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PRELIMINARY ASSESSMENT/ VISUAL SITE INSPECTION

GENERAL MOTORS CORPORATION (GM) POWERTRAIN DIVISION ROMULUS ENGINE OPERATIONS (Formerly GM Chevrolet-Pontiac-Canada Group, Romulus Engine Operations) Romulus, Michigan MID 000 809 905

FINAL REPORT

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Waste Programs Enforcement
Washington, DC 20460

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1.0 INTRODUCTION

PRC Environmental Management, Inc. (PRC), received Work Assignment No. C05087 from the U.S. Environmental Protection Agency (EPA) under Contract No. 68-W9-0006 (TES 9) to conduct preliminary assessments (PA) and visual site inspections (VSI) of hazardous waste treatment and storage facilities in Region 5.

As part of the EPA Region 5 Environmental Priorities Initiative, the RCRA and CERCLA programs are working together to identify and address RCRA facilities that have a high priority for corrective action using applicable RCRA and CERCLA authorities. The PA/VSI is the first step in the process of prioritizing facilities for corrective action. Through the PA/VSI process, enough information is obtained to characterize a facility's actual or potential releases to the environment from solid waste management units (SWMU) and areas of concern (AOC).

A SWMU is defined as any discernible unit at a RCRA facility in which solid wastes have been placed and from which hazardous constituents might migrate, regardless of whether the unit was intended to manage solid or hazardous waste.

The SWMU definition includes the following:

- RCRA-regulated units, such as container storage areas, tanks, surface impoundments, waste piles, land treatment units, landfills, incinerators, and underground injection wells
- Closed and abandoned units
- Recycling units, wastewater treatment units, and other units that EPA has generally exempted from standards applicable to hazardous waste management units
- Areas contaminated by routine and systematic releases of wastes or hazardous constituents. Such areas might include a wood preservative drippage area, a loading-unloading area, or an area where solvent used to wash large parts has continually dripped onto soils.

An AOC is defined as any area where a release to the environment of hazardous waste or constituents has occurred or is suspected to have occurred on a nonroutine and nonsystematic basis. This includes any area where such a release in the future is judged to be a strong possibility.

The purpose of the PA is as follows:

- Identify SWMUs and AOCs at the facility.
- Obtain information on the operational history of the facility.
- Obtain information on releases from any units at the facility.
- Identify data gaps and other informational needs to be filled during the VSI.

The PA generally includes review of all relevant documents and files located at state offices and at the EPA Region 5 office in Chicago.

The purpose of the VSI is as follows:

- Identify SWMUs and AOCs not discovered during the PA.
- Identify releases not discovered during the PA.
- Provide a specific description of the environmental setting.
- Provide information on release pathways and the potential for releases to each medium.
- Confirm information obtained during the PA regarding operations, SWMUs, AOCs, and releases.

The VSI includes interviewing appropriate facility staff, inspecting the entire facility to identify all SWMUs and AOCs, photographing all visible SWMUs, identifying evidence of releases, initially identifying potential sampling parameters and locations, if needed, and obtaining all information necessary to complete the PA/VSI report.

This report documents the results of a PA/VSI of the General Motors Corporation Powertrain Division, Romulus Engine Operations (GM Romulus) facility in Romulus, Michigan. The PA was completed on January 21, 1992. PRC gathered and reviewed information from the Michigan Department of Natural Resources (MDNR), Federal Emergency Management Agency, U.S. Geologic Survey, Soil Conservation Service, and from EPA Region 5 RCRA files. The VSI was conducted on January 30, 1992. It included interviews with GM Romulus facility representatives and a walk-through inspection of the facility. Seven SWMUs and two AOCs were identified at the facility.

PRC completed EPA Form 2070-12 using information gathered during the PA/VSI. This form is included in Attachment A. The VSI is summarized and 16 inspection photographs are included in Attachment B. Field notes from the VSI are included in Attachment C.

2.0 FACILITY DESCRIPTION

This section describes the facility's location, past and present operations (including waste management practices), waste generating processes, history of documented releases, regulatory history, environmental setting, and receptors.

2.1 FACILITY LOCATION

The GM Romulus facility is located at 36880 Ecorse Road in Romulus, Wayne County, Michigan (latitude 42° 15' 57" N and longitude 83° 24' 14" W), as shown in Figure 1. The facility occupies about 120 acres in a mixed use area.

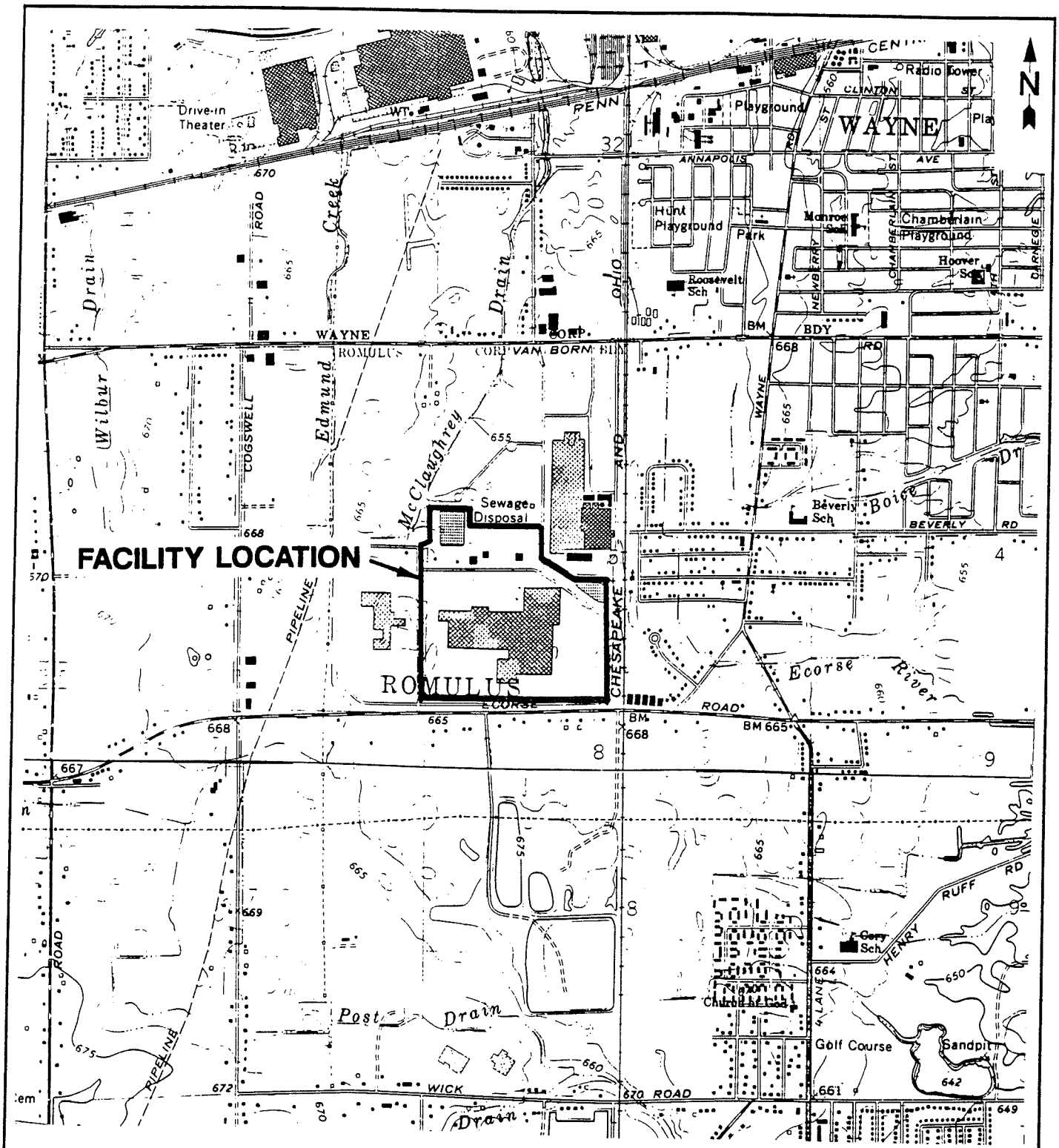
The GM Romulus facility is located within the General Motors Corporation Powertrain Division, Romulus Engine Operations complex. The facility is bordered on the north by undeveloped land and the GM Service Parts operations, on the west by the GM Engineering Center, on the south by residences and a closed landfill, and on the east by a railroad, a manufacturer, and residences.

2.2 FACILITY OPERATIONS

Prior to 1975, the facility property was an undeveloped woodland with a concrete aircraft runway that extended between the two storm water retention pond locations (GM Romulus, 1992c). The GM Romulus facility was built by General Motors Corporation (GM) in 1975 to house the GM Detroit Diesel Allison facility. GM built an addition in 1979, to double parts production for a new 8.2-liter engine. In April 1986, the facility was renamed the GM Chevrolet - Pontiac - Canada Group (GM CPC) and stopped producing parts for a 4.6-liter engine. In 1990, GM renamed the facility the GM Powertrain Division, Romulus Engine Operations and ceased assembly of the 8.2-liter engine.

The GM Romulus facility employs about 1,165 people operating on two shifts and houses the manufacturing operations within the GM Powertrain Division - Romulus Operations Complex. The facility consists of a 500,000 square-foot manufacturing building, 500,000 square feet of facility parking lots, two retention ponds with a holding capacity of 19.5 million gallons, a wastewater treatment plant (WTP) averaging an annual discharge of 119 million gallons, several smaller storage buildings, and a powerhouse.

The facility manufactures and assembles engines and parts for automobiles. Engine parts are manufactured from iron, steel, and aluminum sheets. These sheets are cut to specifications



SCALE 1:24,000

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

SCALE: 1" = 2,000'

GM—POWERTRAIN DIVISION,
ROMULUS ENGINE OPERATIONS
ROMULUS, MICHIGAN

FIGURE 1

FACILITY LOCATION

PRC ENVIRONMENTAL MANAGEMENT, INC.

SOURCE: MODIFIED FROM USGS, 1973 AND 1980

GMCPOWER.DWG — 4/3/92 — MLB

by automatic and manual lathes, and other cutting machines. Once cutting is completed, engine parts are cleaned in a mineral spirits cleaning sink. After cleaning, some parts are painted in a spray paint booth and dried. Parts are then assembled into engines and packaged for transport to other GM divisions.

Facility operations also include a component testing laboratory and the WTP (SWMU 5). Wastewater from the wet machining process, the powerhouse, and the GM Engineering Center feed into the WTP (SWMU 5) by a system of overhead and underground pipes. Portable tank carts also transport wastes to the WTP (SWMU 5).

Two AOCs were identified at the facility. Sixteen underground storage tanks (USTs) were removed during 1990 and 1991. The removal areas are undergoing closure. Facility representatives said the closure report was not finished. No details of the removal were available except for one documented release. The UST Removal Areas comprise AOC 1. The area of the documented release is AOC 2.

The release occurred November 1, 1991. Facility personnel were preparing a UST for removal by pumping out the oil contents through a system of overhead pipes. An overhead pipe burst and spilled about 2,000 gallons of 15W40 crankcase oil onto a roadway and unpaved ground surface. The facility cleaned and removed of 30 cubic yards of contaminated soil. Facility representatives said the soil testing showed the soil was nonhazardous.

The facility has a total of seven SWMUs:

- A maintenance paint shop used to accumulate spent solvents and off-specification paints
- A hazardous waste storage area used prior to 1991 to stored hazardous wastes and used currently to accumulate paint sludge
- Grinding sludge and refuse gondolas used to accumulate grinding sludge and spent filters from the cutting processes
- An iron and steel scrap accumulation area used to accumulate iron and steel scrap from the cutting processes
- A wastewater treatment plant used to accumulate wastewater and waste oil from manufacturing, powerhouse, and Engineering Center wastes
- Aluminum scrap gondolas used to accumulate aluminum scrap from the cutting processes
- A chip house used prior to 1990 to accumulate iron, steel, and aluminum scrap and grinding sludge

Table 1 lists the SWMUs identified at the facility. Figures 2 and 3 show the layout and the locations of each SWMU and AOC.

2.3 WASTE GENERATING PROCESSES

The GM Romulus facility has six primary waste generating processes: (1) cutting of cast iron and steel, (2) cutting of aluminum, (3) parts cleaning, (4) paint hood cleaning, (5) wastewater pretreating, and (6) repairing and maintaining of equipment. These processes generate the following wastes: spent cutting fluids (nonhazardous), grinding sludge-filter refuse (nonhazardous), iron and steel scrap (nonhazardous), aluminum scrap (nonhazardous), filter refuse (nonhazardous), spent mineral spirits (D001), paint sludge (nonhazardous), waste oil (nonhazardous), wastewater (nonhazardous), spent solvent mixtures (F003, F005), and off-specification paint (D001).

Maintenance and renovation activities also periodically generate wastes, including polychlorinated biphenyl (PCB) waste, oil sludge-sulfuric acid (D002), gasoline and diesel fuel (D001), waste oil-freon (F002), dye waste-diesel fuel (D006), and acid-aluminum sludge (D002). In addition, several processes that generated hazardous waste have either been changed or phased out. Each waste process is discussed below. Table 2 lists the wastes the facility generates routinely. Generation rates are based on 1991 waste generation data, unless specified otherwise.

The cutting processes consist of cutting sheets and forms of cast iron and steel using automatic and manual lathes. These processes generate spent cutting fluids, grinding sludge-filter refuse, and iron and steel scrap.

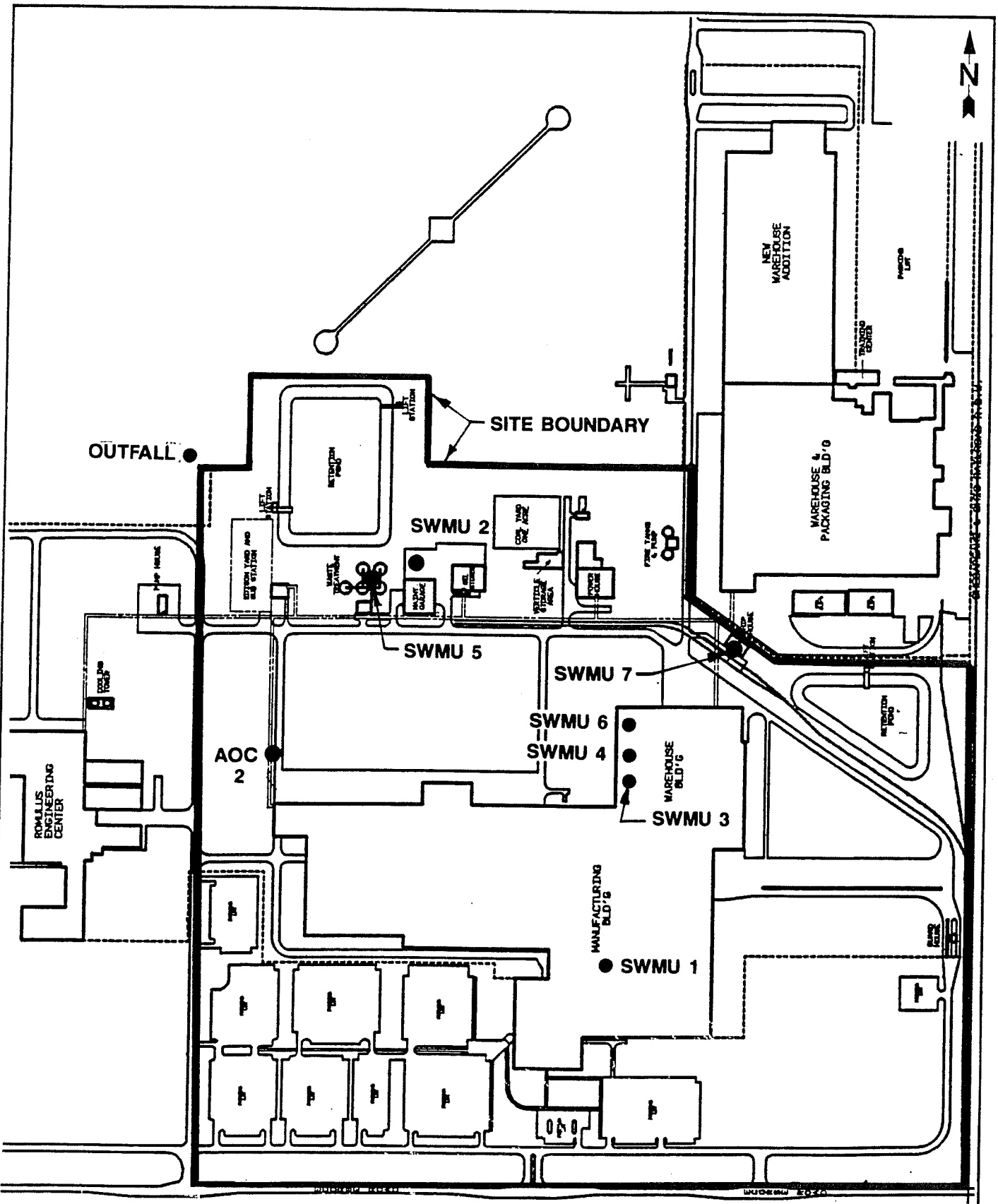
During the cutting process, a stream of cutting fluid is sprayed onto the cutting area to act as a coolant and lubricant. The cutting fluid then drips off the cutter and part, onto and through a drag-out filter, and into a recirculating conveyor. The recirculating conveyor feeds the fluid back into the spraying stream for reuse. When a supply of cutting fluid in a machine becomes ineffective, the spent fluid is removed and replaced with new fluid. A hydraulic piping system pumps the spent fluid out of the machine and sends it to the WTP (SWMU 5), or portable tanks on mobile carts (sludge kings) vacuum the spent fluid out of the machine and transport it to the WTP (SWMU 5).

TABLE 1
SOLID WASTE MANAGEMENT UNITS (SWMU)

SWMU Number	SWMU Name	RCRA Hazardous Waste Management Unit*	Status
1	Maintenance Paint Shop	No	Active
2	Hazardous Waste Storage Area	Yes	Active
3	Grinding Sludge and Refuse Gondola	No	Active
4	Iron and Steel Scrap Accumulation Area	No	Active
5	Wastewater Treatment Plant	No	Active
6	Aluminum Scrap Gondola	No	Active
7	Chip House	No	Inactive

Note:

* A RCRA hazardous waste management unit is one that currently requires or formerly required submittal of a RCRA Part A or Part B permit application.



GM-POWERTRAIN DIVISION,
ROMULUS ENGINE OPERATIONS
ROMULUS, MICHIGAN

FIGURE 2

FACILITY LAYOUT

PRC ENVIRONMENTAL MANAGEMENT, INC.

SOURCE: MODIFIED FROM ROMULUS ENGINE OPERATIONS-ROMULUS PLANT SKETCH RECEIVED BY PRC JANUARY 30, 1992

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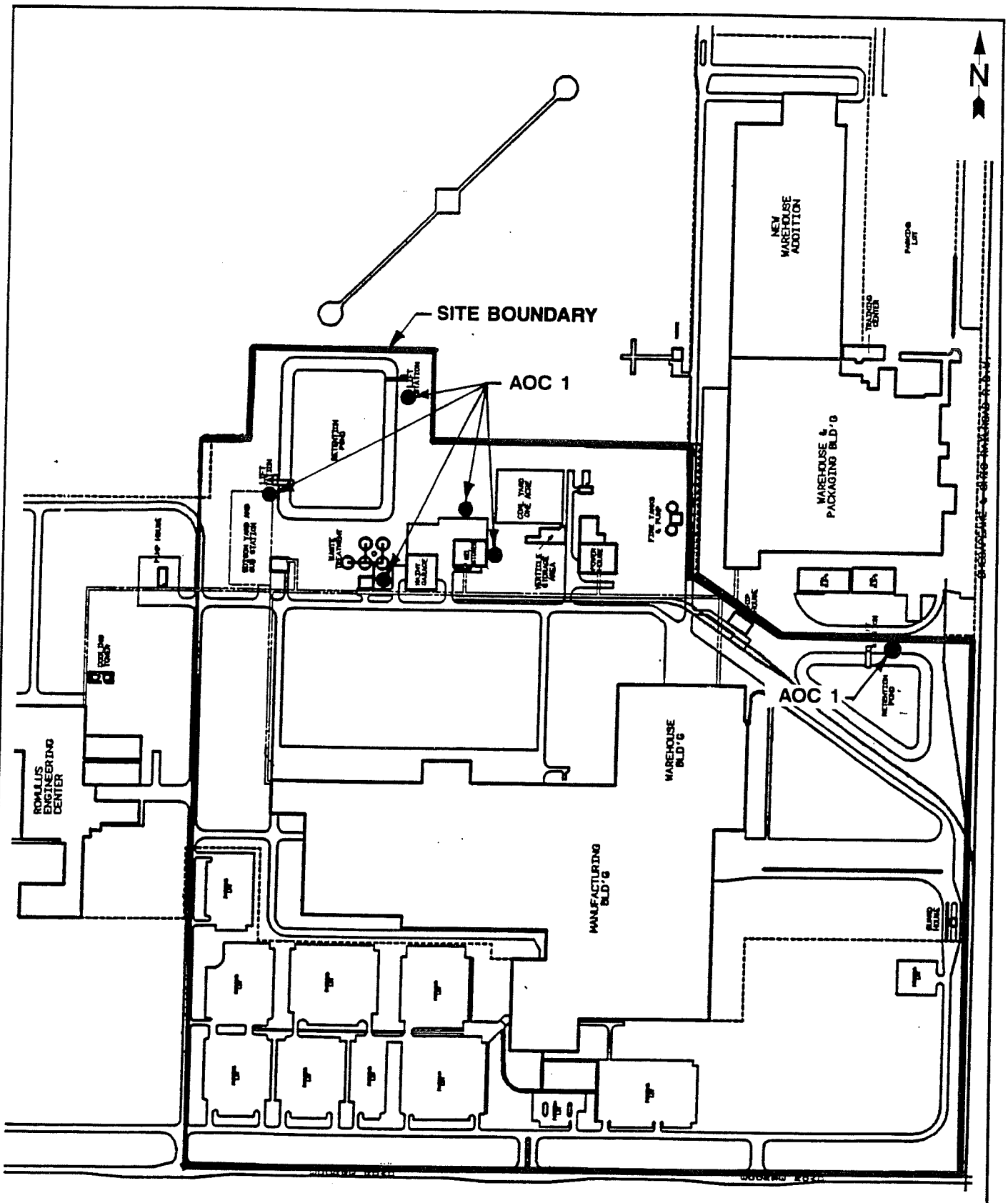

GM—POWERTRAIN DIVISION,
ROMULUS ENGINE OPERATIONS
ROMULUS, MICHIGAN

FIGURE 3

UNDERGROUND STORAGE TANK
REMOVAL LOCATIONS (AOC 1)

SOURCE: MODIFIED FROM ROMULUS ENGINE OPERATIONS—ROMULUS PLANT SKETCH RECEIVED BY PRC JANUARY 30, 1992

PRC ENVIRONMENTAL MANAGEMENT, INC.

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TABLE 2
SOLID WASTES

Waste/EPA Waste Code	Source	Primary Management Unit*
Spent cutting fluids/NA**	Cutting of cast iron, steel, and aluminum	5, 7
Grinding sludge-filter refuse/NA	Cutting of cast iron and steel	3, 7
Iron and steel scrap/NA	Cutting of cast iron and steel	4, 7
Aluminum scrap/NA	Cutting of aluminum	6, 7
Filter refuse/NA	Cutting of aluminum	3
Spent mineral spirits/D001	Parts cleaning	***
Paint sludge/NA	Paint booth cleaning	2
Wastewater/NA	Wastewater treatment	5
Waste oil/NA	Wastewater treatment	5
Spent solvent mixtures/F003, F005	Maintenance cleaning and repairing	1, 2
Off-specification paint/D001	Maintenance cleaning and repairing	1, 2

Notes:

* Primary management unit refers to a SWMU that currently manages or formerly managed the waste.

** Nonapplicable (NA) designates nonhazardous waste.

*** This waste is not accumulated or stored on site. The units are serviced at the point of generation by exchanging the drums of spent mineral spirits for drums of reclaimed mineral spirits.

The drag-out filter also recovers grinding sludge-filter refuse from the cutting machines. A drag-out conveyor belt drops the grinding sludge-filter refuse into hoppers that transport these wastes to the Grinding Sludge and Refuse Gondola (SWMU 3) for accumulation. Nave, Inc., transports this waste off site. Wayne Disposal, Inc., landfill of Ypsilanti, Michigan, accepts this waste for disposal. About 20 cubic yards total of grinding sludge and filter refuse are generated weekly.

The drag-out filter also recovers iron and steel scrap from the cutting machines. The drag-out conveyor moves the iron and steel scrap into a chip ringer. The chip ringer spins the cutting fluids out of the iron and steel scrap by centrifugal force. The chip ringer then returns the cutting fluids to the cutting machines through a system of pipes. A conveyor then moves the scrap into a puffer-blower system that transports the scrap to the Iron and Steel Scrap Accumulation Area (SWMU 4). The puffer-blower system drops the scrap into accumulation piles in SWMU 4. A front loader shovels the scrap piles directly into a truck for transport off site. Both the GM Central Foundry Division in Defiance, Ohio, and in Saginaw, Michigan, accept this waste for recycling. About 20 cubic yards of iron and steel scrap are generated weekly.

Aluminum is also cut into engine parts. This process generates two nonhazardous wastes: aluminum scrap and filter refuse.

Aluminum scrap falls out of the cutting process into a 50-gallon sump. The sump is equipped with a continuous-feed paper filter. A rack pulls out the aluminum scrap and drops it into a hopper that transports it to the Aluminum Scrap Gondola (SWMU 6) for accumulation. Both the GM Central Foundry Division in Defiance, Ohio, and in Saginaw, Michigan, accept this waste for recycling. About 20 cubic yards of aluminum scrap are generated weekly.

Filter refuse also drops into a hopper that transports it to the Grinding Sludge and Refuse Gondola (SWMU 3) for accumulation. This waste is added to the grinding sludge-filter refuse from cast iron and steel cutting processes. Nave, Inc., transports this waste off site. Wayne Disposal, Inc., landfill of Ypsilanti, Michigan, accepts this waste for disposal. As stated earlier, the weekly generation rate for total grinding sludge-filter refuse is 20 cubic yards.

The parts cleaning process consists of rinsing parts with mineral spirits in a parts washer. Each parts cleaning washer drains the spent mineral spirits (D001) back into the product mineral spirits. As a result, spent mineral spirits are not accumulated as a waste but are reused. The facility has 14 parts washers. Safety-Kleen of Romulus, Michigan, services the units by exchanging each 30-gallon drum of mineral spirits mixture for one of reclaimed mineral spirits.

About 3,049 gallons of the spent mineral spirits are generated annually. Facility representatives indicated that this volume has decreased over the years and will continue to decrease.

The painting process consists of spray painting in two areas that are each equipped with an overhead ventilation hood. Airborne paint emissions are either removed by a filter or adhere to the surface of the ventilation hood. The ventilation hoods are cleaned monthly, generating paint sludge (nonhazardous) and spent filters. This waste is placed into paint sludge hoppers. After the cleaning process, the paint sludge hoppers are covered and placed in gondolas at the Hazardous Waste Storage Area (HWSA) (SWMU 2). About 15 cubic yards of paint sludge and spent filters are generated yearly and transported off site once a year. Michigan Disposal, Inc., of Belleville, Michigan, accepts this waste for disposal.

Wastewater treatment consists of aeration and biochemical processes that separate the wastewater into waste oil and wastewater (nonhazardous). The waste oil accumulates in the reclaimed oil tank at the WTP (SWMU 5). Environmental Waste Control, Inc., of Inkster, Michigan, transports and reclaims this waste oil in a fuels program or recycles it. The wastewater is discharged to the City of Romulus sewer system, which discharges to the City of Detroit's publicly owned treatment works (POTW). About 101, 471 gallons of waste oil and 119 million gallons of wastewater are generated annually.

Maintenance operations consist of cleaning and repairing equipment. These processes generate spent solvent mixtures (F003, F005) and off-specification paint (D001) that accumulate at the Maintenance Paint Shop (SWMU 1). One 55-gallon drum of spent solvent mixtures is stored inside each flammable storage cabinet in SWMU 1. In 1989, the facility generated about 1,660 gallons of spent solvent mixtures.

Paint purchased in excess of facility needs becomes off-specification paint. This waste accumulates in 1-gallon containers at SWMU 1. The annual generation rate of off-specification paint varies. In 1987, the facility generated 220 gallons of this waste. Safety-Kleen of Romulus, Michigan, transports both the spent solvent mixtures and the off-specification paint off site. Safety-Kleen of Dolton, Illinois, ultimately accepts these wastes for recycling.

Daily operations generate the wastes described above. Occasionally, facility operations generated the hazardous wastes described below.

Machinery breakdown and upgrading required removing capacitors. Facility personnel drained oil containing PCBs from the capacitors during removal and drummed it for disposal as PCB waste. In 1988, these operations generated 110 gallons of PCB waste. The HWSA (SWMU 2)

stored this waste until it was transported off site. ENSCO, Inc., of El Dorado, Arkansas, accepted this waste for incineration. The facility contracted Marine Pollution Control, Inc., to decontaminate surfaces contaminated by PCBs (GM Romulus, 1992b).

Repair of a WTP (SWMU 5) AST required cleaning and relining the tank, generating an oil sludge-sulfuric acid (D002) waste. In 1987, this process generated 55 gallons of this waste. The waste was stored in a 55-gallon drum in the HWSA (SWMU 2) and transported off site for treatment and disposal (GM Romulus, 1992b).

Employee mishaps generated mixtures of gasoline and diesel fuel (D001) waste. Such incidents generated 440 gallons of waste in 1986 and 55 gallons of waste in 1987. The gasoline and diesel fuel waste was stored in drums in the HWSA (SWMU 2) and transported off site for disposal.

The breakdown of a power house chiller unit generated oil-contaminated freon (F002) waste. This process generated 50 gallons of waste in 1989. This waste was stored in a 55-gallon drum in the HWSA (SWMU 2) and transported off site for disposal (GM Romulus, 1992b).

In 1988, a mixture of red dye added to engine lube oil and diesel fuel generated a waste containing cadmium (D006). The cadmium source was unknown. This process generated 55 gallons of waste in 1987 and 110 gallons of waste in 1988. This waste was stored in 55-gallon drums in the HWSA (SWMU 2) and transported off site for disposal (GM Romulus, 1992b).

The breakdown of an AST in the WTP (SWMU 5) required cleaning that generated acid-aluminum sludge (D002). The quantity of waste was unknown. A vacuum truck removed the sludge directly from the AST and transported it off site. Michigan Disposal, Inc., of Belleville, Michigan, accepted this waste for disposal.

The GM Romulus facility phased out several processes that generated hazardous wastes. These processes and wastes are described below.

From 1975 to 1989, the dragout filter and puffer-blower systems were not used to separate the sludge from the iron, steel, and aluminum scrap. Instead, hoppers transported the scrap and grinding sludge to the Chip House (SWMU 7) and dumped the waste into piles on the floor (GM Romulus, 1992a). The generation rate of this waste is unknown; production from 1975 to 1989 was higher than current production rates. A front loader shoveled the metal scrap and sludge into trucks for transport and disposal off site (GM Romulus, 1992b).

From 1976 to 1986, the facility used a tin plating process. The tin plating process used a heat treating system that generated tin plating sludge (D002). This process generated 165 gallons of waste in 1986. This waste was stored in drums in the HWSA (SWMU 2) and transported off site for disposal. To decontaminate the tin plating area, facility personnel flushed the floor area with water that drained into the trench system leading to the WTP (SWMU 5).

Also from 1976 to 1986, the facility used a zinc plating process that generated wastewater that fed into the WTP (SWMU 5). Waste characteristics and generation rates are unknown. Facility representatives said that zinc plating was a low volume production process limited to miscellaneous Detroit Diesel Allison Division 2-cycle engines.

From 1976 to 1987, the facility used a degreasing process to clean parts instead of the Safety-Kleen serviced parts washers. The degreasing process generated 1,1,1-trichloroethane (F001) waste; 20 gallons of 1,1,1-trichloroethane were generated in 1988. The degreasing units were drained of 1,1,1-trichloroethane waste prior to removal. The waste was not accumulated in satellite accumulation areas inside the facility. The units were self-contained, and the production area was not decontaminated. This waste was stored in drums in the HWSA (SWMU 2) and transported off site for disposal (GM Romulus, 1992b).

From 1975 to 1987, GM auditors tested engine parts for cleanliness using freon 113. This process generated 55 gallons of freon 113 (F002) waste in 1987 and 495 gallons of freon 113 (F002) waste in 1986. This waste was stored in drums in the HWSA (SWMU 2) and transported off site for disposal. The facility replaced the freon 113 used in the audit process with two nonhazardous substances (Citriclene and DH Lemonine) (GM Romulus, 1992b).

In 1987, the facility used a peelable spray booth compound containing methylene chloride (F002). The process generating this waste is unknown. The process generated 55-gallons of this peelable waste in 1987. The waste was stored in a drum in the HWSA (SWMU 2) and transported off site for disposal.

2.4 HISTORY OF DOCUMENTED RELEASES

This section discusses the history of documented releases to ground water, surface water, air, and on-site soils at the GM Romulus facility. The facility has had three documented releases.

The first release occurred from 1975 to 1989. During this period, the drag-out rack and puffer-blower systems used to separate cutting fluids from metal scrap were not yet installed.

Scrap metals and sludge were collected from the machines and dumped into piles on the concrete floors of the Chip House (SWMU 7). Cutting fluids drained onto the floors and seeped into the soil below through cracks in the concrete (GM Romulus, 1992a). Testing in 1988 indicated contamination of subsurface soils by organics and oils (GM Romulus, 1992b).

Facility representatives indicated that they have submitted assessments of the release to MDNR. Facility representatives also said that they are finalizing a work plan for the remediation that will be submitted to MDNR (GM Romulus, 1992a). No documentation on the release was available in EPA or MDNR files. SWMU 7 is described further in Section 3.0.

The second release occurred from 1982 to 1990. During four RCRA inspections, MDNR documented leaking drums and spills on the concrete surface of the HWSA (SWMU 2) and other RCRA violations (GM DD, 1982; MDNR, 1985c; MDNR, 1986a; MDNR, 1987). EPA issued a compliance order for these RCRA violations in September 1987 (EPA, 1987).

The facility is currently closing the HWSA (SWMU 2). Closure testing of soils and ground water has shown low levels of contaminants, including barium, copper, silver, and trichloroethene (Techna, 1991).

The third release occurred on November 1, 1991. Facility personnel were preparing an UST for removal by pumping out the oil contents through the system of overhead pipes. An overhead pipe burst, spilling about 2,000 gallons of 15W40 crankcase oil onto a facility road and soils. Facility personnel responded to the spill by diking the area and notifying a response service.

Facility personnel made unsuccessful attempts to notify MDNR during the incident. Thus, local authorities were notified initially in lieu of MDNR. The facility filed written reports of the spill with Northville District, Michigan State Police and MDNR (Northville District, 1991 and GM, 1991b). The AOC resulting from this release (AOC 1) is described further in Section 4.0.

2.5 REGULATORY HISTORY

General Motors Corporation Detroit Diesel Allison Romulus Plant (GM DD) submitted a Notification of Hazardous Waste Activity to EPA on August 12, 1980 (GM DD, 1980a). The facility submitted a RCRA Part A permit application on November 11, 1980 (GM DD, 1980b). This application listed the following process codes and capacities: storage of 7,500 gallons in containers (S01) and 70,000 gallons in tanks (S02), and treatment of 250,000 gallons per day in

tanks (T01) and 13,000 gallons per day in tanks (T01). The application listed the following annual quantities and wastes: 10,000 pounds (lbs) of F001; 15,000 lbs of F017; 27,500 lbs of F005; 50 lbs of U103; 1,063 lbs of D002; and 10,000 lbs of D002. The facility submitted a Biennial Hazardous Waste Report for 1983 on February 16, 1984 (GM DD, 1984a). The facility submitted a revision to this report on July 23, 1984 (GM DD, 1984b). On November 17, 1986, the facility submitted a revised RCRA Part A permit application that increased the storage capacities and annual waste quantities by a factor of 1,000 each. On April 9, 1988, the facility submitted an update to the RCRA Part A permit application (GM CPC, 1988b). This update included the following changes:

- The facility's name changed to GM Chevrolet-Pontiac-Canada Group.
- Several buildings were covered under a different RCRA identification number.
- WTP discharges to the POTW would be exempt from RCRA regulations.
- The facility added a portable storage building to the HWSA (SWMU 2).
- The facility revised the waste types generated for the 1986-1987 Biennial Hazardous Waste Report.
- The facility notified EPA of intent to submit a closure plan for the HWSA (SWMU 2) and of a status change to generator only (GM CPC, 1988a).

On April 12, 1988, the facility submitted a second Notification of Hazardous Waste Activity (GMC CPC, 1988c) to update EPA records. The notification listed D001, D002, F001, F002, F003, F005, and U226 wastes. On July 28, 1989, Techna Corporation (Techna) submitted an updated RCRA Part A permit application for the facility. This application listed storage of 7,500 gallons in containers. The application also listed the following annual quantities and wastes: 1,200 lbs of F001; 1,200 lbs of F002; 12,000 lbs of F003; 1,200 lbs of F005; 4,000 lbs of D001; 1,200 lbs of D002; 800 lbs of D006; zero lbs of F017 (no longer a listed hazardous waste); zero lbs of U103 (never stored at the facility) (Techna, 1989). On August 17, 1989, MDNR approved the revised RCRA Part A permit application (MDNR, 1989a).

The facility is closing the HWSA (SWMU 2). GM CPC submitted the closure plan on September 7, 1984 to MDNR. On April 9, 1985, MDNR sent GM a letter noting deficiencies in the closure plan (MDNR, 1985a). The facility responded to the deficiencies on May 9, 1985 (GM DD, 1985b). On June 12, 1985, MDNR approved the closure plan revisions (MDNR, 1985b). On June 15, 1988, Techna submitted another closure plan for the HWSA (SWMU 2) (Techna, 1988). On August 31, 1989, MDNR approved a modified closure plan submitted by GM on July 31, 1989 (MDNR, 1989b). The approved modified closure plan altered the

The facility does not have a history of air permit compliance problems. The facility has no history of odor complaints from area residents.

The facility is required to have a National Pollutant Discharge Elimination System (NPDES) permit. The facility has no history of NPDES compliance problems. The facility's NPDES permit expired October 1, 1991; however, the facility has submitted a renewal application. MDNR has notified the facility that the existing permit (#MI0039039) will remain in effect until the renewal is issued (MDNR, 1991c).

The facility has one permitted outfall, which discharges water from two storm water retention ponds to the McClaughrey Drain. The McClaughrey Drain discharges to the Lower Rouge River. Pond waters are monitored for pH, chlorine, cyanide, oil and grease, zinc, cadmium, copper, lead, and PCBs.

The facility has another permit for discharges to the POTW in Detroit. The permit expired March 1, 1992; the facility has applied for a renewed permit. The facility has no history of POTW compliance problems. Sanitary waste and pretreated wastewater are discharged to the POTW sewer system.

2.6 ENVIRONMENTAL SETTING

This section describes the climate, flood plain and surface water, geology and soils, and ground water in the vicinity of the GM Romulus facility.

2.6.1 Climate

The climate in Wayne County is humid temperate. The average annual daily high temperature is 60°F. The average annual daily low temperature is 40°F. The lowest average daily temperature is 18°F in January. The highest average daily temperature is 85°F in July (USDA, 1977).

The total annual precipitation for Wayne County is 30 inches. The mean annual lake evaporation is about 30 inches (U.S. DOC, 1963; 1968). The 1-year, 24-hour rainfall is about 2 inches (NOAA, 1980). Snowfall averages 32 inches annually (USDA, 1977).

The prevailing wind is from the south at 11.5 miles per hour. Average wind speed is highest in both January and April at 13 miles per hour from the west-southwest. Due to the

direction of the prevailing winds, Lake St. Clair and Lake Erie have a minimal effect on the Wayne County climate. Average wind speed is lowest in August at 9 miles per hour from the southwest (USDA, 1977).

2.6.2 Flood Plain and Surface Water

The GM Romulus facility is not located in a flood-prone area. The City of Romulus does not participate in the floodplain program. No major water bodies are located close enough to Romulus to cause a flooding hazard (FEMA, 1992). The nearest surface water body, McClaughrey Drain, is located 50 feet northwest of the facility and is used for recreational purposes. The original path of McClaughrey Drain was closer to the facility; it was rerouted to border the westernmost boundary of the Engineering Center. McClaughrey Drain discharges to the Lower Rouge River. The Lower Rouge River combines with the Upper and Middle Rouge Rivers before discharging into the Detroit River.

Other surface water bodies in the area are the Ecorse River, located 800 feet east of the facility; and Lake Belleville, located about 3 miles southwest of the facility. Detroit River, Lake St. Clair, and Lake Erie are located 8 to 15 miles downstream, east of the facility. Small wetlands about 0.10 mile in diameter are located about 2 miles northwest, 1.25 miles south, and 0.75 mile southwest of the facility (USGS, 1980).

Surface water drainage at the facility is to the west toward McClaughrey Drain. A set of storm sewer drainage ditches channel surface runoff to two storm water retention ponds. The retention ponds discharge to McClaughrey Drain through an outfall (see Photograph No. 11) just beyond the northwest corner of the facility. The facility discharges runoff under a NPDES permit. The NPDES permit expired October 1, 1991. However, the facility has submitted a renewal application, and MDNR is allowing the facility to operate under the expired permit until the new permit is approved (MDNR, 1991c).

The facility also discharges to the Detroit sewer system under a POTW permit. The permit expired March 1, 1992. However, the facility has submitted a renewal application.

2.6.3 Geology and Soils

The surface soils and subsurface soils in the area are classified in the Thetford-Granby-Tedrow association. These are nearly level, very poorly drained to somewhat poorly drained soils that have a coarse textured subsoil. Surface layers are made of loamy fine sand to loamy sand. Subsurface soils are made of loamy fine sand to fine and very fine sand. This association exhibits

very slow and ponded runoff, low to moderately low organic matter content, and moderate to rapid permeability. On-site soils are classified within the Tedrow series, with a 0- to 2-percent slope. These soils are formed from water depositing sand (USDA, 1977). Vertical hydraulic conductivity of the clay soils at the Chip House (SWMU 7) is about 2 x 10^{-10} centimeters per second (cm/sec) (McNamee, 1990).

The surface geology of the area is a mixture of glacial and organic deposits. Pleistocene epoch glaciation, along with deposition and erosion, formed the land. The present land forms consist of materials deposited in the Cary substage of the Wisconsinan Glacial stage. Glacial deposits over bedrock range from 3 feet to 330 feet thick in this area. Primarily, glacial till and lacustrine deposits make up the glacial deposits in this area.

The bedrock in Wayne County consists of consolidated and cemented Middle Devonian limestone from the Paleozoic era. Within the Michigan basin, the sedimentary rocks dip at an angle of less than 1 degree toward the center of the basin, which is located in the central portion of the southern Michigan peninsula (Mozola, 1969).

2.6.4 Ground Water

The following description of ground water conditions is based on well logs in the surrounding area. Depth to ground water varies from 2 feet to 127 feet below ground surface in the Romulus area, although it generally averages between 4 and 5 feet. Ground water in the area flows southeast, toward Lake Erie. The aquifers range from 3 to 55 feet thick (Cullen, 1992b).

A hydrogeologic assessment of the Chip House (SWMU 7) area showed ground water to flow radially away from the front of the building. The assessment also showed that the aquifer under the Chip House averaged about 10 feet thick (McNamee, 1990). Ground water under the HWSA (SWMU 2) and the Chip House (SWMU 7) was 5 feet to 8 feet below ground surface (Techna, 1991 and McNamee, 1990; respectively). Horizontal hydraulic conductivity in the area of the Chip House (SWMU 7) was about 1 x 10^{-2} cm/sec (McNamee 1990).

Ground water in the Romulus area is used for drinking water by residences, 1 mile to 2 miles south and west of the facility which do not receive water from the City of Romulus. In addition, Woodland Meadows landfill, located 0.63 mile south of the facility, has monitoring wells. Well monitoring at Woodland Meadows landfill has shown no contamination to date (Cullen, 1992a). Ground-water testing at the Chip House (SWMU 7) has revealed petroleum hydrocarbons and volatile organic compounds in the ground water (McNamee, 1990).

2.7 RECEPTORS

The GM Romulus facility occupies 120-acres in a mixed use area in Romulus, Michigan. Romulus has a population of about 22,987 (Rand McNally, 1992).

The GM Romulus facility is bordered on the north by undeveloped GM property and by GM Service Parts Operations; beyond GM property is a waste recovery facility. The GM Engineering Center borders the facility on the west; undeveloped land lies beyond the GM property. Residences border the facility on the south; beyond the residences is a closed landfill. The Chesapeake and Ohio railroad tracks border the facility on the east; beyond the tracks are manufacturing facilities and residences. The nearest school, Beverly School, is located 0.5 mile east of the facility. Facility access is controlled by a security fence, guards, and a guard house.

The nearest surface water body, McClaughrey Drain, is located 50 feet northwest of the facility and is used for recreational purposes. It is not used for drinking water. Other surface water bodies in the area are the Ecorse River, located 800 feet east of the facility, and Lake Belleville, located about 3 miles southwest of the facility. The Detroit River, Lake St. Clair, and Lake Erie are located 8 to 15 miles downstream, east of the facility. Wetlands are located about 2 miles northwest, 1.25 miles south, and 0.75 mile southwest of the facility.

Ground water is not used for drinking water by either the facility or the City of Romulus. However, ground water is used for drinking water within 3 miles of the facility. The nearest drinking water well is located 0.75 mile southwest and downgradient of the facility. The nearest industrial well, monitoring wells for the Woodland Meadows landfill, is located 0.5 mile south of the facility. The monitoring wells are downgradient of the facility. Sensitive environments are not located on site.

3.0 SOLID WASTE MANAGEMENT UNITS

This section describes the seven SWMUs identified during the PA/VSI. The following information is presented for each SWMU: description of the unit, dates of operation, wastes managed, release controls, history of documented releases, and PRC observations. Figure 2 shows the SWMU locations.

SWMU 1 **Maintenance Paint Shop**

Unit Description: The Maintenance Paint Shop is located in a south central area of the manufacturing building. The unit accumulates 55-gallon drums of spent solvent (F003, F005) and off-specification paints (D001). The unit consists of an open floor area and two flammable storage cabinets that are each about 6 feet tall by 5 feet wide by 3 feet deep (see Photographs No. 1 and 2). The unit's floors are made of concrete slabs surrounded by trenches. The trenches are covered with steel grate drain plates and lie flush to the floor surface. The trenches drain into a system of pipes and sewers. The pipes and sewers lead to a sump. The waste that collects in the sump [part of the WTP (SWMU 5)] is pumped to the WTP (SWMU 5).

Date of Startup: The unit began operation in June 1975.

Date of Closure: The unit is active.

Wastes Managed: The unit manages spent solvents (F003, F005), off-specification paints (D001), and maintenance equipment. Wastes from this unit are picked up by Safety-Kleen of Romulus, Michigan, and are ultimately recycled at Safety-Kleen of Dolton, Illinois.

Release Controls: The unit is constructed on a concrete slab. The slab is surrounded by trenches that route any spill to the WTP (SWMU 5). The drums are kept inside closed flammable storage cabinets that limit volatile migration.

History of Documented Releases: No releases from this unit have been documented.

Observations: The unit contained one 55-gallon drum of spent solvent, several 16-gallon drums of solvent, an assortment of transferring equipment, and several half-gallon size hand-held containers in each cabinet during the VSI. The unit had minor paint and solvent stains inside the cabinets. All drums were closed. The cabinet doors were opened for PRC's observation. The floors had no cracks or stains. No evidence of release outside the cabinets was noted.

SWMU 2 **Hazardous Waste Storage Area**

Unit Description: The Hazardous Waste Storage Area is located outside in the north central area of the facility. The unit was used to store hazardous waste in drums. Currently, the unit accumulates nonhazardous paint sludge and spent filters in gondolas (see Photographs No. 12 and 13). The unit measures 100 feet by 107 feet and consists of a concrete slab with a metal storage shed on the northwest corner. The storage shed measures about 5 feet high by 10 feet wide by 25 feet long. It is surrounded by a 6-foot-high security fence and warning signs (see Photograph No. 3). The unit has a steel grate covered drainage trench that extends from the center to the east border and up to the northeastern corner (see Photograph No. 4).

Date of Startup: The unit began operation in 1980. The storage shed was added in 1988.

Date of Closure: The unit has not stored hazardous waste since August 1990 and is undergoing closure. Techna filed a Hazardous Waste Storage Area closure report for the facility with MDNR on May 7, 1991. MDNR has not yet approved the closure.

Wastes Managed: This unit managed spent solvent mixtures (F003, F005), off-specification paint (D001), sludge (D002), waste oil (D006), waste solvent and freon (F002), peelable spray booth compound (F002), PCB capacitors, 1,1,1-trichloroethane waste (F001), and spill residues in the drums. These wastes have either been phased out, were one-time occurrences, or are now serviced at the point of generation. Currently the unit is used to accumulate nonhazardous

paint sludge in gondolas. Wastes from this unit were ultimately disposed of at Safety-Kleen (both in Dolton, Illinois, and Romulus, Michigan); Michigan Disposal, Inc., of Belleville, Michigan; ENSCO, Inc., of El Dorado, Arkansas; Petro Chem, Inc., of Detroit, Michigan; and Environmental Waste Control, Inc., of Inkster, Michigan.

Release Controls:

The unit is constructed on concrete slabs that have sealed joints. Two spill drainage trenches are built into the unit. One trench extends from the center of the pad to the middle of the east border. The second trench extends along the east border, from the northeast edge of the pad to the east central point. At the east central point, the trenches drain into a sump located in the oil storage building. Spill material in the sump is pumped through overhead pipes to the WTP (SWMU 5).

History of Documented Releases:

During four RCRA inspections, MDNR documented violations in the handling of waste on this unit. MDNR noted open drums and spills on the concrete surface (GM DD, 1982; MDNR, 1985c; MDNR, 1986a; MDNR, 1987). The RCRA inspections in late 1986 and early 1987 led to a compliance order in September 1987 (EPA, 1987).

In addition, closure testing of soils and ground water has shown low levels of contaminants, including barium, copper, silver, and trichloroethene.

Observations:

The unit was used to accumulate nonhazardous paint sludge during the VSI. No drums were in storage at the unit. The area was partially covered with snow; however, PRC noted no deep cracks on the visible portions of the concrete and no evidence of release.

SWMU 3

Grinding Sludge and Refuse Gondola

Unit Description:

The Grinding Sludge and Refuse Gondola is located in the northeast center of the facility; inside Warehouse G in a high bay area. The unit accumulates grinding sludge and filter refuse from

	cutting processes and filter refuse from aluminum wet machining processes. The refuse also contains cutting fluids from machining processes. The unit is an open steel gondola that measures about 6 feet wide by 5 feet high by 15 feet long (see Photograph No. 14). The unit is a rectangular cart on wheels. The area has no floor drains.
Date of Startup:	This unit began operation in January 1987.
Date of Closure:	The unit is active.
Wastes Managed:	The unit manages iron and steel sludge, graphite, filter refuse (nonhazardous), and spent cutting fluid. Hoppers collect the wastes from the machines, transport the wastes to the gondola, and dump the wastes into the gondola. Wastes from this unit are ultimately transported by Nave, Inc., to Wayne Disposal, Inc., of Ypsilanti, Michigan for disposal.
Release Controls:	The unit rests on a concrete floor that slopes down toward the center of the building. The low end of the floor is bordered by a 5-foot dock berm. A berm level with the dock berm border the sides of the floor. As such, the height of the side berms increases as the depth of the floor decreases (see Photograph No. 15). The high end of the floor is bordered by dock doors. The area has no floor drains.
History of Documented Releases:	No releases from this unit have been documented.
Observations:	The unit contained a partially filled gondola during the VSI. No cracks were evident in the concrete floor. Dark dust was evident on the floors, due to piles of scrap metal managed alongside the unit at SWMU 4. No evidence of release was noted.
SWMU 4	**Iron and Steel Scrap Accumulation Area**
Unit Description:	The Iron and Steel Scrap Accumulation Area is located in the northeast center of the facility, inside Warehouse G in a high bay

area. The unit accumulates iron and steel scrap in piles (see Photographs No. 15 and 16). These wastes are generated during the cutting processes. The unit measures about 100 feet by 50 feet and consists of a concrete floor made of slabs. The slabs slope away from the dock doors. The area has no floor drains.

Date of Startup: This unit began operation in January 1987.

Date of Closure: The unit is active.

Wastes Managed: This unit manages nonhazardous iron and steel scrap. A front loader shovels the piles of iron and steel scrap when the scrap is transported off site. Wastes from this unit are ultimately sent to a GM foundry in Saginaw, Michigan, or Defiance, Ohio, for recycling.

Release Controls: The unit is a concrete floor that slopes away from the dock doors. The floor beyond and surrounding the unit is level, forming a berm that extends around 3 sides of the unit. A 5-foot-wide berm runs down the middle of the area, partitioning the area (see Photograph No. 15). The berms limit the migration of iron and steel scrap into the rest of the warehouse. A partitioning wall separates the rest of the warehouse from the unit, limiting airborne iron and steel dust from readily migrating into the warehouse. The area has no floor drains.

History of Documented Releases: No releases from this unit have been documented.

Observations: The unit contained two piles of about 4 cubic yards each of iron and steel scrap during the VSI. No cracks were evident on the floors. Dusty wheel tracks extended from the piles of scrap.

SWMU 5 **Wastewater Treatment Plant**

Unit Description: The Wastewater Treatment Plant is located on the north side of the facility in a separate building. The unit has aboveground storage tanks (AST) both inside and outside of the building. The unit has a

system of overhead and underground pipes and trenches and a sump system to connect the unit to the manufacturing building. In addition, the unit consists of one 15,000-gallon waste solid separator AST, four 200,000-gallon (each) treatment ASTs, one 33,000-gallon oil separator AST, four 3,000-gallon (each) cooker ASTs, one 5,000-gallon cooker AST, one 20,000-gallon acid-aluminum AST, and one 8,000-gallon reclaimed oil AST (see Photographs No. 5 through 10).

The waste solid separator has a flow rate of 250 gallons per minute. Wastewater is either channelled to the WTP by the pipes and the sump system or is transported by portable tank carts. The cooker ASTs are made of fiberglass; all other ASTs are made of steel.

The first floor of the building is tiled. The second floor consists of a steel grate. Four-inch-high berms surround the indoor ASTs. Central floor trenches drain any spills or overflow back into the treatment process via a sump system. All indoor ASTs are covered. A 5-foot-high berm surrounds the reclaimed oil AST. The area under this AST is asphalt. Snow cover obscured the area surrounding the four outdoor treatment ASTs.

Date of Startup: This unit began operation in June 1975.

Date of Closure: This unit is active.

Wastes Managed: This unit manages waste oil, spent cutting fluids, and wastewater. Waste oil is disposed of through Environmental Waste Control, Inc., of Inkster, Michigan, for use in a fuels program. Spent cutting fluids are treated and disposed of as wastewater. Wastewater is discharged to the city sewer system.

Release Controls: Four-inch-high berms surround the indoor ASTs. A five-foot-high berm surrounds the reclaimed oil AST. The ground floor inside the unit is tiled. Steel grate covered trenches drain spills and overflows back into the process through a sump system. The ground surface from south of the reclaimed oil AST to the street is

concrete. The ground surface within the reclaimed oil AST berm is asphalt.

History of Documented Releases: No releases from this unit have been documented.

Observations: PRC observed no cracks or staining on the floors or berms surrounding the ASTs. Minor staining was observed on all ASTs. Moderate staining and exterior paint deterioration was evident on one AST (see Photograph No. 10). One small flocculation unit was observed foaming over and draining into the floor trench (note arrow in Photograph No. 8). Snow cover obscured the ground surrounding the outdoor ASTs.

SWMU 6 **Aluminum Scrap Gondola**

Unit Description: The Aluminum Scrap Gondola is located in the northeast center of the facility; inside Warehouse G in a high bay area. The unit accumulates aluminum scrap from the cutting processes. The unit is an open steel gondola that measures about 6 feet wide by 5 feet high by 15 feet long (see Photograph No. 16). The area has no floor drains.

Date of Startup: This unit began operation in January 1987.

Date of Closure: This unit is active.

Wastes Managed: This unit manages nonhazardous aluminum scrap. Small portable hoppers collect the scrap from the machines in the manufacturing area. The hoppers transport the scrap to the gondola and dump the aluminum scrap into the gondola. Wastes from this unit are ultimately transported to a GM foundry in Saginaw, Michigan, or Defiance, Ohio, for recycling.

Release Controls: The unit rests on a concrete floor that slopes down toward the center of the building. The low end of the floor is bordered by a 5-foot dock berm. A berm level with the dock berm borders the side of the floor. As such, the height of the side berms increases as

	the depth of the floor decreases (see Photograph No. 15). The high end of the floor is bordered by dock doors. The area has no floor drains.
History of Documented Releases:	No releases from this unit have been documented.
Observations:	The unit contained a partially filled gondola during the VSI. No cracks were evident in the gondola or concrete floor. Dark dust was evident on the floors, probably due to piles of scrap metal managed alongside this unit at SWMU 4. No evidence of release was noted.
SWMU 7	**Chip House**
Unit Description:	The Chip House is located in the northeast area of the facility and consists of a concrete building northwest of the east side retention pond. The unit stored metal waste, including grinding sludge, iron scrap, steel scrap, aluminum scraps, and cutting oils. The unit measures 75 feet by 45 feet. The floors in the unit are also made of concrete. Floor drains in the building drain into the sump system that feeds into the WTP (SWMU 5) (GM Romulus, 1992a and 1992b).
Date of Startup:	This unit began operation in 1975.
Date of Closure:	The unit has been inactive since 1989 and is undergoing assessment for closure under Michigan Act 307 (GM Romulus 1992a and 1992b).
Wastes Managed:	This unit managed waste from machining processes, including grinding sludge; iron, steel, and aluminum scrap; and cutting oils. These wastes were dumped into piles on the concrete floor. Wastes from this unit were ultimately disposed of off site (GM Romulus, 1992a and 1992b).
Release Controls:	The unit is made of concrete. The floors have trenches that drain to the sump system leading to the WTP (SWMU 5).

History of Documented Releases:

One release has been documented. During a facility sponsored environmental audit in 1988, the area was singled out as an AOC when testing of subsurface soils and ground water indicated contamination. The release occurred over a period of years, when cutting oils drained out of the waste piles and seeped through cracks in the concrete floor. The waste contained substantial amounts of cutting oils from the machining processes. Facility representatives said that they met with MDNR in 1989 to discuss the results of the assessment. Facility representatives have contracted with Geraghty and Miller to design a work plan for remediation of the area (GM Romulus, 1992a).

Observations:

The unit was not observed or discussed during the VSI. The unit and its associated release were discussed during a subsequent telephone conversation between PRC and facility representatives. Facility representatives indicated that the SWMU is inactive (GM Romulus, 1992a).

4.0 AREAS OF CONCERN

PRC identified two AOCs during the PA/VSI. These AOCs are discussed below. The location of AOC 2 is shown in Figure 2; locations of AOC 1 are shown in Figure 3.

AOC 1 UST Removal Areas

From 1990 through 1992 the facility removed 16 USTs that contained product oil. The oldest USTs were in place 15 years at the time of removal. Three tanks had a 1,500-gallon capacity, each; eight had a 10,000-gallon capacity, each; and five had a 20,000-gallon capacity, each. The USTs have either been replaced by ASTs or have been phased out of production (GM Romulus, 1992b).

Facility representatives said that no leaking or spills occurred during the removals and that the USTs were removed in accordance with state and federal regulations (GM Romulus, 1992b). The UST closure report was not finished or available during the VSI. Figure 3 shows the locations of the UST removal areas.

AOC 2 UST Removal Oil Spill

On November 1, 1991, about 2,000 gallons of 15W40 crankcase oil spilled onto a facility road and soils as facility personnel prepared a UST for removal and closure. The oil was being pumped out of the UST through overhead pipes. The release occurred when one of the pipes burst.

Facility personnel responding to the spill diked the area to stop the flow of oil into the storm sewers (GM, 1991a). Vac-All Inc., conducted the cleanup within 24 hours of the release. The oil flow reached the storm catch basin but did not reach the storm water retention ponds. Oil was vacuumed from the catch basin and surface soils. A high pressure water spray was used to blast oil from the concrete road. All visibly stained soil (30-cubic yards) was removed. Facility representatives said that soil analysis indicated the soil was nonhazardous. Woodland Meadows landfill of Wayne, Michigan, accepted the contaminated soil.

Facility representatives were unable to reach MDNR during the incident (GM, 1991a) and notified local authorities initially, in lieu of MDNR. The facility submitted reports describing the spill to Northville District, Michigan State Police and to MDNR (Northville District, 1991 and GM, 1991b).

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ATTACHMENT A

EPA PRELIMINARY ASSESSMENT FORM 2070-12

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MI	MID 000 809 905

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
GM Powertrain Division, Romulus Engine Operations	36880 Ecorse Road				
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 COUNTY**	**07 COUNTY CODE**	**08 CONG DIST**
Romulus	MI	48174	Wayne	163	
09 COORDINATES: LATITUDE	**LONGITUDE**				
42° 15' 57". N	83° 24' 14". W				

10 DIRECTIONS TO SITE *(Starting from nearest public road)*

Interstate 94, exit Wayne Road south, to Ecorse Road, exit west to 36880.

III. RESPONSIBLE PARTIES

01 OWNER *(if known)*	02 STREET *(Business, mailing residential)*		
GM Powertrain Division, Romulus	36880 Ecorse Road		
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 TELEPHONE NUMBER**
Romulus	MI	48174	(313)595-5419
07 OPERATOR *(If known and different from owner)*	**08 STREET** *(Business, mailing, residential)*		
Same			
09 CITY	**10 STATE**	**11 ZIP CODE**	**12 TELEPHONE NUMBER**
			( )

13 TYPE OF OWNERSHIP *(Check one)*

☒ A. PRIVATE ☐ B. FEDERAL: _____ *(Agency name)* ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL

☐ F. OTHER _____ *(Specify)* ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE *(Check all that apply)*

☒ A. RCRA 3010 DATE RECEIVED: 08 / 12 / 80 (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE *(CERCLA 103 c)* DATE RECEIVED: / / (MONTH DAY YEAR) ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION

☒ YES DATE 01 / 30 / 92
☐ NO

BY *(Check all that apply)*

☐ A. EPA ☒ B. EPA CONTRACTOR ☐ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: _____ *(Specify)*

CONTRACTOR NAME(S): PRC Environmental Management, Inc. (PRC)

02 SITE STATUS *(Check one)*	03 YEARS OF OPERATION
☒ A. ACTIVE ☐ B. INACTIVE ☐ C. UNKNOWN	10/01/75 | Present (BEGINNING YEAR ENDING YEAR) ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

The substances present were spent solvents, off specification paints, and spent mineral spirits.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

The facility has had releases to subsurface soils and ground water from cutting oils and some unknown sources.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION *(Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents.)*

☐ A. HIGH *(Inspection required promptly)* ☒ B. MEDIUM *(Inspection required)* ☐ C. LOW *(Inspect on time-available basis)* ☐ D. NONE *(No further action needed; complete current disposition form)*

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF *(Agency/Organization)*			03 TELEPHONE NUMBER
Kevin Pierard	U.S. EPA			(312) 886-4448
04 PERSON RESPONSIBLE FOR ASSESSMENT	**05 AGENCY**	**06 ORGANIZATION**	**07 TELEPHONE NUMBER**	**08 DATE**
Celeste Brancel		PRC	(312) 856-8700	05 / 15 / 92 (MONTH DAY YEAR)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MI	MID 000 809 905

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES *(Check all that apply)*

- ☐ A. SOLID
- ☐ B. POWDER, FINES
- ☐ C. SLUDGE
- ☐ D. OTHER _____ *(Specify)*
- ☐ E. SLURRY
- ☒ F. LIQUID
- ☐ G. GAS

02 WASTE QUANTITY AT SITE *(Measures of waste quantities must be independent)*

TON NA

CUBIC YARDS NA

NO. OF DRUMS 16

03 WASTE CHARACTERISTICS *(Check all that apply)*

- ☒ A. TOXIC
- ☒ B. CORROSIVE
- ☐ C. RADIOACTIVE
- ☐ D. PERSISTENT
- ☐ E. SOLUBLE
- ☐ F. INFECTIOUS
- ☐ G. FLAMMABLE
- ☒ H. IGNITABLE
- ☐ I. HIGHLY VOLATILE
- ☐ J. EXPLOSIVE
- ☐ K. REACTIVE
- ☐ L. INCOMPATIBLE
- ☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	960	Cubic yard	Not managed as hazardous waste
OLW	OILY WASTE	4,709	Gallons	
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES *(See Appendix for most frequently cited CAS Numbers)*

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
SOL	Spent solvent mixture/F005, F003	999	Accumulation in drums/disposed of off site		
SOL	Off-specification paint/D001	999	Accumulation in drums/disposed of off site		
SOL	Spent mineral spirits/D001	999	Contained within process/ serviced by off-site firm		

V. FEEDSTOCKS *(See Appendix for CAS Numbers)*

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION *(Cite specific references; e.g., state files, sample analysis, reports)*

MDNR files, U.S. EPA Region 5 files, site inspection, followup telephone and letter correspondence with GM Romulus Engine operations, telephone and letter correspondence with Wayne County Health Department.

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
MI	MID 000 809 905

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION — 02 ☒ OBSERVED (DATE: May 1990) — ☐ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: 300 — 04 NARRATIVE DESCRIPTION

Ground-water surrounding the Chip House was found to have levels of volatile organic compounds and petroleum hydrocarbons.

01 ☒ B. SURFACE WATER CONTAMINATION — 02 ☐ OBSERVED (DATE: _____) — ☒ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

The GM Romulus facility is permitted to discharge storm water runoff from two retention ponds. The discharge from the ponds is monitored for contaminants.

01 ☐ C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

None .

01 ☒ D. FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE: _____) — ☒ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: 1,165 — 04 NARRATIVE DESCRIPTION

GM Romulus facility employees could potentially be affected by the management of ignitable wastes (D001, F003, F005).

01 ☒ E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE: _____) — ☒ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: <1,165 — 04 NARRATIVE DESCRIPTION

GM Romulus facility employees could potentially be affected by the management of ignitable wastes (D001, F003, F005).

01 ☒ F. CONTAMINATION OF SOIL — 02 ☒ OBSERVED (DATE: May 1990, May 1991) — ☐ POTENTIAL — ☐ ALLEGED

03 AREA POTENTIALLY AFFECTED: Unknown (Acres) — 04 NARRATIVE DESCRIPTION

Soil below the Chip House was found to have levels of volatile organic compounds and petroleum hydrocarbons. Soil below the Hazardous Waste Storage Area was found to have low levels of barium, copper, silver, and trichloroethylene.

01 ☒ G. DRINKING WATER CONTAMINATION — 02 ☒ OBSERVED (DATE: May 1990) — ☒ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: 300 — 04 NARRATIVE DESCRIPTION

Ground water surrounding the Chip House was found to have been contaminated; extent of contamination has not yet been determined.

01 ☒ H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: _____) — ☒ POTENTIAL — ☐ ALLEGED

03 WORKERS POTENTIALLY AFFECTED: <1,165 — 04 NARRATIVE DESCRIPTION

GM Romulus facility employees could potentially be affected by the management of toxic and ignitable wastes (D001, F003, F005).

01 ☐ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

None

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MI	MID 000 809 905

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED

04 NARRATIVE DESCRIPTION

None

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED

04 NARRATIVE DESCRIPTION (Include name(s) of species)

None

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED

04 NARRATIVE DESCRIPTION

None

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

None

01 ☐ N. DAMAGE TO OFF-SITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED

04 NARRATIVE DESCRIPTION

None

01 ☒ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPS — ☐ OBSERVED (DATE: _____) — ☒ POTENTIAL — ☐ ALLEGED

04 NARRATIVE DESCRIPTION

GM Romulus facility is permitted to discharge to the City of Romulus sewer system. However, the discharge is pretreated and monitored.

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED

04 NARRATIVE DESCRIPTION

None

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

Currently, the facility's highest threat from release is from cutting oils that drained into the grounds under the Chip House during the period 1975 to 1989.

V. SOURCES OF INFORMATION *(Cite specific references; e.g., state files, sample analysis, reports)*

MDNR files, U.S. EPA Region 5 files, site inspection, followup telephone and letter correspondence with GM Romulus Engine Operations, telehone and letter correspondence with Wayne County Health Department.

ATTACHMENT B

VISUAL SITE INSPECTION SUMMARY AND PHOTOGRAPHS

VISUAL SITE INSPECTION SUMMARY

GM Romulus
Romulus, Michigan
MID 000 809 905

Date:	January 30, 1992
Facility Representatives:	Tom Rang, Environmental Engineer Gary Stahle, GM Powertrain Division - Environmental Activities Pat Fitzgerald, Production Manager George Nadzan, Superintendent of Manufacturing and Engineering Tom Dillon, Chief Engineer Richard Granke, Environmental Engineer Dawn Jenkins, Secretary Bill Babcock, Manufacturing Engineer Director
Inspection Team:	Mary Wojciechowski, PRC Environmental Management, Inc. (PRC) Celeste Brancel, PRC
Photographers:	Mary Wojciechowski and Celeste Brancel, PRC
Weather Conditions:	Windy, overcast, 35°F
Summary of Activities:	The visual site inspection (VSI) began at 8:45 a.m. with an introductory meeting. The inspection team discussed the purpose of the VSI and the agenda for the visit. Facility representatives then discussed the GM Romulus facility's past and current operations, solid wastes generated, and release history. Most of the information was exchanged on a question-and-answer basis. GM Romulus representatives provided the inspection team with copies of documents requested. The VSI tour began at 10:30 a.m. The tour covered, in order, the Maintenance Paint Shop (SWMU 1), the Hazardous Waste Storage Area (SWMU 2), the Wastewater Treatment Plant (WTP) (SWMU 5), the NPDES outfall, the Grinding Sludge and Refuse Gondola (SWMU 3), the Iron and Steel Scrap Accumulation Area (SWMU 4), the Aluminum Scrap Gondola (SWMU 6), and the UST Removal Oil Spill (AOC 2). PRC did not tour the Chip House (SWMU 7) or the UST Removal Areas (AOC 1). The Chip House was not identified until several weeks after the VSI. Snow cover obscured the UST Removal Areas (AOC 1). The tour concluded at 11:30 a.m., after which the inspection team held an exit meeting with GM Romulus representatives. The VSI was completed, and the inspection team left the facility at 11:50 a.m.

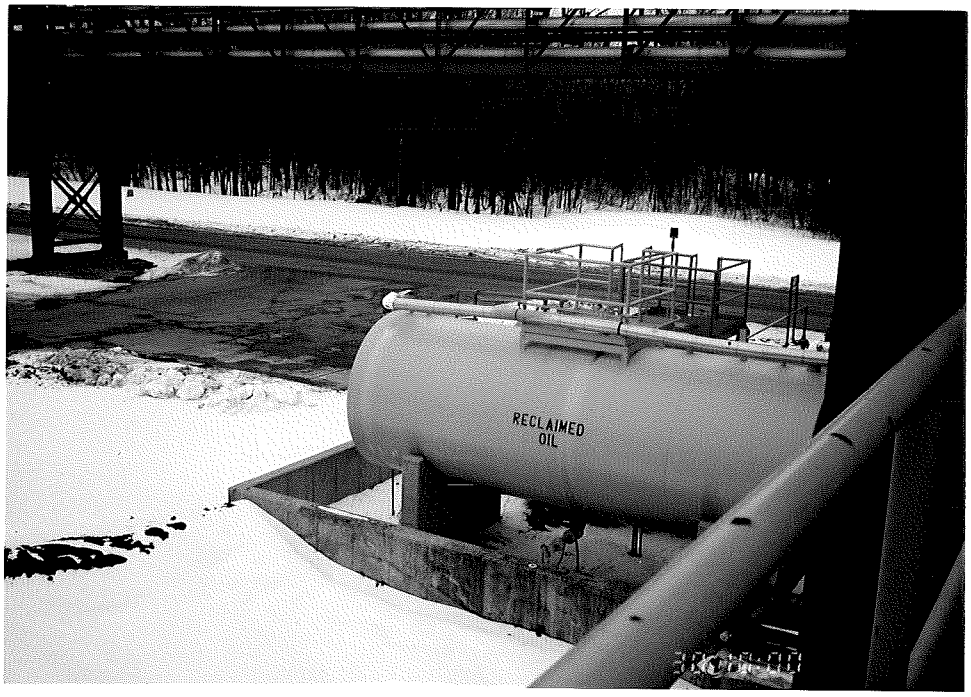
<-
Photograph No. 1
Location: SWMU 1
Orientation: Southeast
Date: 01/30/92
Description: This photograph shows one flammable storage cabinet containing spent solvent, solvent product, and maintenance equipment.

->
Photograph No. 2
Location: SWMU 1
Orientation: Southwest
Date: 01/30/92
Description: This photograph shows the second flammable storage cabinet containing spent solvent, solvent product, and maintenance equipment.

Photograph No. 3 Location: SWMU 2
Orientation: North Date: 01/30/92
Description: This photograph shows the HWSA shed.

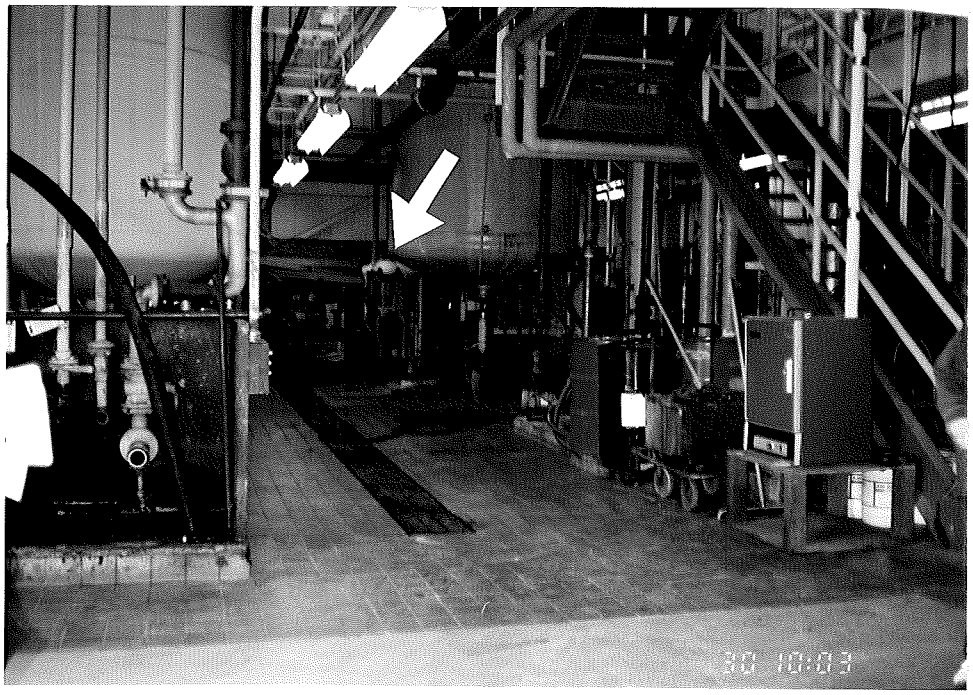
Photograph No. 4 Location: SWMU 2
Orientation: East Date: 01/30/92
Description: This photograph shows the HWSA, including the central drainage trench.

Photograph No. 5 Location: SWMU 5
Orientation: North Date: 01/30/92
Description: This photograph shows an emulsion AST at the WTP.

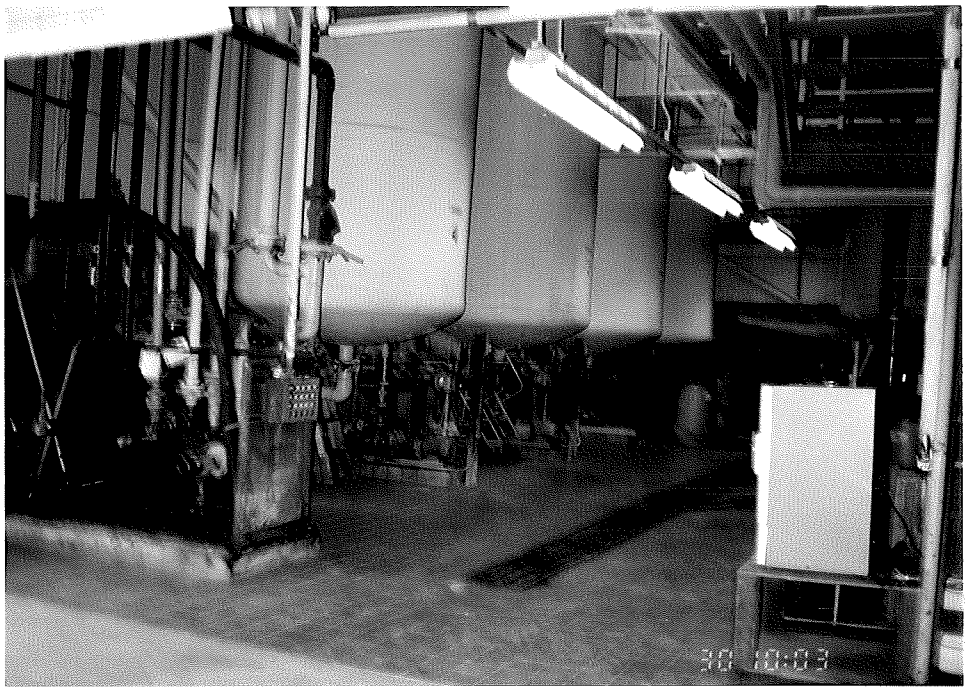


Photograph No. 6 Location: SWMU 5
Orientation: Southeast Date: 01/30/92
Description: This photograph shows the reclaimed oil AST at the WTP.

Photograph No. 7 Location: SWMU 5
Orientation: Northwest Date: 01/30/92
Description: This photograph shows the cooker ASTs inside the WTP from the second floor.



Photograph No. 8 Location: SWMU 5
Orientation: West Date: 01/30/92
Description: This photograph shows the lower level of the WTP. In the far central rear area, a vat of air scrubber solution is foaming over and draining toward a trench.



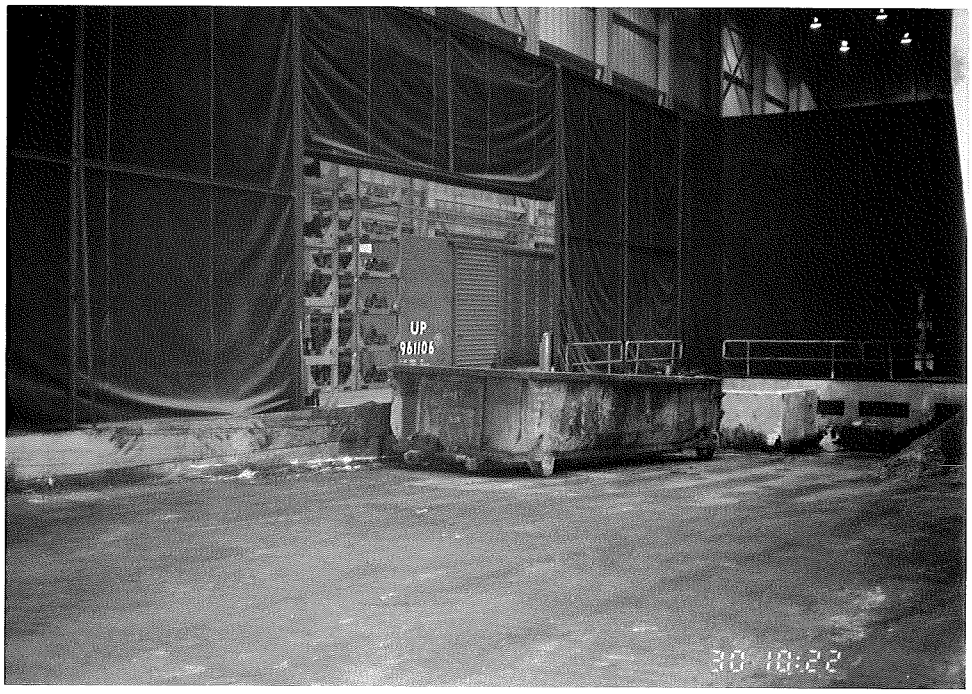
Photograph No. 9 Location: SWMU 5
Orientation: Northwest Date: 01/30/92
Description: This photograph shows the cooker ASTs in the WTP from the first floor.

Photograph No. 10 Location: SWMU 5
Orientation: South Date: 01/30/92
Description: This photograph shows the scum holding AST and a work bench on the lower level of the WTP; note staining and paint deterioration on the scum holding AST.

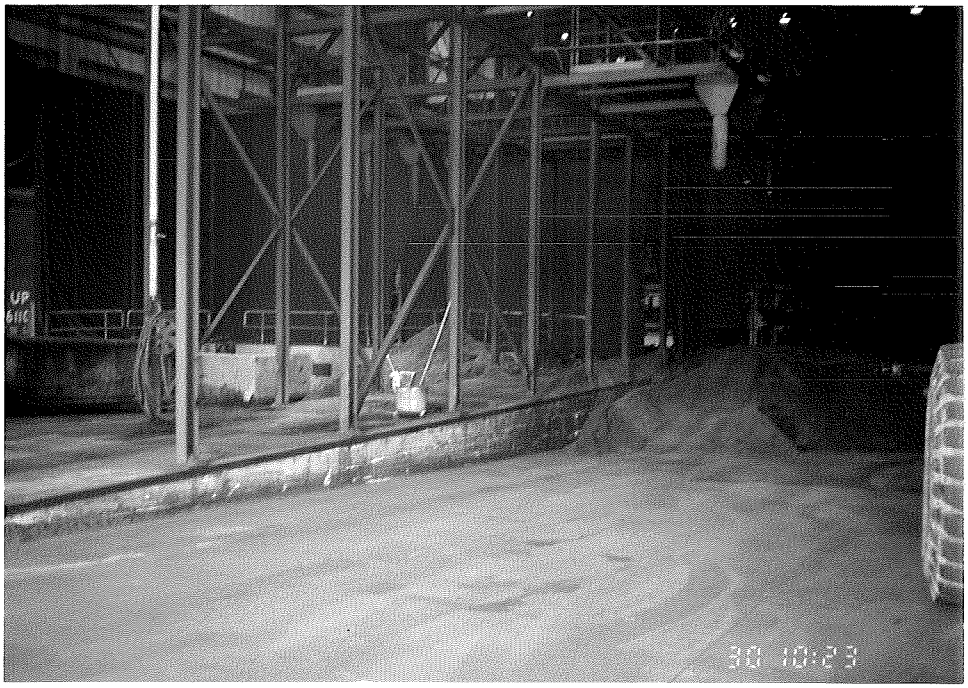
Photograph No. 11 Location: NPDES Outfall
Orientation: Southwest Date: 01/30/92
Description: This photograph shows the NPDES outfall and drainage creek.

Photograph No. 12 Location: SWMU 2
Orientation: East Date: 01/30/92
Description: This photograph shows the paint sludge (NA) gondola at the HWSA (SWMU 2).

Photograph No. 13 Location: SWMU 2 and 7
Orientation: Southwest Date: 01/30/92
Description: This photograph shows the paint sludge gondola at the HWSA (SWMU 2).



Photograph No. 14 Location: SWMU 3
Orientation: East Date: 01/30/92
Description: This photograph shows the Grinding Sludge and Refuse Gondola and the sloping concrete floor.



Photograph No. 15 Location: SWMU 3 and 4
Orientation: East Date: 01/30/92
Description: This photograph shows the Iron and Steel Scrap Accumulation piles and a portion of the berm. SWMU 3 is visible at the left edge of the photograph.

Photograph No. 16 Location: SWMUs 4 and 6
Orientation: North Date: 01/30/92
Description: This photograph shows the Aluminum Scrap Gondola and a front loader used for shoveling up the scrap. SWMU 4 is visible on the left side of the photograph.

ATTACHMENT C

VISUAL SITE INSPECTION FIELD NOTES

PRC, ENC. RCRA VSI - Romulus

1/20/92
8:45am

- PRE-MEETING CONFERENCE

NAME	REPRESENTING
Mary Wojciechowski	PRC
PAT FITZGERALD	PRODUCTION MGR.
[illegible]	[illegible]
TOM DILLON	CHIEF ENGINEER
RICHARD GRANKE	ENVIRONMENTAL ENGINEER
GARY R. STAHLE	GM POWERTRAIN DIVISION - ENV. ACTIVITIES
[illegible]	[illegible]
BILL BABCOCK	MANF. ENGINEERING DIRECTOR
[illegible]	[illegible]
Celeste Brancel	PRC -

History

GM Detroit Diesel Allison - blt 1975
Prts mfg for Desiel Eng
space Dble 1972
- added assembly & Prts for 8.2 l Eng
1986 - Became CPC GM
Deisel prts eliminated
4.6 l gasoline
8.2 l - ceased assembly stoped Dec 9C
- continued spr prts for awhile

Warehouse in back & other Div - difference MID #s.
1165 employees - 2 shifts.
approximately 300 to 400

Processes - Metalworking, wet maching of cast Iron / steel parts, painting, assembling, testing.

formly tin/zinc plating
heat treating.

Wastes from – Parts cleaning
– Painting
– general Maintence etc...

RCRA Clo rpt. to DNR 5/7/91
No reply from DNR
@ one time had PCBs...
not likely to have much more
bulk of PCBs removed 86/87
* got copy of body of rpt...

NPDES expired 6/1/91, renewal app submited
MI0039039
to Mclaureay drain flows N to
Ecorse River (Lower Range river)
→only outfall. ends
surface runoff via SS ditches to
2 retain Pnds + M drain
11/20/91 DNR → can operate
under old until
new submitted

POTW Detroit - 3/1/92 renewed
Detroit River Lake St Clair
& Lake Huron
Romulus City water

air Permits

C-7603 spray booth
Wayne Co Health Dept. - report state

C-7687 Engine Test Stand carousel Type

C-8994 # 3 Boiler Conversion to add natural gas + oil to coal combustion (3 boilers operating)

new waste - grinding sludge - to LF Wayne Disposal in Ypsilanti
* get annual total currently 20 yd/week

get copies of still active

87

F003 F005 1035 in 87

D002 Tin Plating sludge tin oxide
KOH
165 in 86
end of Process

D002 sludge - from acid tank clean
55 gal in 87

D001 off-spec paint
220, 275 in 86 & 87...
rate varies

89 biennial

(1) F003, F005 - 1660 gal, maintnce Paint Shop. spent solvent toluol, xylol acetone

(2) D001 - 8k parts cleaners, mineral spirits ~15 units 3049 gal in 89
14 active 8k units

one time or no longer generated

D001 - gasoline/diesel fuel from fuel one time 55 gal in 88

1,1,1 TCA - degreaser from eliminated process 20 gal in 1988

Freon 55+ 30 gal in 89, now using F002 citriclene DL-lemonine... non haz can be dumped to WT

F002 - oil w/ Freon 50 gal in 89 from a air conditine

D002 - one time dye waste 110 gal in 88

2 USTs (new) gasoline — 10 000 gal gas / 5000 gal diesel
↳ Christmas
↳ 1991

No USTs removed ..... gas
↳ same put in 1975 - diesel
- engine oil
- cutting oil
- cleaning solns
- sm WT-oil dump tank

rpt being prepared ... all have been pulled
will go to DNR & fire Marshal

↳ double wall steel
fiberglass coated

Release Hist

- Engine oil fed into Plt
  Pipe burst, ~2000 gal
  on ground....
  30 yd^3 compared to no visible
  stains.....
  taken to woodland meadows
  in Wayne, Mi (Manifested
  NH)
  11/1/91 ....

Romulus

IOAF

1. Maintence Paint Shop
2. WWTP (NH)
3. Paint sludge (NH) Roll off
4. Grinding sludge Roll off (NH)
5. HWSA
6. ~~Barrel yd~~ . . . reconditioned by Columbus steel drum . . .
7. Spill area - oil
8. NPDES outfall → retention Pnds
9. chip house

get location of new USTS
old USTS

Waste name (haz waste code, if applicable)	generation	rate of generation (annual)	that currently manage the waste	that formerly managed the waste (if applicable)	destination of the waste (city, state, name & type of receiving facility)
maintnce waste (D001) (F003) (F005)	maintnce Paint... shop cabinets - legal drums	annual rpt	Picked from PT of generation.	HWSA in past...	SK in Dalton
Pet naptha Mineral spirits (D001)		annual rpt	out of process		SK in Romulus
Paint Sludge NH (D001?)		10 - 15 yd in a year	Roll off box 20 yd		~~SK~~ ~~Dalton~~ Mi Disp
Oil/ scum from WT reclaimed oil		get 1991 total before leaving ↓decrease in .002	Portable carts from machines & floor trenches Pipes above & underground...		EWC

acid/alum sludge (D002)	tank clean in WWT	varies	WWT	MDI Michigan disposal
grinding sludge	?	?	?	?