order) without restriction. To the extent that existing data is supplemented and verified during performance of the Facility Investigation (Task IV of the RFI SOW, Attachment II of this Order), U.S. EPA may approve use of such supplemented and verified data in completing the Investigation Analysis and Reports (Tasks V and VI of the RFI

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SOW, Attachment II of this Order), provided Respondent distinguishes such supplemented and verified existing data from data produced in compliance with the U.S. EPA-approved QAPjP for this Order and from validated existing data. Respondent shall not use existing data submitted with the Description of Current Conditions Report that is (1) not validated by EPA or (2) not supplemented and verified during performance of the Facility Investigation (Task IV of the RFI SOW, Attachment II of this Order) in completion of the Investigation Analysis and Reports (Tasks V and VI of the RFI SOW, Attachment II of this Order).

IX. AGENCY APPROVALS/PROPOSED CONTRACTOR/ADDITIONAL WORK/DISPUTE RESOLUTION

A. EPA APPROVALS

(1) EPA will provide Respondent with its written approval, approval with conditions and/or modifications, disapproval, or disapproval with comments, for any workplan, report (except progress reports), specification, or schedule submitted pursuant to or required by this Order. EPA will provide a statement of reasons for any approval with conditions and/or modifications, disapproval or disapproval with comments.

(2) Respondent shall revise any workplan, report, specification, or schedule in accordance with EPA's written comments. Respondent shall submit to U.S. EPA any revised submittals in accordance with the due date specified by U.S. EPA. Revised submittals are subject to U.S. EPA approval, approval with conditions and/or modifications, disapproval, or disapproval with comments.