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DRAFT REPORT
RCRA FACILITY ASSESSMENT
GENERAL MOTORS CORPORATION

T E S III

TECHNICAL ENFORCEMENT SUPPORT AT HAZARDOUS WASTE SITES

U.S. EPA CONTRACT NO. 68-01-7331

CDM Federal Programs Corporation

DRAFT REPORT
RCRA FACILITY ASSESSMENT
GENERAL MOTORS CORPORATION

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
of Waste Programs Enforcement
Washington, D.C. 20460

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Date Prepared	:	December 23, 1988

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1.0 INTRODUCTION

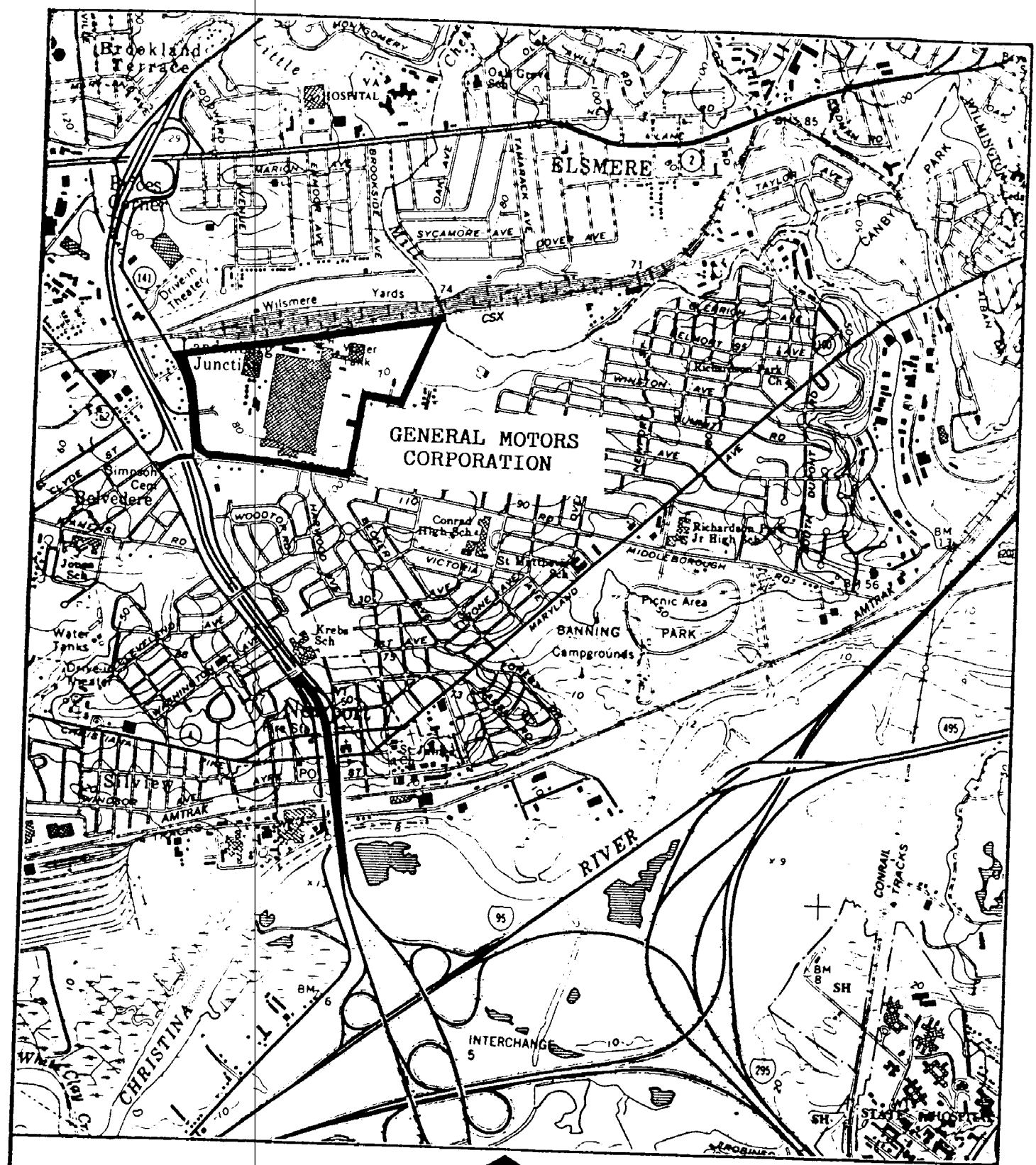
1.1 Statement of Work

CDM Federal Programs Corporation (CDM FPC) has conducted a RCRA Facility Assessment (RFA) of the General Motors Corporation (GMC) Assembly Division for the U.S. Environmental Protection Agency (EPA) under EPA Contract No. 68-01-7331, TES III, Work Assignment 819. This report documents the findings of the RFA which was performed to identify and evaluate past and potential releases to the environment from solid waste management units (SWMUs) and other identified areas of concern at the Wilmington, Delaware facility. The information presented herein is based upon documents obtained from GMC, EPA Region III, the Delaware Department of Natural Resources and Environmental Control (DE DNREC) and the findings of the visual site inspection (VSI) of the facility conducted on September 27, 1988. Present during the VSI were Bruce Pluta and Kathryn Garris of CDM FPC, and Ernest Bosetti of GMC. Seven SWMUs and two additional areas of concern were identified and evaluated during the course of the RFA.

1.2 Site Location

The General Motors Corporation Assembly Division is located in Wilmington, Delaware (Figure 1). It is bounded by Route 141 on the west and Boxwood Road on the south. East of the facility is a residential area. To the north are the Wilsmere Yards of the Baltimore and Ohio Railroad. The facility occupies approximately 141 acres (GMC, October 1982).

FIGURE 1



SITE LOCATION MAP

0 1000 2000 3000

SCALE IN FEET

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WILMINGTON SOUTH QUADRANGLE
DELAWARE–NEW JERSEY
7.5 MINUTE SERIES (TOPOGRAPHIC)

CDM Federal Programs Corporation

2.0 FACILITY DESCRIPTION

2.1 Hazardous Waste Generation

General Motors Corporation (GMC) operates an automobile assembly division in Wilmington, Delaware (CDM, September 1988). The facility assembles automobiles from component parts which are manufactured by subdivisions of General Motors and shipped to the Wilmington plant (DE DNREC, June 1982).

Painting of the assembled cars and the associated processes with the painting provide the source of the hazardous waste generation at the facility. These processes include phosphating, application of primer, application of primer-surfacer, and the application of the base coat/clear coat.

When the assembled car leaves the body shop, it is subject to a phosphating process to remove oil and dirt. Facility representatives indicated that the chemicals used in this process are "Alchem" chemicals, however, the exact composition is unknown (GMC, December 1988). The resulting wastewater is filtered and then treated in the onsite pretreatment unit before entering the city sewer system. The filtered material, known as bonderite sludge, is disposed in one of two 25 cubic yard hoppers inside the pretreatment unit. It is ultimately disposed offsite (GMC, September 1988).

After phosphating, the car is then sent to the paint department (old modular shop) via a conveyer belt where a primer (trade name - ELPO; exact composition is unknown) is applied. Waste primer is blended with other process waste and sent to the wastewater pretreatment unit (GMC, November 1988).

The car then goes to the new modular shop where there are seven painting booths. In the first booth, the car is checked for breaks in the ELPO. If breaks are detected, a small quantity of primer-surfacer is applied. Any waste primer-surfacer goes directly to the wastewater pretreatment unit. Overall, annual quantities of the primer-surfacer utilized by the facility are minimal (GMC, November 1988).

The car goes through one of the remaining booths where the base coat (the actual color of the car) and the clear coat (a high gloss finish) is applied (GMC, November 1988). The paint used in these booths is mixed in 150-gallon tanks which are connected to the painting booths by a system of pipes (DE DNREC, February 1984).

Paint remaining in the booth after the painting process, referred to as "overspray" is washed from the booth. The water used in this process is chemically treated with a polymer. The water is then recycled for approximately one month while gradually accumulating paint sludge (GMC, November 1988). After one month, the water and sludge mixture is poured into 800-gallon containers where the water eventually separates and rises to the surface. The water is decanted and sent to the pretreatment unit. The remaining sludge, still in the container, is stored in an outdoor paint sludge storage area until it is disposed at an offsite municipal landfill (GMC, October 6, 1988).

Unused paint is removed, drummed, and stored at an outdoor hazardous waste storage area until it is ultimately disposed offsite. "Line" solvent (the facility representative indicated that the composition is unknown) is pumped through the system to remove any remaining paint (GMC, October 1988). The solvent and paint residue first enter one of two 300-gallon "gun boxes" which empty directly into one of two 6000-gallon tanks. During the year (except in the summer when fuel demand for the facility is at a minimum), solvent is siphoned from the top of the tank, filtered, and piped to the powerhouse. In the powerhouse, the solvent is filtered again and burned as fuel in a modified boiler. The filters, filtered material, and remaining solids in the tank are drummed and stored at the hazardous waste storage area until disposal (GMC, September 1988).

During the summer, the contents of the tank are drained directly to a tanker truck which transports the waste to an offsite disposal facility (GMC, October 6, 1988).

2.2 Regulatory Status

Since November 19, 1980 GMC has operated a hazardous waste management facility subject to regulations promulgated under the Resource Conservation and Recovery Act. This facility qualified for interim status for the hazardous waste container storage area and two hazardous waste storage tanks. In 1986, the facility was found in non-compliance with Part 265 Interim Status Closure Requirements when it replaced its existing hazardous storage pad and tanks with new ones without submitting a closure plan for these units (GMC, September 1986). GMC submitted a Part B application to EPA in December 1982. The facility has indicated that it is withdrawing its Part B application.

The facility maintained an NPDES permit (No. 0000523) to discharge stormwater to the Little Mill Creek. This permit expired in May 1988. The facility has requested a permit renewal (GMC, October 10, 1988). The facility currently maintains a permit with New Castle County (No. WDP-76-018) to discharge treated water from the wastewater pretreatment unit to the Wilmington sewer system (GMC, November 1988).

The facility currently hold seven air permits:

- o APC-85-183 Automotive Coating System
- o APC-82/1228 Vapor Balance System
- o APC-82/1224 Third Color Booth and Oven
- o APC-82-034 Blu-Surf Oven
- o APC-81/849 Primer Surfacer Booth and Oven
- o APC-81/656 Cathodic Electrode Position Primer
- o APC-80/145 Final Paint Booth and Oven

(GMC, October 1988).

3.0 DESCRIPTION OF SOLID WASTE MANAGEMENT UNITS AND OTHER AREAS OF CONCERN

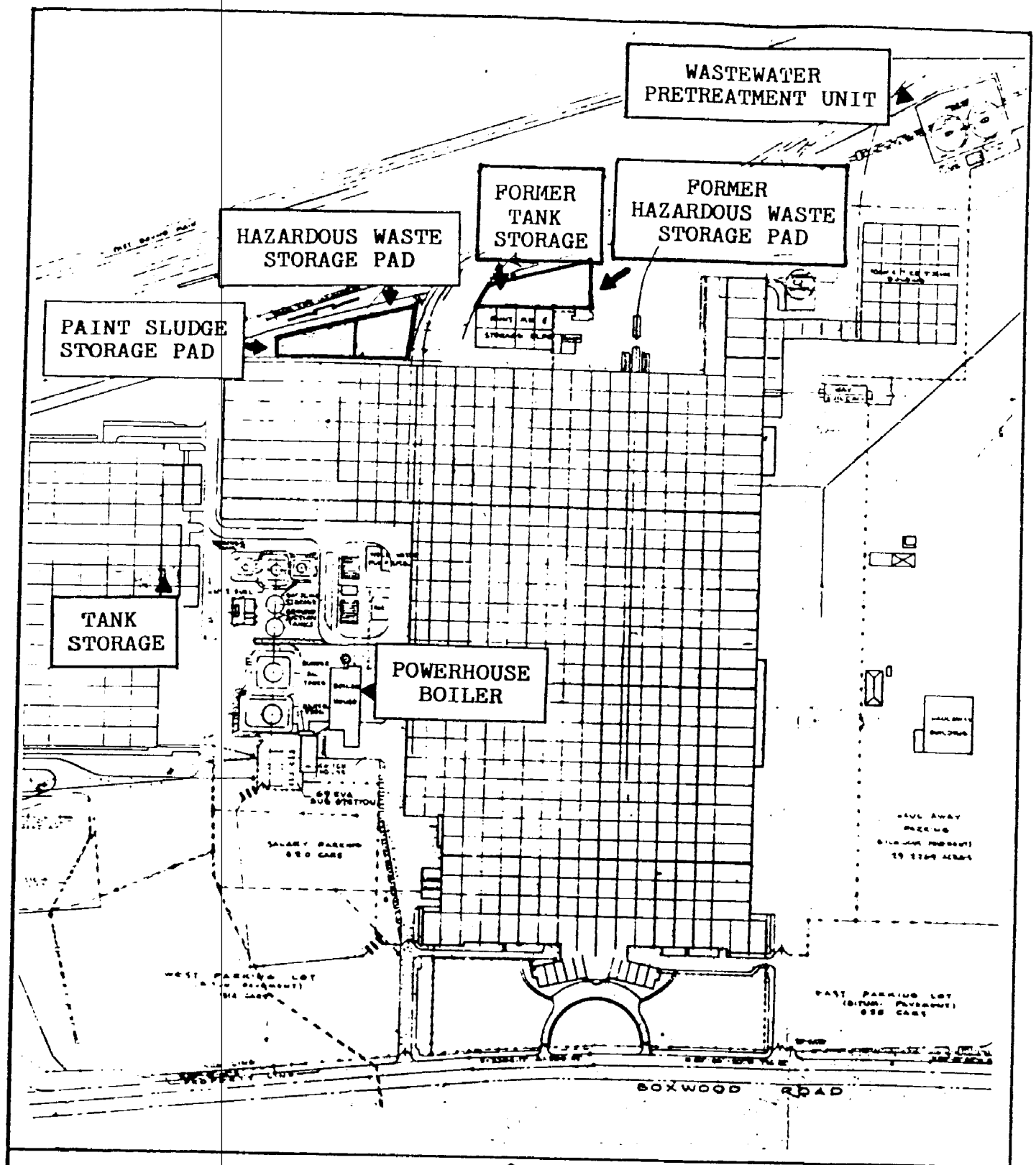
Seven solid waste management units (SWMUs) and two additional areas of concern have been identified at the facility. The location of each SWMU is shown in Figure 2.

3.1 Paint Sludge Storage Area

Description: The Paint Sludge Storage Pad is an outdoor, concrete area approximately 5000 square feet in size. The storage pad is contained by a concrete curb approximately 6 inches high. No cracks were observed in either the pad or the curb. The area drains via an underground culvert directly to the wastewater pretreatment unit. The valve on the drain is usually closed (GMC. November 1988). The maximum capacity for the paint sludge storage area is ten 800-gallon containers. GMC representatives report that the contents of the containers are disposed at the Pigeon Point Landfill in Delaware twice a week (GMC, October 6, 1988). It should be noted that the Pigeon Point Landfill has been closed for approximately six years; it is presumed by CDM FPC that GMC utilizes Cherry Island which is a municipal landfill for New Castle County, Delaware. This has been confirmed by CDM FPC in conversations with DE DNREC (DE DNREC, October 1988). The four containers present in this area at the time of the VSI (September 27, 1988) appeared scratched and slightly rusty. No stains were visible in the area. This area has been in use since 1980 (GMC, October 6, 1988).

Waste Characteristics: According to the analytical data from Environmental Industrial Research Associates, this sludge has been determined to be non-hazardous based on proposed TCLP regulatory levels (Appendix 1).

FIGURE 2



Solid Waste Management Unit Location Map

1" = 120'

Source:
PLOT PLAN
G M ASSEMBLY DIVISION
WILMINGTON PLANT
WILMINGTON, DELAWARE

CDM Federal Programs Corporation

Evidence of Releases:

No releases have been known to have occurred from this unit. No evidence of release was noted during the VSI.

3.2 Hazardous Waste Storage Pad

Description:

The Hazardous Waste Storage Pad is an outdoor, concrete area approximately 3750 square feet in size which is surrounded by a chainlink fence 8 feet high. The storage pad is contained by an approximate 6 inch curb. No cracks were observed in either the pad or the curb. The area drains via an underground culvert directly to the wastewater pretreatment unit. The valve on the drain is usually closed (GMC, November 1988). This SWMU is used to store 55-gallon drums containing waste paint and solvents. According to the facility representative, the area has a capacity of 100 drums; storage time does not exceed four weeks (GMC, October 6, 1988).

Drums are disposed according to the waste type. Petroleum Naphtha (D001 and D003) is disposed at Safety Kleen in Pennsylvania. Sulfuric Acid (D002) is disposed at Waste Conversion in Pennsylvania. Flammable liquid (D001, F003, and F005), corrosive liquid (D002), and 1,1,1-trichloroethane (F002) is disposed at Frontier Chemical in New York. Flammable liquid has also been disposed at Michigan Recovery System in Michigan and Marine Shale Processors in Louisiana (GMC, February 1988). Three of the drums observed had deformed lids. The labels on several drums were faded. This area has been in use since 1986.

Waste Characteristics:	According to the facility, waste materials such as sealers, solvents, waste paint, and corrosive liquid are stored at this unit. This would include listed wastes D001, D002, D003, F002, F003, and F005.
Evidence of Releases:	No releases have been known to occur from this unit. No evidence of release was noted during the VSI.

3.3 Former Hazardous Waste Storage Pad

Description:	The Former Hazardous Waste Storage Pad is an outdoor concrete area measuring approximately 20,000 square feet. The storage pad is contained by a curb approximately 6 inches high. It had been used to store raw materials as well as hazardous waste until 1986 when the new hazardous waste storage pad was constructed. Presently, the pad is occasionally used to store 55-gallon drums of waste when the new storage pad reaches its maximum capacity of 100 drums. No drums were present in this area at the time of the VSI. The area drains via an underground culvert directly to the wastewater pretreatment unit. The valve on the drain is usually closed (GMC, November 1988). This pad was installed in 1967.
Waste Characteristics:	According to the facility, this unit stored the same waste as the new hazardous waste storage pad. This would include listed wastes D001, D002, D003, F002, F003, and F005.
Evidence of Release:	No releases have been known to occur from this unit. No evidence of release was noted during the VSI.

3.4 Tank Storage Area

Description: This unit consists of two 6,000-gallon tanks that are used for the storage of accumulated paint residue and spent solvents from the purging of paint lines during the operation of the automobile assembly lines. These tanks are located inside the new paint building and are contained by a concrete dike (GMC, November 1988). During most of the year, the solvent is siphoned from the top of the tank, filtered, and piped to the powerhouse. The filters, filtered material, and remaining solids in the new tanks are drummed and stored at the hazardous waste storage pad. During the summer when the fuel need of the facility is minimal, the tanks' content are drained twice a week directly to a tanker truck which transports the waste to Marine Shale in Louisiana (GMC, October 6, 1988). The outside area where the trucks load is not contained. This unit has been in use since 1986.

Waste Characteristics: According to the facility, spent solvents and paint residue are stored at this unit. This would include listed wastes D001, F003, and F005.

Evidence of Releases: No releases have been known to occur from this unit. No evidence of release was noted during the VSI.

3.5 Former Tank Storage Area

Description: This unit consisted of two 6,000-gallon tanks that are used for the storage of accumulated paint residue and spent solvents. This unit was located on the former hazardous waste storage pad. It was dismantled in 1986 without a closure plan. This unit had been in use from 1975 until 1986.

Waste Characteristics:	According to the facility, this unit stored the same waste as the present tank storage unit. This would include listed wastes D001, F003, and F005.
Evidence of Releases:	No releases are known to have occurred from this unit. No evidence of release was noted during the VSI.

3.6 Powerhouse Boiler No. 1

Description:	Boiler No. 1 is a 60,000 pounds per hour steam boiler that has been modified to burn waste solvents. The boiler is fired with low sulfur fuel oil or natural gas. Solvent is burned when the boiler reaches 50 percent of the firing rate and a furnace temperature of 2500° Fahrenheit. This is done to ensure complete combustion of the solvents. When fully operating, approximately 60 gallons per hour of solvent are consumed (GMC, September 1988). Solvents have been burned as boiler fuel since 1982 (DE DNREC, February 1984).
Waste Characteristics:	According to the facility, waste solvent is burned at this unit. This would include listed wastes D001, F003, and F005.
Evidence of Releases:	No releases are known to have occurred from this unit. No evidence of release was noted during the VSI.

3.7 Wastewater Pretreatment Unit

Description:

The Wastewater Pretreatment Unit treats the industrial waste water before it is discharged to the Wilmington Sewage System. The industrial waste water includes water from the phosphating process, application of primer paint, and paint sludge. The pretreatment operation is designed to remove inorganics via a polymer and caustic process. Wastewater had previously been treated with lime. This process was changed in 1986 to reduce the amount of sludge produced. The sludge, referred to as bonderite sludge, is collected in two 25-cubic yard containers and disposed of at Waste Conversion in Pennsylvania (GMC, November 1988). This unit has been in operation since 1972. Prior to 1972, wastewater was released directly to the Wilmington Sewer System (GMC, October 6, 1988).

Waste Characteristics:

According to the facility, the sludge disposed from this unit is listed as D008. It had been previously listed as F006 since the bonderite sludge was considered part of an electroplating operation (GMC, November 1988). The facility is in the process of attempting to delist the sludge from this unit. Current analytical data (shown in Appendix 2) indicate it is non-hazardous based on proposed TCLP Regulatory Levels.

Evidence of Releases:

No releases are known to have occurred from this unit. No evidence of release was noted during the VSI.

3.8 Other Areas of Concern

3.8.1 Storm Water Treatment

Description: The facility's storm water treatment unit consists of three 100,000-gallon retention tanks which treat storm water collected from parking lots and roof conductors before it is discharged to the Little Mill Creek. These tanks are fitted with sediment removal and oil skimming equipment. According to the NPDES permit, this system may be bypassed if flow is greater that 2.8 MGD (DE DNREC, June 1982). There is no documentation available which indicates that a bypass has occurred. However, should bypass occur, there is the potential of oil being released to the Little Mill Creek. This unit has been operation since 1972 (GMC, October 6, 1988).

Waste Characteristics: Oil from the parking lots.

Evidence of Releases: No uncontrolled releases are known to have occurred from this area.

3.8.2 Facility Sewer System

Description: The sewer system transports wastewater from plant processes to the wastewater pretreatment unit. This is an underground system that could pose a threat to the groundwater and soil underlying the facility should a leak develop in the system as it transports wastewater from the processing areas and the hazardous waste storage area. According to the facility, this unit was constructed at the same time as the wastewater pretreatment unit in 1972.

Waste Characteristics:	Exact composition of wastewater is unknown, however, the potential exists for the transport of trace amounts of oil and solvents from the processing areas. There is also a possibility of transporting listed wastes D001, D002, D003, F002, F003, and F005 as drainage from the Hazardous Waste Storage Area should a spill occur.
Evidence of Releases:	No uncontrolled releases are known to have occurred from this system.

4.0 ENVIRONMENTAL SETTING

4.1 Geology and Hydrogeology

General Motors Corporation (GMC) lies within the Fall Zone which is the sharp junction of the Appalachian Piedmont Province and the Atlantic Coastal Plain Province (Delaware Geological Survey, 1972). GMC is situated chiefly within the Atlantic Coastal Plain Province which in this area, consists of the Potomac Formation. The northernmost portion of the property lies within the Appalachian Piedmont Province which, in the area, includes the Wilmington Complex (Delaware Geological Survey, 1975, 1981).

The early Cretaceous Potomac Formation is fluvial in origin and is composed predominantly of clays and silts with some interbedded sands. Generally, in the northern part of the Coastal Plain where the GMC facility is located, these sands are thin and irregular in extent and thickness. The deposition of the Potomac sediments by a complex stream system appears to have been continuous throughout the time of their formation. The geometry of the sand bodies resembles the shoestring channel deposits formed by unidirectional currents. The individual beds are usually restricted laterally in northern Delaware. The Potomac consists of variegated red, gray, purple, yellow, and white, frequently lignitic silts and clays containing interbedded white, gray and rust-brown quartz sands and some gravel (Delaware Geological Survey, 1972, 1975, 1981). According to soil borings at GMC (see Appendix 3), the area beneath the new paint building consists of a stiff light brown and gray stratified fine sandy silty clay combined with a clayey silt and medium dense silty fine sand down to a depth of approximately 30 feet. Between a depth of approximately 30 and 50 feet, soil composition changes to a dense to very dense gray and brown stratified silty gravelly coarse to fine sand with seams of clayey silt and finer sand. Between a depth of 50 and 75 feet, the soil composition changes to a hard, predominately dark green micaceous fine sandy silty clay and clayey silt. Bedrock is encountered at a depth of approximately 75 feet.

The Lower Paleozoic-Precambrian Wilmington Complex is subdivided into amphilbolites, gabbros, banded gneisses, and some granites. Specifically, it is composed of interlayered hornblende-plagioclase gneiss containing small amounts of orth-and clinopyroxene, and pyroxene-plagioclase gneiss, amphibolite, and quartz-plagioclase gneiss. The Wilmington Complex is essentially a dense gray rock (Delaware Geological Survey, 1975, University of Delaware, 1971).

Soils in the site area consist primarily of Made Land and Urban Land and partially of the Othello Series, the Elsinboro series, and the Kinkora Series. Made Land and Urban Land are areas that have been filled with soil material, trash, or both; it also consists of land that has been so altered or disturbed by urban works and structures that classifying the soils is no longer feasible. In many areas, the original soil has been covered by 18 inches to several feet of fill material that has been hauled in or graded from higher areas. In small areas, the soil profile has been entirely cut away (U.S. Dept. of Agriculture, 1970). The soil at the site can be classified as top soil for the first few inches. Then bituminous pavement and crushed stone base occur down to 2 feet. In some areas, fill material extends down to approximately 5 feet.

The northern part of the GMC site lies within the Othello-Fallsington-Urban land complex which consists of poorly drained, nearly level Othello and Fallsington soils that have been used for residential, commercial, and industrial development. Originally, about two-thirds of the complex was Othello soils and one-third was Fallsington soils which are poorly drained and occur on upland flats in the southern, or Coastal Plain, part of the county. The Othello Series consists of poorly drained soils that occur on upland flats of the Coastal Plain. These soils developed in highly silty material underlain by sand. A typical profile has a dark grayish-brown silt loam surface layer about 7 inches thick and a pale-brown silt loam very fine sandy loam subsurface layer about 3 inches thick. The subsoil, about 20 inches thick, is a gray or light-gray silt loam that is mottled with yellowish-brown very fine sandy loam mottled with gray or light-gray (U.S. Dept. of Agriculture, 1970). The Fallsington soils developed on old sandy deposits containing moderate amounts of silt and clay. In a typical

profile the uppermost layer is a dark grayish-brown loam about 11 inches thick. The subsoil is about 19 inches thick. The upper part of the subsoil is slightly sticky when wet and consists of a light brownish-gray sandy clay loam mottled with yellowish-brown. The lower part is gray or light-gray sandy loam also mottled with yellowish-brown. The underlying material is much the same color as the lower part of the subsoil but it is sandier. Most of the remaining 75 percent has been covered with as much as 18 inches of fill material. Some small areas have been covered with more than 18 inches of fill, but in few, if any, areas has the original soil profile been entirely removed (U.S. Dept. of Agriculture, 1970).

The western part of the site is situated within the Elsinboro-Delanco-Urban land complex which consists of level to gently sloping Elsinboro and Delanco soils that have been used for residential or other community purposes. Elsinboro soils originally made up two-thirds of the complex, and Delanco soils the remaining one-third. The Elsinboro Series soils are deep and well drained. They occur on terraces, benches, and low bluffs above the flood plains along some of the major streams on the northern part of the county, particularly along the boundary between the Piedmont Plateau and the Coastal Plain. These soils developed in old alluvium that washed mainly from areas of crystalline micaceous rocks. A typical profile has a brown or dark-brown surface layer about 7 inches thick and a yellowish-brown subsurface layer about 5 inches thick. Both layers are a silt loam that is slightly sticky when wet. The subsoil, about 24 inches thick, is a strong-brown silty clay loam in the upper part and is a strong-brown silt loam in the lower part. It is slightly sticky or sticky and contains mica flakes. The underlying material is a strong-brown fine sandy loam that generally is highly micaceous (U.S. Dept. of Agriculture, 1970). The Delanco soils are moderately well drained and occur on terraces along some of the major streams in the northern part of the county. These soils developed from material that washed from soils on uplands of the Piedmont Plateau. In a typical profile, the surface layer is a dark grayish-brown silt loam about 7 inches thick. The subsoil (about 30 inches thick) is a yellowish-brown silt loam in the upper-most 5 inches, a yellowish-brown and strong-brown silty clay loam is present between the depths of 11 to 23 inches, and a yellowish-red silt loam at depths between

23 to 32 inches. This layer is mottled with grayish-brown between the depths of 23 and 36 inches. The underlying material is a yellowish-red very fine sandy loam mottled with light brownish-gray. This layer contains some waterworn pebbles and is micaceous. About 40 percent of the total complex acreage has been relatively undisturbed. About 40 percent consists of places where as much as two-thirds of the original soil profile has been removed or has been covered with as much as 18 inches of fill material. The remaining 20 percent of the complex has been covered with more than 18 inches of fill, or the soil profile as been almost entirely cut away. Most of the fill material is silty (U.S. Dept. of Agriculture, 1970).

The site borders the Kinkora Series to the east. This series consists of level to gently sloping (0 to 3 percent slopes), poorly drained soils that occur on benchlike terraces just above the flood plains along some of the major streams in the northern part of the county. These soils developed in the old alluvial sediments that were washed primarily from areas of crystalline rocks on the Piedmont Plateau. In a typical profile, the surface layer is a dark-gray silt loam about 8 inches thick. Below this is a subsurface layer, about 4 inches thick, that is a gray silt loam and is mottled with strong brown. The subsoil, about 18 inches thick, is a heavy silt clay loam that is gray in the upper part and gray or light-gray in the lower part. The underlying material is a gray or light-gray silt loam and fine sandy loam. Mottles of strong brown occur in the subsoil, and mottles of yellowish-brown are in the upper part of the underlying material. Mica flakes are common in lower layers (U.S. Dept. of Agriculture, 1970).

The hydrology of the Piedmont Province aquifers is complex. The very old rocks that constitute most of the Piedmont are relatively impermeable, although groundwater may be present in considerable quantities along faults and fractures in the crystalline rocks. However, the quantities of water in such rocks are unpredictable and the mere presence of faults and fractures does not necessarily mean that a sufficient amount of groundwater is available. Formation and yields within the Wilmington Complex are usually low. The yield of an average house well is about 1 gallons per minute (gpm) and dry holes are fairly common. The main source of groundwater in this area is the sands of the Potomac Formation. Generally,

these sands have sufficient permeability, porosity, and saturated thickness, and other characteristics necessary to be considered an economically suitable aquifer. Yields from the Potomac are highly variable ranging from as low as a few gallons per minute to as high as 500 gpm. Since grain size varies widely among the sands of the Potomac, development of wells can be difficult and time consuming in the finer grained sands (Delaware Geological Survey, 1972, 1981), (University of Delaware, 1971). Based on the water levels noted on the soil boring records from the facility, groundwater generally flows in an eastern direction across the site (Appendix 3).

4.2 Surface Water

GMC discharges storm water to the Little Mill Creek which borders the facility on the west (Figure 1). This creek is confluent with the Christina River approximately 4 miles downstream from the facility. According to the regional water resources agency servicing New Castle County, the Christina River is the main waterway that drains the area (WRA, September 1988).

Drainage from the Hazardous Waste Storage Pad, the Old Hazardous Waste Storage Pad, and the Paint Sludge Storage Pad is directed to the facility's Wastewater Pretreatment Unit. After treatment, the water is combined with sanitary sewerage from the facility and discharged to the Wilmington Sewer System (GMC, October 6, 1988).

4.3 Meteorology

In general, the Wilmington area climate consists of warm and humid summers and usually mild winters. The average mean temperature is 54.1° Fahrenheit (F). Extreme temperatures during the winter range from a maximum of 64°F to a minimum of -7°F. Minimal temperatures usually occur in January with an average temperature of 32°F (NOAA, 1983).

The average annual precipitation is 43.55 inches, and the average annual lake evaporation is 33 inches. The net precipitation is therefore 10.55 inches. The 1-year, 24-hour rainfall maximum is 2.7 inches (NOAA, 1983, EPA 1982).

Rainfall distribution throughout the year is fairly uniform; however, the greatest amounts are normally received during the summer months. Mostly, summer rainfall comes in the form of thunderstorms. Hurricanes occasionally cause heavy rainfall. The maximum monthly precipitation was 12.09 inches in August 1955, while the minimum was 0.16 inches in July of the same year. Generally, the maximum precipitation occurs in August with an average of 3.04 inches. An average annual snowfall is 21 inches. Seasonal amounts range from 1 to 50 inches (NOAA, 1983).

In the Wilmington area, west to northwest winds predominate. Southern winds have secondary maximum frequency. The average wind speed is 9.2 mph (NOAA, 1983).

5.0 POLLUTION MIGRATION PATHWAYS

5.1 Groundwater

There have been no known releases to the groundwater pathway. However, the nature and the integrity of the facility sewer system is unknown. No monitoring wells have been installed at the facility. If leaks have developed or should develop in the future, the potential exists for the migration of hazardous waste constituents to the groundwater.

5.2 Surface Water

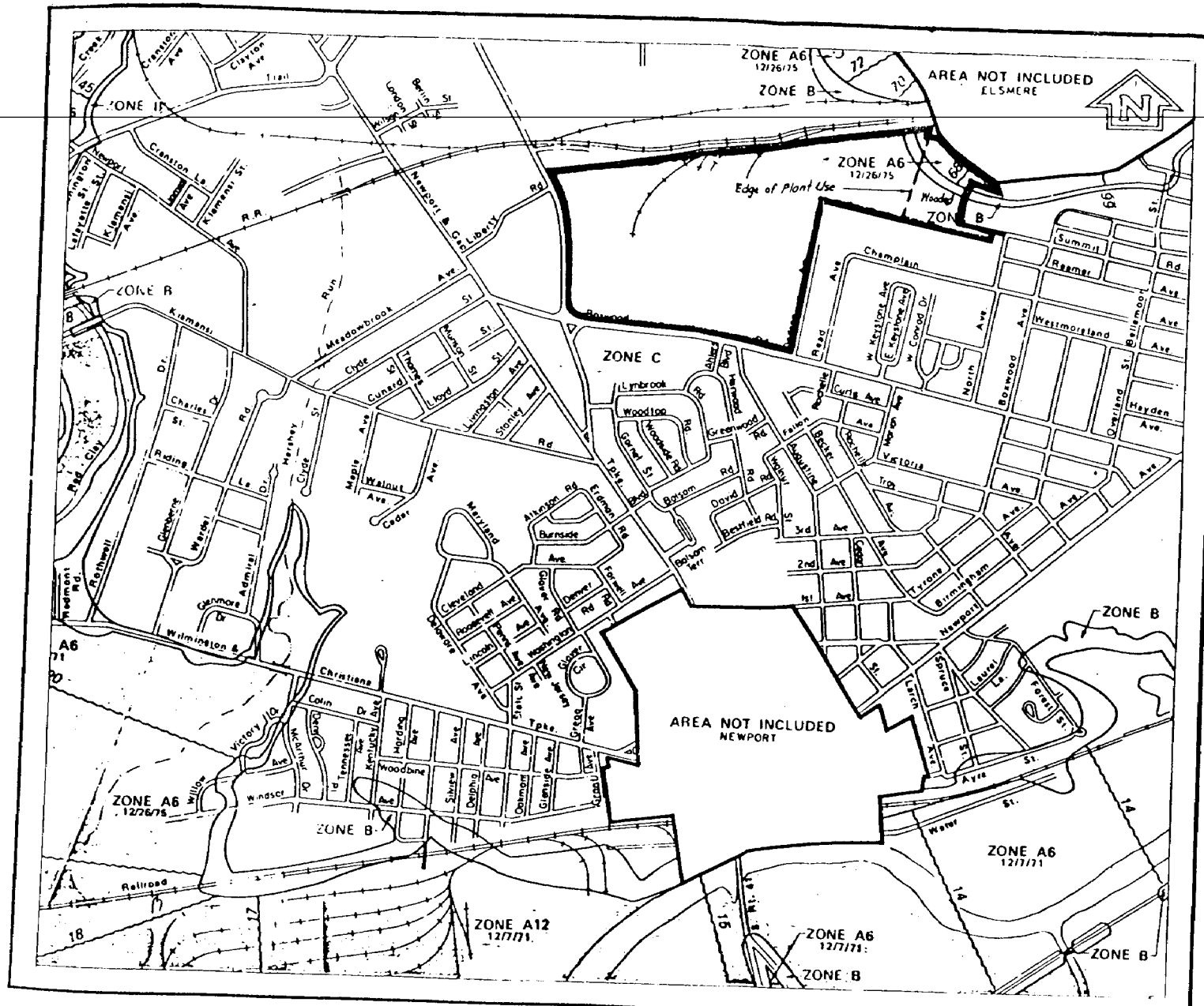
Storm water is discharged into the Little Mill Creek (Figure 1). The influent storm line begins from an open culvert across Boxwood Road south of the facility. Storm water runoff enters this line through seven drains on the west side of the plant. The storm line runs north on the west side of the plant and east along the north side. According to the facility, storm water in this line drains from parking lots and roof conductors. Prior to the discharge at Little Mill Creek, the storm water is collected in three 100,000-gallon retention tanks which are fitted with sediment removal and oil skimming equipment (DE DNREC, June 1982).

Drainage from plant processes and storage pads is directed to the facility wastewater pretreatment unit (GMC, October, 1988). It is ultimately released to the Wilmington Sewer System.

The most probable release to the surface water pathway would be through flooding.

According to a flood hazard boundary map, most of the facility lies in Zone C (Minimal flood hazard). However, the hazard increases to the east toward the Little Mill Creek (Figure 3). Should flooding occur, there is a possibility of hazardous constituents being released to the creek from the facility operations such as painting processes.

FIGURE 3


ZONE A6
12/26/75
ZONE B
AREA NOT INCLUDED
ELSMERE
ZONE A6
12/26/75
Edge of Plant Use
Wooded
ZONE B
ZONE C
ZONE B
AREA NOT INCLUDED
NEWPORT
ZONE A6
12/26/75
ZONE B
ZONE A12
12/7/71
ZONE A6
12/7/71
ZONE B
ZONE A6
12/7/71
ZONE B
Base Flood Elevation Line 513
Base Flood Elevation (513' M.S.L.)
Elevation Reference Mark RM7
River Mile M 1.5
*EXPLANATION OF ZONE DESIGNATIONS
A flood insurance map displays the zone designations for a community according to areas of designated flood hazards. The zone designations used by FIA are
Zone Symbol
Category
A
Areas of special flood hazards (SFHA) and without base flood elevations determined
A1 through A30
Areas of special flood hazards (SFHA) with base flood elevations. Zones are assigned according to flood hazard factors and dates of SFHA identification
AO
Areas of special flood hazards that have shallow flood depths (less than two feet) and or undefined above flow paths. Base flood elevations are not determined
V
Areas of special flood hazards with velocity that are inundated by tidal floods. Zones are assigned according to flood hazard factors and dates of SFHA identification
B
Areas of moderate flood hazards
C
Areas of minimal flood hazards
D
Areas of undetermined, but possible flood hazards
APPROXIMATE SCALE
0
1000
2000
SCALE IN FEET
NEW CASTLE CO., DE
FLOOD HAZARD BOUNDARY MAP
SOURCE:
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
CDM Federal Programs Corporation

5.3 Soil

There are no known releases to the soil pathway (GMC, August 1988). However, the nature and integrity of the facility sewer system is unknown. If leaks have developed or should develop in the future, the potential exists for the migration of hazardous waste constituents to the soil.

5.4 Air

There are no known releases to the air pathway. There is no indication of airborne contamination from the facility.

5.5 Subsurface Gas

There are no known releases to the subsurface gas pathway. No landfills are known to exist at this site.

6.0 EXPOSURE POTENTIAL

6.1 Groundwater

The potential for exposure from groundwater contamination is expected to be low. Residents within a one mile radius of the facility are supplied with drinking water from the Artesian Water Company which utilizes wells located in the area between DuPont Boulevard and the Delaware River for its water supply. This area is located more than four miles from GMC. A spokesman for Artesian Water Company indicated that there may be a few older homes in the area utilizing private wells (Sam Baker, September 1988). The residents in these homes would be at risk to possible groundwater contamination.

6.2 Surface Water

The Little Mill Creek is not used as a drinking water source by any of the area's water companies. According to the Delaware Nature Educational Society the creek is also not used for recreational purposes (Ann Loring, December 1988). There is no evidence to suggest that the creek is used for private drinking water supplies.

6.3 Soil

There is no known potential for exposure from contaminated soil. If contamination existed, exposure should be limited to plant personnel as the facility is contained by a fence and entry is limited.

6.4 Air

There is no known potential for exposure to air contaminants from the GMC facility. The population within a one mile radius of the facility has not been determined at this time.

6.5 Subsurface Gas

There is no known potential for exposure to subsurface gas as a result of the activities at the GMC facility.

REFERENCES

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U.S. Department of Agriculture. Soil Survey, New Castle County, Delaware. October, 1970.

APPENDIX 1
PAINT SLUDGE ANALYTICAL DATA

ENVIRONMENTAL INDUSTRIAL RESEARCH ASSOCIATES, INC
161 James Drive West, Suite 100
St. Rose, Louisiana 70087
(504) 469-0333

METHODS

Soils, Sediments and Hazardous Waste Evaluation Procedures:

1. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, U.S.E.P.A. Second Edition Revised April, 1984

GC/MS Method For Volatile Organics	Method 8240
Sample Introduction: VOA	Method 5030
GC/MS Method for Semivolatile Organics	Method 8270
Continuous Liquid/Liquid Extraction	Method 3520
Organochlorine Pesticides and PCB's	Method 8080
Chlorinated Herbicides	Method 8150
Arsenic	Method 7060
Barium	Method 7080
Cadmium	Method 7130
Chromium	Method 7190
Lead	Method 7420
Mercury	Method 7470
Selenium	Method 7740
Silver	Method 7760
Acid Digestion Procedure for Flame AAS	Method 3010
Acid Digestion Procedures for Furnace AAS	Method 3020

2. Standard Methods for the Examination of Water and Wastewater APHA, AWWA, WPCF, Sixteenth Edition, 1985

Mercury	Method 303F

3. FEDERAL REGISTER: Friday June 13, 1986. 40 CFR Parts 261, 271, and 302

TCLP Extraction Procedure	Page 21685

John R. Troost,
Manager of Analytical Services

1/26/88
Date

Thomas E. Orr,
Quality Assurance Coordinator

Date

EIRA ENVIRONMENTAL INDUSTRIAL RESEARCH ASSOCIATES, INC.

0030 TCLP EXTRACT

STANDARD ADDITIONS

Metals	Concentration in Extract (mg/l)	RDL (mg/l)	Correlation Coefficient (mg/l)
Arsenic	BDL	0.002	0.9945
Barium	1.8	0.1	0.9993
Cadmium	0.030	0.005	1.0000
Chromium	BDL	0.05	0.9970
Lead	0.30	0.1	0.9973
Mercury	0.0012	0.0002	0.9911
Selenium	BDL	0.002	0.9982
Silver	0.08	0.01	0.9999

BDL: Below Detection Limit
RDL: Required Detection Limit

Client: Weston
Sample: 0030

Date Extracted: 01/05/87
Date Analyzed : 01/09/87

TCLP VOLATILE ORGANICS

Compound	Retention Time (min)	Concentration in Extract (ug/l)	RDL (ug/l)
Vinyl Chloride		BDL	5.0
Methylene Chloride	5.44	9 B	5.0
1.1-Dichloroethene		BDL	5.0
Chloroform		BDL	5.0
1.2-Dichloroethane		BDL	5.0
1.1.1-Trichloroethane		BDL	5.0
Carbon tetrachloride		BDL	5.0
Trichloroethene		BDL	5.0
1.1.2-Trichloroethane		BDL	5.0
Benzene		BDL	5.0
Tetrachloroethene		BDL	5.0
1.1.2.2-Tetrachloroethane		BDL	5.0
Toluene	22.90	3 **	5.0
Chlorobenzene		BDL	5.0
Carbon Disulfide		BDL	5.0
2-Butanone		BDL	5.0
Acrylonitrile		BDL	5.0
Isobutenol		BDL	5.0
1.1.1.2-tetrachloroethane		BDL	5.0

SURROGATE RECOVERY	%
1,2-Dichloroethane-d4	85
Toluene-d8	103
4-Bromofluorobenzene	94

(Results are not corrected for Recovery)

Associated Blank: Blank #2

RDL: Required Detection Limit
BDL: Below Detection Limit
** : Below Report Limit, but Detected
B : Detected in Blank
MS : Matrix Spike Compound added to Sample at a Level of _____

Client: Weston
Sample: 0030

Date Extracted: 01/14/87
Date Analyzed : 01/25/87

TCLP BASE/NEUTRAL EXTRACTABLES

Compound	Retention Time (min)	Concentration in Extract (ug/l)	RDL (ug/l)
Bis(2chloroethyl)ether		BDL	20.0
1,3-Dichlorobenzene		BDL	20.0
1,4-Dichlorobenzene		BDL	20.0
1,2-Dichlorobenzene		BDL	20.0
Hexachloroethane		BDL	20.0
Nitrobenzene		BDL	20.0
Hexachlorobutadiene		BDL	20.0
2,4-Dinitrotoluene		BDL	20.0
Hexachlorobenzene		BDL	20.0

SURROGATE RECOVERY	%
d-5 nitrobenzene	76
2-Fluorobiphenyl	74
d-14 Terphenyl	100

(Results are not corrected for Recovery)

Associated Blank: Blank #4

TCLP ACID EXTRACTABLES

Compound	Retention Time (min)	Concentration in Extract (ug/l)	RDL (ug/l)
Phenol		BDL	20.0
2,4,6-Trichlorophenol		BDL	20.0
Pentachlorophenol		BDL	20.0
2-Methylphenol		BDL	20.0
4-Methylphenol		BDL	20.0
2,4,5-Trichlorophenol		BDL	20.0
3-Methylphenol		BDL	20.0
2,3,4,6-Tetrachlorophenol		BDL	20.0

SURROGATE RECOVERY	%
d-5 phenol	64
2-Fluorophenol	74
2,4,6-Tribromophenol	91

(Results are not corrected for Recovery)

Associated Blank: Blank #4

RDL: Required Detection Limit
BDL: Below Detection Limit
** : Below Report Limit, but Detected
B : Detected in Blank
MS : Matrix Spike Compound added to Sample at a Level of _____

Client: Weston
Sample: 0030

Date Extracted: 01/23/87
Date Analyzed: 01/26/87

TCLP EXTRACT: PESTICIDES/HERBICIDES

PESTICIDE FRACTION

Compounds	Retention Time (min.)	Concentration (ug/l)	RDL (ug/l)
Gamma-BHC (Lindane)		BDL	5.00
Heptachlor		BDL	5.00
Heptachlor Hydroxide		BDL	5.00
Endrin		BDL	10.00
Methoxychlor		BDL	50.00
Chlordane		BDL	50.00
Toxaphene		BDL	100.00

Surrogate: Dibutyl Chlorendate Recovery: 105%

HERBICIDE FRACTION

Compounds	Retention Time (min.)	Concentration (ug/l)	RDL (ug/l)
2,4-D		BDL	65.00
2,4,5-TP (Silvex)		BDL	20.00

Surrogate: 4-(2,4-Dichlorophenoxy)butyric Acid Recovery: 48%

NOTES:
- RDL: Detection Limit Required by Method
- BDL: Below Required Detection Limit
- **: Below Required Detection Limit but Detected
- DL: Diluted Out
- B: Compound Detected in Blank
- MS: Matrix Spike Compound: Level:

ug/l for Aldrin/G-BHC/Heptachlor
ug/l for Dieldrin/Endrin/4,4'-DDT
ug/l for 2,4-D (Herbicide)

Toxicity Characteristic Contaminant Levels

PESTICIDES

Compound	Proposed TCLP Regulatory Levels (mg/l)	Final CCWE F001-F005 Treatment (mg/l)
Chlordane	0.03	---
Endrin	0.003	---
Heptachlor(and its hydroxide)	0.001	---
2,4D	1.4	---
Lindane	0.06	---
Methoxychlor	1.4	---
Toxaphene	0.07	---
2,4,5-TP (silvex)	0.14	---

INORGANICS

Compound	Proposed TCLP Regulatory Levels (mg/l)	Final CCWE F001-F005 Treatment (mg/l)
Arsenic	5.0	---
Barium	100.	---
Cadmium	1.0	---
Chromium	5.0	---
Lead	5.0	---
Mercury	0.2	---
Selenium	1.0	---
Silver	5.0	---

1) Sources - Proposed TCLP Regulatory Levels - 6-13-86 Federal Register - p. 21685.
Final Constituents in Waste Extract (CCWE) Treatment Levels - 11-7-86 Federal Register - p. 40642.

2) "---" - indicates no applicable limit.

3) CCWE levels apply only to F001-F005 wastes, but may reflect levels which will apply to other individual wastes when additional regulations are promulgated.

4) TCLP Levels are proposed and subject to change.

5) When limits are given in both columns, use the more restrictive of the two when evaluating a waste as potentially hazardous. None of the above limits currently apply to wastes other than F001-F005, but should be considered indicative of limits which may become effective over the next several years.

Toxicity Characteristic Contaminant Levels

ORGANICS

Compound	Proposed TCLP Regulatory Levels (mg/l)	Final CCWE F001-F005 Treatment (mg/l)
Acetone	---	0.59
Acrylonitrile	5.0	---
Benzene	0.07	---
Bis(2-chloroethyl)ether	0.05	---
n-Butyl Alcohol	---	5.0
Carbon Disulfide	14.4	4.81
Carbon Tetrachloride	0.07	0.96
Chlorobenzene	1.4	0.05
Chloroform	0.07	---
Cresol(all isomers)	10.0	0.75
Cyclohexanone	---	0.75
1,2-Dichlorobenzene	4.3	0.125
1,4-Dichlorobenzene	10.8	---
1,2-Dichloroethane	0.40	---
1,1-Dichloroethylene	0.1	---
2,4-Dinitrotoluene	0.13	---
Ethyl Acetate	---	0.75
Ethyl Benzene	---	0.053
Ethyl Ether	---	0.75
Hexachlorobenzene	0.13	---
Hexachlorobutadiene	0.72	---
Hexachloroethane	4.3	---
Isobutanol	36.	5.0
Methanol	---	0.75
Methylene Chloride	8.6	0.96
Methyl Ethyl Ketone	7.2	0.75
Methyl Isobutyl Ketone	---	0.33
Nitrobenzene	0.13	0.125
Pentachlorophenol	3.6	---
Phenol	14.4	---
Pyridine	5.0	0.33
1,1,1,2-Tetrachloroethane	10.0	---
1,1,2,2-Tetrachloroethane	1.3	---
Tetrachlorethylene	0.1	0.05
2,3,4,6-Tetrachlorophenol	1.5	---
Toluene	14.4	0.33
1,1,1-Trichloroethane	30.	0.41
122-Trichloro-122-trifluoro-ethane	---	0.96
1,1,2-Trichloroethane	1.2	---
Trichloroethylene	0.07	0.091
2,4,5-Trichlorophenol	5.8	---
2,4,6-Trichlorophenol	0.30	---
Trichlorofluoromethane	---	0.96
Vinyl Chloride	0.05	---
Xylene	---	0.15

APPENDIX 2
WASTEWATER TREATMENT SLUDGE

ENVIRONMENTAL INDUSTRIAL RESEARCH ASSOCIATES, INC
161 James Drive West, Suite 100
St. Rose, Louisiana 70087
(504) 469-0333

METHODS

Soils, Sediments and Hazardous Waste Evaluation Procedures:

1. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, U.S.E.P.A. Second Edition Revised April, 1984

GC/MS Method For Volatile Organics	Method 8240
Sample Introduction: VOA	Method 5030
GC/MS Method for Semivolatile Organics	Method 8270
Continuous Liquid/Liquid Extraction	Method 3520
Organochlorine Pesticides and PCB's	Method 8080
Chlorinated Herbicides	Method 8150
Arsenic	Method 7060
Barium	Method 7080
Cadmium	Method 7130
Chromium	Method 7190
Lead	Method 7420
Mercury	Method 7470
Selenium	Method 7740
Silver	Method 7760
Acid Digestion Procedure for Flame AAS	Method 3010
Acid Digestion Procedures for Furnace AAS	Method 3020

2. Standard Methods for the Examination of Water and Wastewater APHA, AWWA, WPCF, Sixteenth Edition, 1985

Mercury	Method 303F

3. FEDERAL REGISTER: Friday June 13, 1986. 40 CFR Parts 261, 271, and 302

TCLP Extraction Procedure	Page 21685

John R. Troost,
Manager of Analytical Services

1/26/88
Date

Thomas E. Orr,
Quality Assurance Coordinator

Date

EIRA ENVIRONMENTAL INDUSTRIAL RESEARCH ASSOCIATES, INC.

WASTE TREATMENT 8612-342-0090

STANDARD ADDITIONS

Metals	Concentration in Extract (mg/l)	RDL (mg/l)	Correlation Coefficient (mg/l)
Arsenic	0.004	0.002	0.9995
Barium	0.16	0.1	0.9993
Cadmium	0.020	0.005	0.9999
Chromium	0.006	0.05	0.9966
Lead	0.083	0.05	1.0000
Mercury	0.0027	0.0002	0.9942
Selenium	0.0002	0.002	0.9958
Silver	0.059	0.01	0.9930

Client: Weston
Sample: Waste Treatment Building

Date Extracted: 12/15/86
Date Analyzed : 12/17/87

TCLP VOLATILE ORGANICS

Compound	Retention Time (min)	Concentration in Extract (ug/l)	RDL (ug/l)
Vinyl Chloride		BDL	5.0
Methylene Chloride	5.71	16 B	5.0
1.1-Dichloroethene		BDL	5.0
Chloroform		BDL	5.0
1.2-Dichloroethane		BDL	5.0
1.1.1-Trichloroethane		BDL	5.0
Carbon tetrachloride		BDL	5.0
Trichloroethene		BDL	5.0
1.1.2-Trichloroethane		BDL	5.0
Benzene		BDL	5.0
Tetrachloroethene		BDL	5.0
1.1.2.2-Tetrachloroethane		BDL	5.0
Toluene	22.97	7 B	5.0
Chlorobenzene		BDL	5.0
Carbon Disulfide		BDL	5.0
2-Butanone	11.56	250 B	5.0
Acrylonitrile		BDL	5.0
Isobutenol		BDL	5.0
1.1.1.2-tetrachloroethane		BDL	5.0

SURROGATE RECOVERY	%
1,2-Dichloroethane-d4	100
Toluene-d8	98
4-Bromofluorobenzene	98

(Results are not corrected for Recovery)

Associated Blank: Blank #5

RDL: Required Detection Limit
BDL: Below Detection Limit
** : Below Report Limit, but Detected
B : Detected in Blank
MS : Matrix Spike Compound added to Sample at a Level of _____

Client: Weston
Sample: Waste Treatment Building

Date Extracted: 12/15/86
Date Analyzed : 12/30/87

TCLP BASE/NEUTRAL EXTRACTABLES

Compound	Retention Time (min)	Concentration in Extract (ug/l)	RDL (ug/l)
Bis(2chloroethyl)ether		BDL	20.0
1,3-Dichlorobenzene		BDL	20.0
1,4-Dichlorobenzene		BDL	20.0
1,2-Dichlorobenzene		BDL	20.0
Hexachloroethane		BDL	20.0
Nitrobenzene		BDL	20.0
Hexachlorobutadiene		BDL	20.0
2,4-Dinitrotoluene		BDL	20.0
Hexachlorobenzene		BDL	20.0

SURROGATE RECOVERY	%
d-5 nitrobenzene	76
2-Fluorobiphenyl	99
d-14 Terphenyl	68

(Results are not corrected for Recovery)

Associated Blank: Blank #1

TCLP ACID EXTRACTABLES

Compound	Retention Time (min)	Concentration in Extract (ug/l)	RDL (ug/l)
Phenol		BDL	20.0
2,4,6-Trichlorophenol		BDL	20.0
Pentachlorophenol		BDL	20.0
2-Methylphenol		BDL	20.0
4-Methylphenol		BDL	20.0
2,4,5-Trichlorophenol		BDL	20.0
3-Methylphenol		BDL	20.0
2,3,4,6-Tetrachlorophenol		BDL	20.0

SURROGATE RECOVERY	%
d-5 phenol	79
2-Fluorophenol	84
2,4,6-Tribromophenol	91

(Results are not corrected for Recovery)

Associated Blank: Blank #1

RDL: Required Detection Limit
BDL: Below Detection Limit
** : Below Report Limit, but Detected
B : Detected in Blank
MS : Matrix Spike Compound added to Sample at a Level of _____

Client: Weston
Sample: Waste Treatment 8612342-0090

Date Extracted:
Date Analyzed: 1/6/87

TCLP EXTRACT: PESTICIDES/HERBICIDES

PESTICIDE FRACTION

Compounds	Retention Time (min.)	Concentration (ug/l)	RDL (ug/l)
Gamma-BHC (Lindane)		BDL	5.00
Heptachlor		BDL	5.00
Heptachlor Hydroxide		BDL	5.00
Endrin		BDL	10.00
Methoxychlor		BDL	50.00
Chlorodane		BDL	50.00
Toxaphene		BDL	100.00

Surrogate: Dibutyl Chlorendate Recovery: 110%

HERBICIDE FRACTION

Compounds	Retention Time (min.)	Concentration (ug/l)	RDL (ug/l)
2,4-D		BDL	65.00
2,4,5-TP (Silvex)		BDL	20.00

Surrogate: 4-(2,4-Dichlorophenoxy)butyric Acid Recovery: 43%

NOTES:
- RDL: Detection Limit Required by Method
- BDL: Below Required Detection Limit
- **: Below Required Detection Limit but Detected
- DL: Diluted Out
- B: Compound Detected in Blank
- MS: Matrix Spike Compound: Level:

ug/l for Aldrin/G-BHC/Heptachlor
ug/l for Dieldrin/Endrin/4,4'-DDT
ug/l for 2,4-D (Herbicide)

Toxicity Characteristic Contaminant Levels

PESTICIDES

Compound	Proposed TCLP Regulatory Levels (mg/l)	Final CCWE F001-F005 Treatment (mg/l)
Chlordane	0.03	---
Endrin	0.003	---
Heptachlor(and its hydroxide)	0.001	---
2,4D	1.4	---
Lindane	0.06	---
Methoxychlor	1.4	---
Toxaphene	0.07	---
2,4,5-TP (silvex)	0.14	---

INORGANICS

Compound	Proposed TCLP Regulatory Levels (mg/l)	Final CCWE F001-F005 Treatment (mg/l)
Arsenic	5.0	---
Barium	100.	---
Cadmium	1.0	---
Chromium	5.0	---
Lead	5.0	---
Mercury	0.2	---
Selenium	1.0	---
Silver	5.0	---

1) Sources - Proposed TCLP Regulatory Levels - 6-13-86 Federal Register - p. 21685.
Final Constituents in Waste Extract (CCWE) Treatment Levels - 11-7-86 Federal Register - p. 40642.

2) "---" - indicates no applicable limit.

3) CCWE levels apply only to F001-F005 wastes, but may reflect levels which will apply to other individual wastes when additional regulations are promulgated.

4) TCLP Levels are proposed and subject to change.

5) When limits are given in both columns, use the more restrictive of the two when evaluating a waste as potentially hazardous. None of the above limits currently apply to wastes other than F001-F005, but should be considered indicative of limits which may become effective over the next several years.

Toxicity Characteristic Contaminant Levels

ORGANICS

Compound	Proposed TCLP Regulatory Levels (mg/l)	Final CCWE F001-F005 Treatment (mg/l)
Acetone	---	0.59
Acrylonitrile	5.0	---
Benzene	0.07	---
Bis(2-chloroethyl)ether	0.05	---
n-Butyl Alcohol	---	5.0
Carbon Disulfide	14.4	4.81
Carbon Tetrachloride	0.07	0.96
Chlorobenzene	1.4	0.05
Chloroform	0.07	---
Cresol(all isomers)	10.0	0.75
Cyclohexanone	---	0.75
1,2-Dichlorobenzene	4.3	0.125
1,4-Dichlorobenzene	10.8	---
1,2-Dichloroethane	0.40	---
1,1-Dichloroethylene	0.1	---
2,4-Dinitrotoluene	0.13	---
Ethyl Acetate	---	0.75
Ethyl Benzene	---	0.053
Ethyl Ether	---	0.75
Hexachlorobenzene	0.13	---
Hexachlorobutadiene	0.72	---
Hexachloroethane	4.3	---
Isobutanol	36.	5.0
Methanol	---	0.75
Methylene Chloride	8.6	0.96
Methyl Ethyl Ketone	7.2	0.75
Methyl Isobutyl Ketone	---	0.33
Nitrobenzene	0.13	0.125
Pentachlorophenol	3.6	---
Phenol	14.4	---
Pyridine	5.0	0.33
1,1,1,2-Tetrachloroethane	10.0	---
1,1,2,2-Tetrachloroethane	1.3	---
Tetrachlorethylene	0.1	0.05
2,3,4,6-Tetrachlorophenol	1.5	---
Toluene	14.4	0.33
1,1,1-Trichloroethane	30.	0.41
122-Trichloro-122-trifluoro-ethane	---	0.96
1,1,2-Trichloroethane	1.2	---
Trichloroethylene	0.07	0.091
2,4,5-Trichlorophenol	5.8	---
2,4,6-Trichlorophenol	0.30	---
Trichlorofluoromethane	---	0.96
Vinyl Chloride	0.05	---
Xylene	---	0.15

APPENDIX 3
SOIL BORING LOG

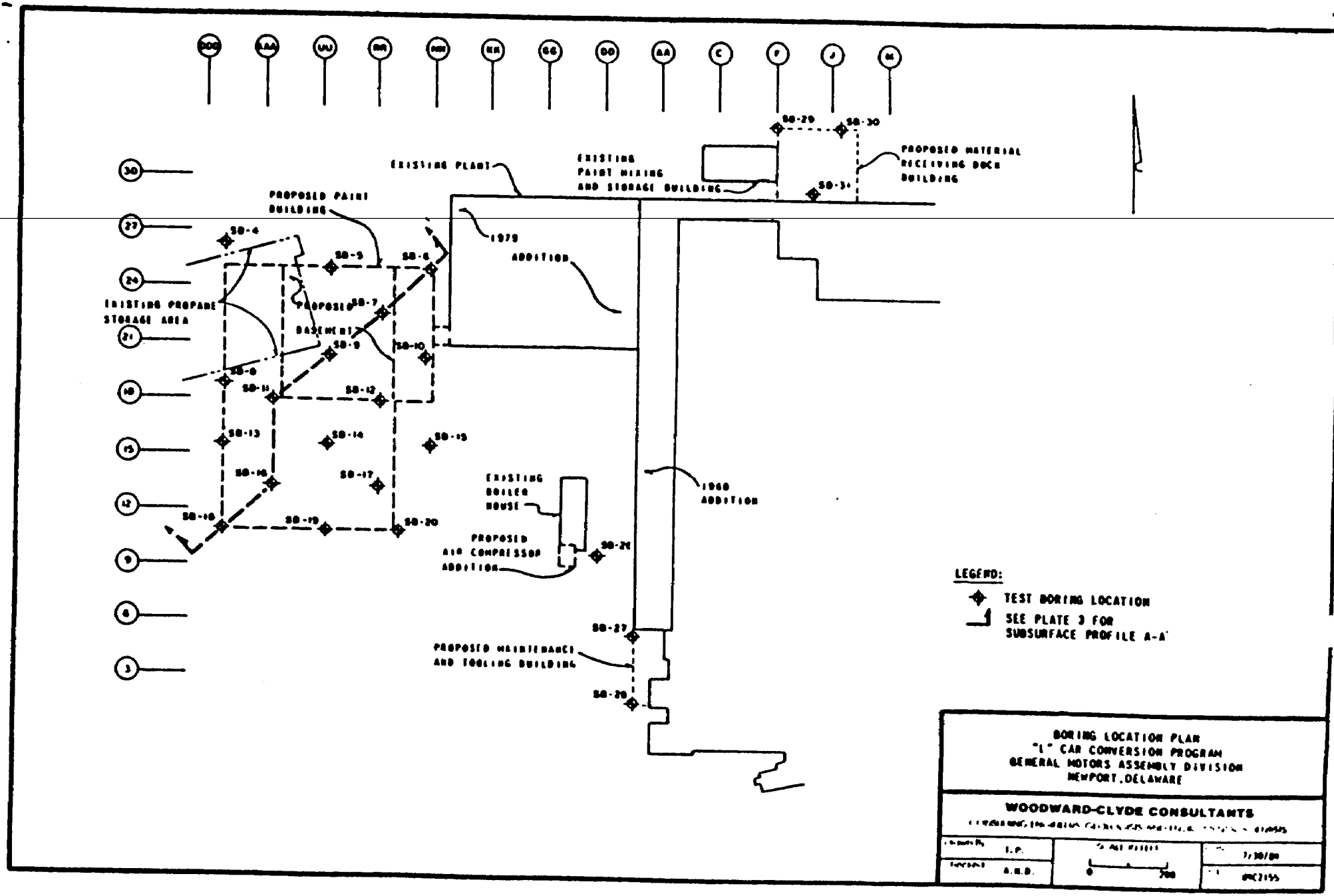
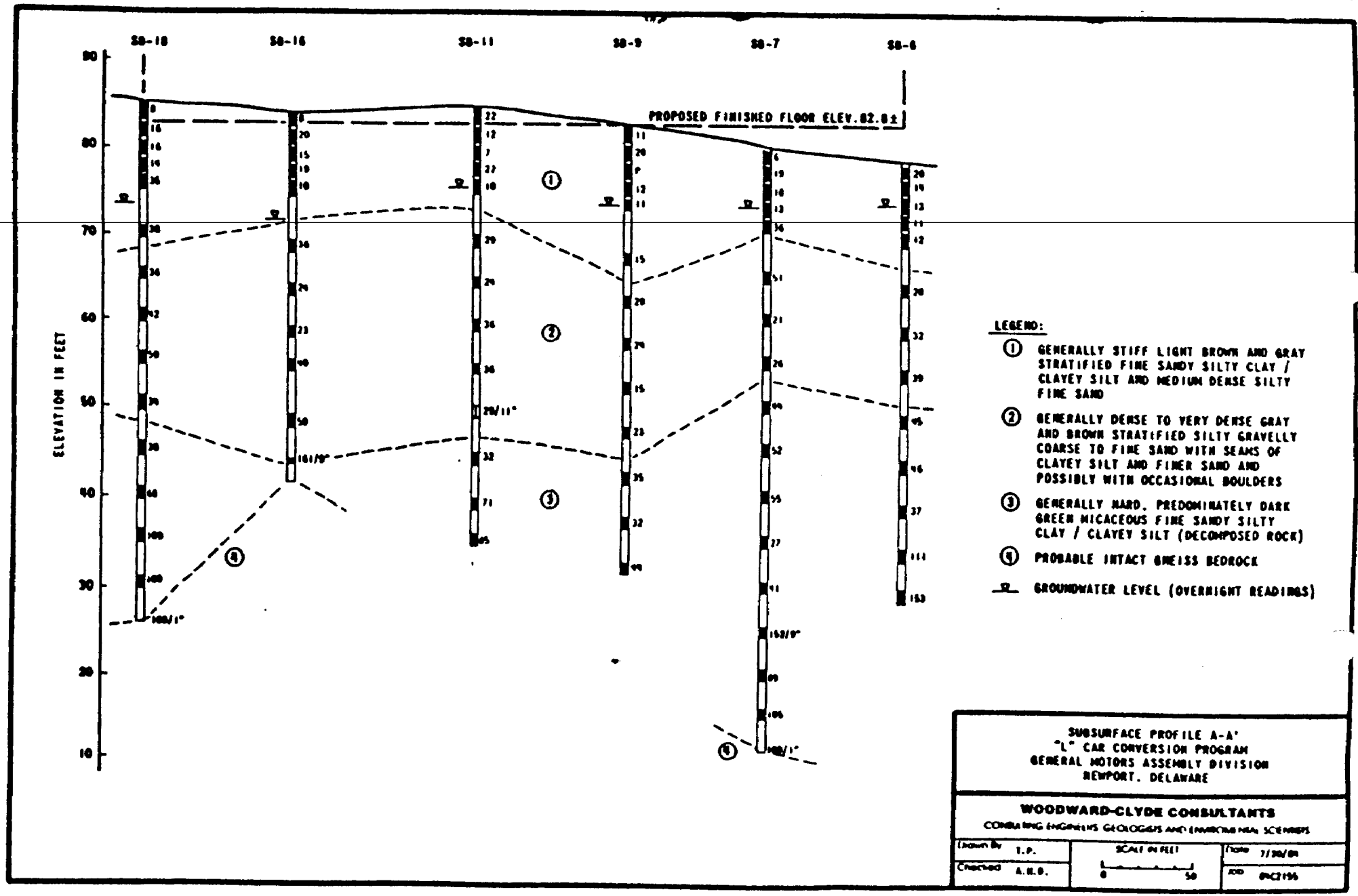

EXISTING PLANT
EXISTING PAINT MIXING AND STORAGE BUILDING
PROPOSED MATERIAL RECEIVING DOCK BUILDING
PROPOSED PAINT BUILDING
1979 ADDITION
EXISTING PROPANE STORAGE AREA
PROPOSED BASEMENT
1968 ADDITION
EXISTING BOILER HOUSE
PROPOSED AIR COMPRESSOR ADDITION
PROPOSED MAINTENANCE AND TOOLING BUILDING
SB-1
SB-2
SB-3
SB-4
SB-5
SB-6
SB-7
SB-8
SB-9
SB-10
SB-11
SB-12
SB-13
SB-14
SB-15
SB-16
SB-17
SB-18
SB-19
SB-20
SB-21
SB-22
SB-23
SB-24
SB-25
SB-26
SB-27
SB-28
SB-29
SB-30
LEGEND:
TEST BORING LOCATION
SEE PLATE 3 FOR SUBSURFACE PROFILE A-A'
BORING LOCATION PLAN
"L" CAR CONVERSION PROGRAM
GENERAL MOTORS ASSEMBLY DIVISION
NEWPORT, DELAWARE
WOODWARD-CLYDE CONSULTANTS
J.P.
A.B.D.
7/30/80
0
200

PLATE 2



SUBSURFACE PROFILE A-A'
"L" CAR CONVERSION PROGRAM
GENERAL MOTORS ASSEMBLY DIVISION
NEWPORT, DELAWARE

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

Drawn By T.P.	SCALE IN FEET 0 50	Date 7/30/89
Checked A.H.D.		Job 89C2196

PLATE 3

LOG of BORING No. SB-4

DATE 7/6/84 SURFACE ELEVATION 83.9 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		9	Topsoil (4")	83.6				
		7	Stiff brown fine sandy clayey silt and silty clay		25.7	34	22	
		18						
		20		76.1	23.0	37	25	
10		15	Dense orange-brown and gray stratified silty medium to fine sand and medium to fine sandy silty clay	70.9	22.3			M
		21	Medium dense to very dense orange-brown and gray silty gravelly coarse to fine sand		20.7			M
20		35						
		56			12.3			M
30		9		50.9				
		81	Hard brown, becoming predominantly green, micaceous fine sandy clayey silt/silty clay (Decomposed Rock)		30.9	61	35	M
40		32						
		147						
50		56			22.6	37	20	M
		65						
60		48						
		43						
70		129						
		100/1"		9.2				ROD
80		NX/86	Hard green and gray moderately fractured gneiss, with soft and friable zone from approximately 76.7 to 78.1 ft.	-0.8				29%
90								

Completion Depth 84.7 Feet Water Depth 12.9 Feet Date 7/6/84

Project Name General Motors Project Number 84C2155

LOG of BORING No. SB-5

DATE 7/9/84 SURFACE ELEVATION 79.4 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		9	Bituminous Pavement (2")	78.9				
		21	Crushed Stone Base (4")					
		13	Stiff to very stiff brown and gray fine sandy silty clay and clayey silt					
		12		70.9				
10		13	Medium dense brown micaceous silty fine sand	67.4				
		29	Very dense light gray and brown stratified coarse to fine sand and medium to fine sand, with occasional thin silt seams					
20		35						
		53						
30		52		46.9				
		32	Very stiff to hard brown and gray, becoming green, micaceous stratified fine sandy silty clay/clayey silt (Decomposed Rock)					
40		48						
		78						
50		28		29.4				

Completion Depth 50.0 Feet Water Depth 6.2 Feet Date 7/10/84

Project Name General Motors Project Number 84C2155

LOG of BORING No. SB-6

DATE 7/13/84 SURFACE ELEVATION 78.5 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		20	Bituminous Pavement (2"); Crushed Stone Base (4"); Sand/silt/glass/wire fill (18")	76.5				
		14						
		13						
		11	Medium dense to dense gray and brown stratified fine sandy silt, silty fine sand and silty medium to fine sand					
10		12		66.5				
		20	Dense to very dense gray and brown coarse to fine sand, trace gravel, with thin silt seams					
20		32						
		39		50.5				
30		45	Hard dense green and light brown micaceous fine sandy silty clay and clayey silt (Decomposed Rock)					
		46						
40		37						
		111						
50		153		28.5				

Completion Depth 50.0 Feet Water Depth 5.7 Feet Date 7/16/84

Project Name General Motors Project Number 84C2155

LOG of BORING No. SB-7

DATE 7/10/84 SURFACE ELEVATION 80.0 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		6	Bituminous Pavement (2")	79.6				
		19	Crushed Stone Base (3")					
		18	Stiff brown, gray, red-brown and green fine sandy clayey silt, trace coarse to medium sand					
		13		70.5				
10		36	Dense to very dense gray, red-brown and orange-brown silty coarse to fine sand					
		51						
20		21		58.0				
		26	Stiff green and red clayey silt, becoming orange-brown silty fine sand	53.0				
30		44	Hard gray and orange-brown, becoming predominantly green below 45 feet, stratified micaceous fine sandy clayey silt/silty clay (Decomposed Rock)					
		52						
40		55						
		27						
50		41						
		152/9"						
60		89						
		105						
70		100/1"		10.9				
			Note: Auger refusal at 69.0 feet					

Completion Depth 69.1 Feet Water Depth 7.0 Feet Date 7/11/84

Project Name General Motors Project Number 84C2155

LOG of BORING No. SB-8

DATE 7/11/84 SURFACE ELEVATION 84.4 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		17	Topsoil (5")	84.0				
		10	Stiff brown fine silty clay/clayey silt, trace fine sand		20.7	30	16	
		P		78.4	18.9	30	23	M,C,W
		11	Medium dense brown silty medium to fine sand		21.4	NP	NP	
10		11		72.4				
		13	Stiff dark gray silty clay	66.4	35.3	56	29	
20		14	Medium dense to dense light brown, orange-brown and gray stratified silty gravelly coarse to fine sand, with occasional thin silt seams; possible boulder at 32.8 feet					
		23			15.2			M
30		19						
		19			10.5			M
				46.4				
40		25	Very stiff to hard predominantly dark gray and green micaceous medium to fine sandy silty clay/clayey silt, becoming silty coarse to fine sand with rock fragments (Decomposed Rock)		38.2	66	31	M
		48						
50		39		34.4	17.2	NP	NP	M

Completion Depth 50.0 Feet Water Depth 7.7 Feet Date 7/12/84

Project Name General Motors Project Number 84C2155

LOG of BORING No. SB-9

DATE 7/9/84 SURFACE ELEVATION 82.4 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		11	Bituminous Pavement (2")	81.9				
		20	Crushed Stone Base (4")					
		P	Stiff light brown micaceous fine sandy silty clay, trace gravel		21.4	35	19	M,C W
		12						
		11		72.6				
10			Medium dense red-brown and light brown silty medium to fine sand					
		15		64.4				
20		28	Dense light brown gravelly silty coarse to fine sand					
		24		54.4				
30		15	Medium dense red-brown fine sand with thin seams of silty clay/clayey silt	49.4				
		23	Dense light brown silty gravelly coarse to fine sand with seams of clayey silt	43.9				
40		35	Hard stratified light gray and brown, becoming green, micaceous medium to fine sandy silty clay/clayey silt (Decomposed Rock)					
		32						
50		44		31.4				

Completion Depth 51.0 Feet Water Depth 9.3 Feet Date 7/9/84

Project Name General Motors Project Number 84C2155

LOG of BORING No. SB-10

DATE 7/12/84 SURFACE ELEVATION 80.0 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		15	Bituminous pavement (2") underlain by stiff dark gray gravelly clayey silt (Fill)	78.0				
		6						
		12	Firm to stiff brown stratified fine sandy silty clay/clayey silt and medium dense brown micaceous silty fine sand					
		7						
10		10						
		19						
20		26	Dense orange-brown gravelly silty coarse to fine sand	62.0				
			Very dense orange-brown fine sand, trace silt, with thin silt seams	57.0				
		39						
30		11	Stiff light brown and gray micaceous clayey silt, trace fine sand	52.0				
		17						
40		26		41.5				
		29	Hard light brown, gray and dark green micaceous fine sandy clayey silt/silty clay (Decomposed Rock)					
50		76		30.0				

Note: Undisturbed samples at depth of 2.0-4.0 feet in offset borings SB-10A and SB-10B. Sampling resistance from 4.0-6.0 feet was 5 and 10 blows per foot in each offset boring, respectively

Completion Depth 50.0 Feet Water Depth 7.8 Feet Date 7/13/84

Project Name General Motors Project Number 84C2155

LOG of BORING No. SB-11

DATE 7/8/84 SURFACE ELEVATION 84.4 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		22 12 7	Topsoil (8") underlain by stiff to very stiff tan and gray fine sandy clayey silt with root fibers	80.4				
10		22 10	Medium dense to dense brown silty fine sand with seams of clayey silt	72.4				
20		29 24	Dense to very dense light brown and gray stratified silty coarse to fine sand and silty medium to fine sand					
30		36 36						
40		29/11" 32		46.4				
50		71 85	Hard light brown and gray, becoming green, fine sandy clayey silt/silty clay, becoming silty fine sand (Decomposed Rock)	34.4				

Completion Depth 50.0 Feet Water Depth 9.2 Feet Date 7/10/84

Project Name General Motors Project Number 84C2155

LOG of BORING No. SB-12

DATE 7/13/84 SURFACE ELEVATION 81.2 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		24	Very dense gray and light brown mottled clayey silt and fine sand, trace coarse sand (FILL)	79.2				
		7						
		17	Medium dense to dense brown micaceous silty fine sand	75.2				
		7						
10		7	Firm brown, gray and red-brown fine sandy clayey silt	69.2				
		32	Very dense brown, gray, orange-brown and red-brown stratified silty gravelly coarse to fine sand, with thin silt seams					
20		33						
		36		53.2				
30		34	Hard light brown and green stratified micaceous fine sandy silty clay/clayey silt					
		35						
40		38						
		48						
50		54		31.2				

Completion Depth 50.0 Feet Water Depth 8.6 Feet Date 7/16/84

Project Name General Motors Project Number 84C2155

LOG of BORING No. SB-13

DATE 7/11/84 SURFACE ELEVATION 85.7 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		27 8 26 16	Medium dense to very dense brown and gray silty fine sand	79.7				
10		20	Medium dense to very dense brown and gray silty gravelly coarse to fine sand, with seams of silty fine sand, silty medium to fine sand, silty clay/ clayey silt, and possibly with cobbles and/or boulders.					
		13						
20		100/1"						
		23						
30		51						
		151/11"						
40		109		45.7				
		76	Very dense brown, becoming green, micaceous fine sandy silty clay/ clayey silt (decomposed rock)					
50		41		35.7				

Completion Depth 50.0 Feet Water Depth 8.3 Feet Date 7/12/84

Project Name General Motors Project Number 84C2155