

GRMP ENVIR. FILE

RESULTS OF  
HYDROGEOLOGICAL INVESTIGATION  
AT THE COLUMN A-15 EXCAVATION  
FOR  
GENERAL MOTORS CORPORATION  
CHEVROLET-PONTIAC-CANADA GROUP  
GRAND RAPIDS, MICHIGAN

MARCH, 1986

PHASE I

**EDI Engineering & Science**

Environmental Engineering, Geology, Biology and Chemistry  
Grand Rapids, MI: (616) 942-0970



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## INTRODUCTION

EDI Engineering & Science has conducted a Phase I study of the hydrogeology at the General Motors Corporation CPC Metal Fabrication Plant in Grand Rapids, Michigan. The specific area of investigation is a large excavation located in the northeast section of the plant in the area of column A-15. The excavation is part of the plant modernization program.

The General Motors Corporation CPC Metal Fabrication Plant is located approximately five miles south of downtown Grand Rapids and one-third mile east of Highway US-131. More specifically, the plant is located within the NE 1/4 of Section 24, T6W-R12W, Kent County, Michigan at the corner of 36th Street and Buchanan Avenue. A map showing the GM CPC plant site in relation to nearby roads and other features is shown in Figure 1.

The excavation that was constructed during June, 1985 went down to a depth of approximately 20 feet (Figure 2). In some areas, soil was removed down to the water table where a distinct layer of hydrocarbons consisting of mineral spirits was discovered (in contact with the groundwater). After the oil was discovered in the excavation by General Motors, EDI began a hydrogeological investigation to determine the impact of the oil, if any, on the underlying upper saturated zone and to establish more information on the hydrogeology.

The Phase I study determined the subsurface conditions near the excavation and in three monitoring wells on the west and north sides of the plant. The study was accomplished by: 1) drilling and completing seven monitoring wells; 2) measuring the oil layer in wells near the excavation; 3) determining groundwater elevations in the wells; and 4) taking water samples from the wells for laboratory analysis. This report also makes an estimate of the extent of oil-impacted groundwater in the area of the excavation. The existing information was reviewed and incorporated into the study.

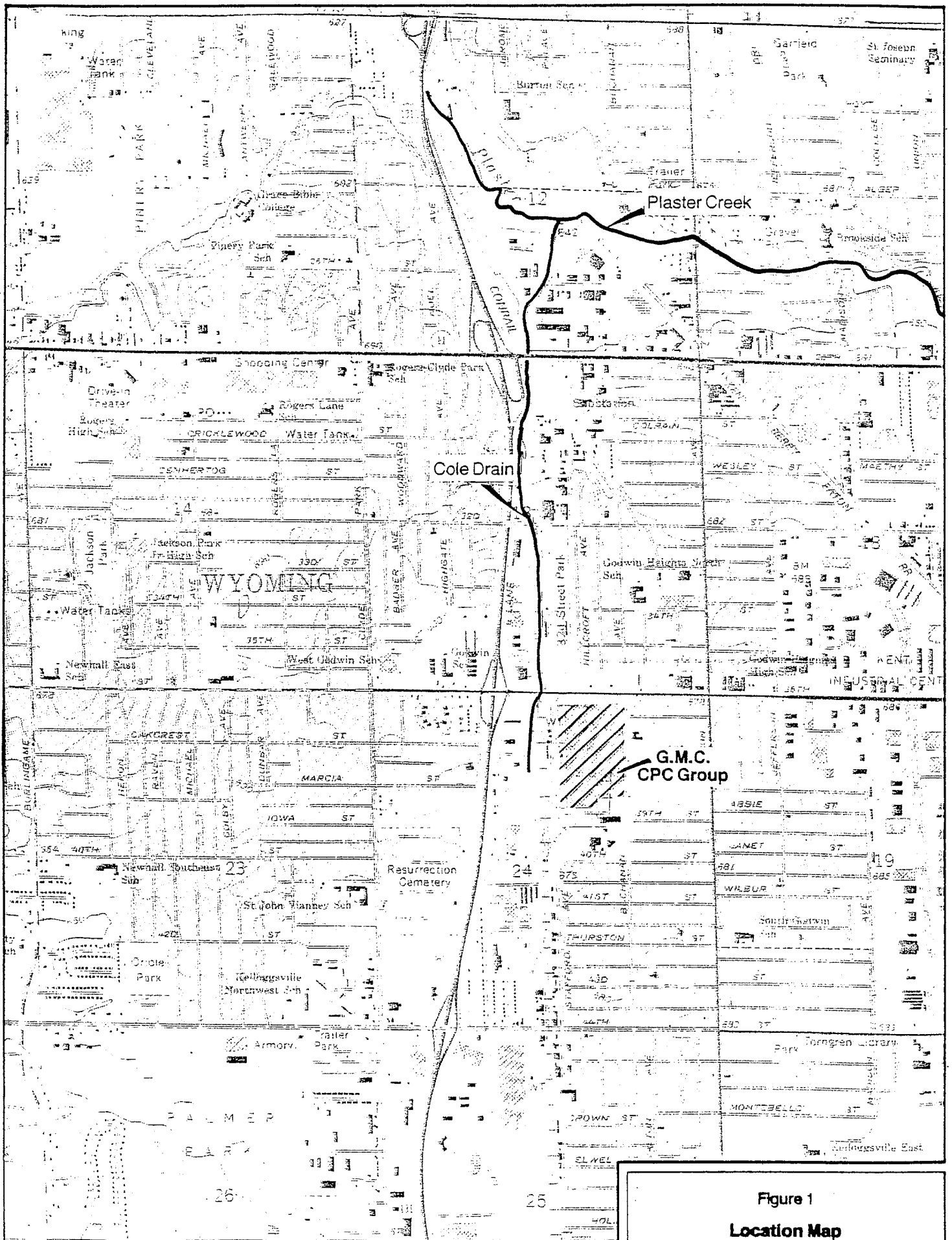
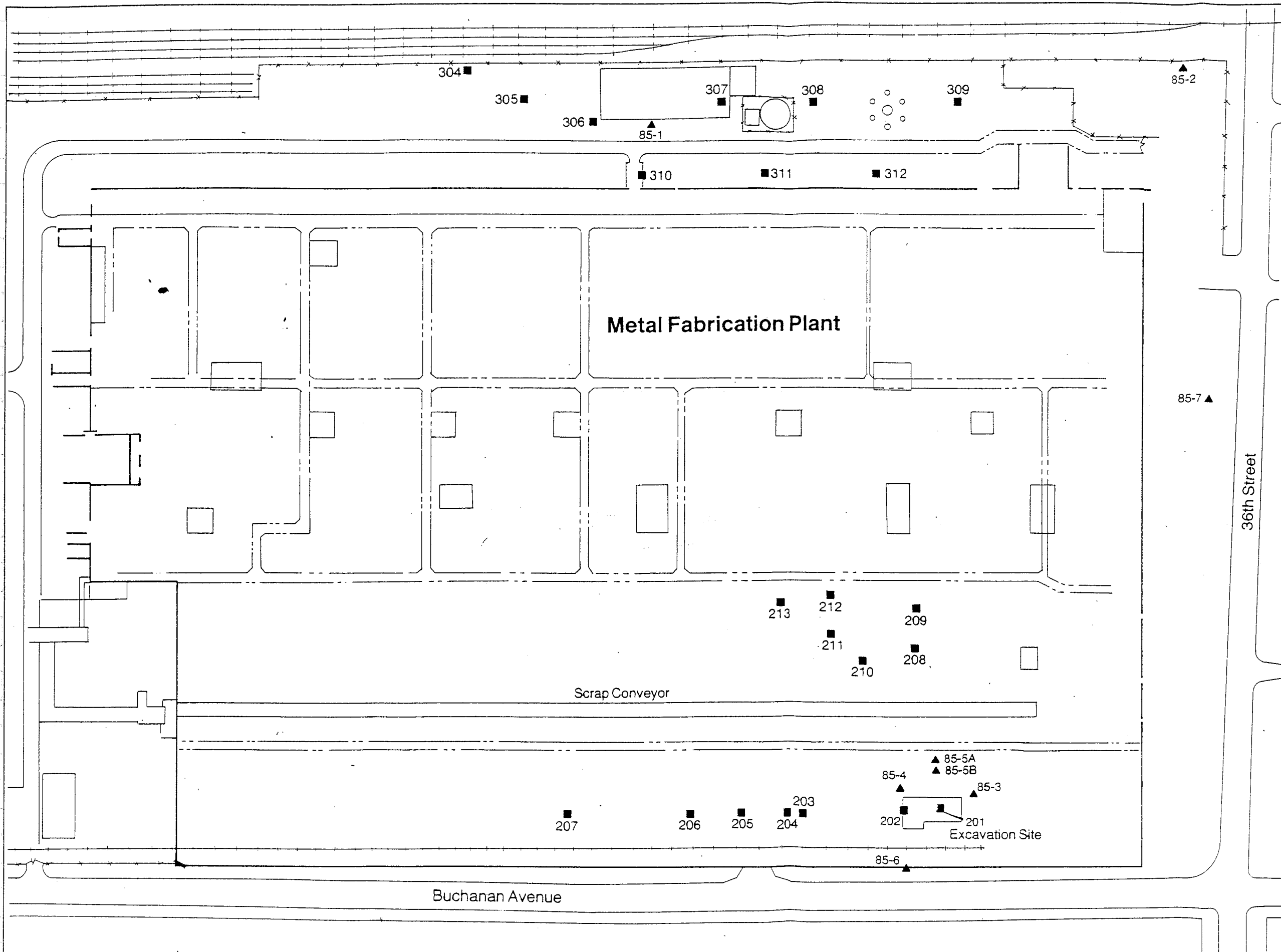


Figure 1  
 Location Map  
 General Motors Corp.-CPC Group  
 February, 1986 20458



**Legend**

- ▲ Monitor Well  
Drilled by EDI November, 1985
- Soil Boring  
Drilled by Soils and Materials  
Engineers March, 1985

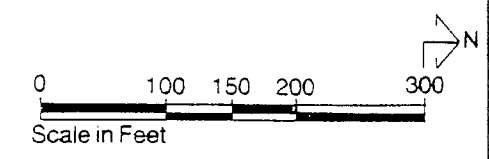


Figure 2  
**Plan Showing Metal Fabrication Plant  
 with Sampling Locations**  
 General Motors Corporation-CPC Group  
 February, 1986 20456

In addition to the Phase I study outlined above, water samples were collected from dewatering wells and discharge points in the area of new construction at the south end of the plant. The sampling was done at the request of the MDNR, and the water samples were collected during November, 1985 and January, 1986. The results are summarized in a letter report to Merl Petzold at General Motors dated February 14, 1986.

## METHODS OF INVESTIGATION

All of the monitoring wells terminated in a shallow sand or gravelly sand saturated zone and range in depth from 20 feet to 33 feet. The monitoring wells were drilled using a hollow stem auger and split spoon cores were collected every 5 feet starting at a depth of 5 feet below the surface.

The seven monitoring wells were completed with 2-inch galvanized steel casing attached to a wire-wrapped stainless steel screen. The casing and screen for each well were steam cleaned prior to being lowered into the hole. Wells 85-1, 85-2, 85-6 and 85-7 have 5-foot screens and wells 85-3, 85-4, and 85-5B, have 10-foot screens. The wells were constructed to have the screens only partially submerged below the water table so that floatable hydrocarbons could be detected and the thickness measured. The wells were backfilled with natural soils and bentonite, and cement grout was placed around the wells at the surface. Detailed information about each of the monitoring wells and borings can be found in Appendix A.

The elevation of the top of casing was determined for each monitoring well using standard instrument surveying techniques. The wells were completed with flush-mounted sealed caps with enclosed locking caps. At all of the locations, the top of casing was measured at the top of the surface pipe. Within the plant, the top of the casing is at the same elevation as the top of concrete floor. The seal-type flush-mounts eliminate the need for raising the tops of the casing above the level of the concrete. Because the well screens straddle the water table, venting of the wells is not required.

Water levels in the monitoring wells were measured on December 6, 1985 using a steel tape. The thickness of the hydrocarbon layer was measured in Wells 85-4, 85-5B, and 85-3 at the same time as sampling occurred. A clear acrylic bailer was used except in the case of 85-3. The bailer was lowered into the well and recovered the oil and water through a bottom check valve. The clear bailer would not fit inside the screen of Well 85-3. The stainless steel

bailer which is slightly smaller in diameter was lowered into the well so that the oil and water entered through the bottom check valve. The liquid was then poured into the clear acrylic bailer for measurement. The difference in internal diameter of the two bailers is 1/8-inch so the difference measured is not significant.

After the hydrocarbon thickness measurement at each well inside the plant; three casing volumes of water were removed from the well with the stainless steel bailer. The stainless steel bailer was rinsed at each well before sampling.

The seven monitoring wells were sampled in the following order: 85-4, 85-5B, 85-3, 85-1, 85-2, 85-7, and 85-6. The two bailers were thoroughly washed with detergent and water after the sampling of well 85-3 which was the last of the wells containing floatables.

The acrylic bailer was not employed in the sampling of the wells outside the plant as these wells had shown no indication of oil during drilling and did not show a sheen while the three casing volumes were being removed to purge the well.

Because of the sampling procedure, there is the possibility of cross contamination between the wells containing the oil. However, the two wells having less oil were sampled prior to 85-3. A second concern in sampling a well straddling the water table and containing oil is that the bailer goes through the oil and may bring the sample water into more contact with the oil.

The analyses of the water samples for priority pollutants were performed in EDI's laboratory. The volatiles on the priority pollutant list were analyzed using gas chromatography/mass spectrometry (GC/MS). The GC/MS volatile analyses were done according to EPA Method 624. The analyses of the base neutrals on the priority pollutant list were done according to EPA Method 625.



## FINDINGS

A total of seven monitoring wells were drilled at the General Motors CPC Metal Fabrication Plant during November and December, 1985.

Four of the wells were drilled around the excavation which is located within the northeastern portion of the plant. Three additional wells were drilled outside of the plant on the north, northwest and west sides of the building. The locations of the seven wells are shown in Figure 2.

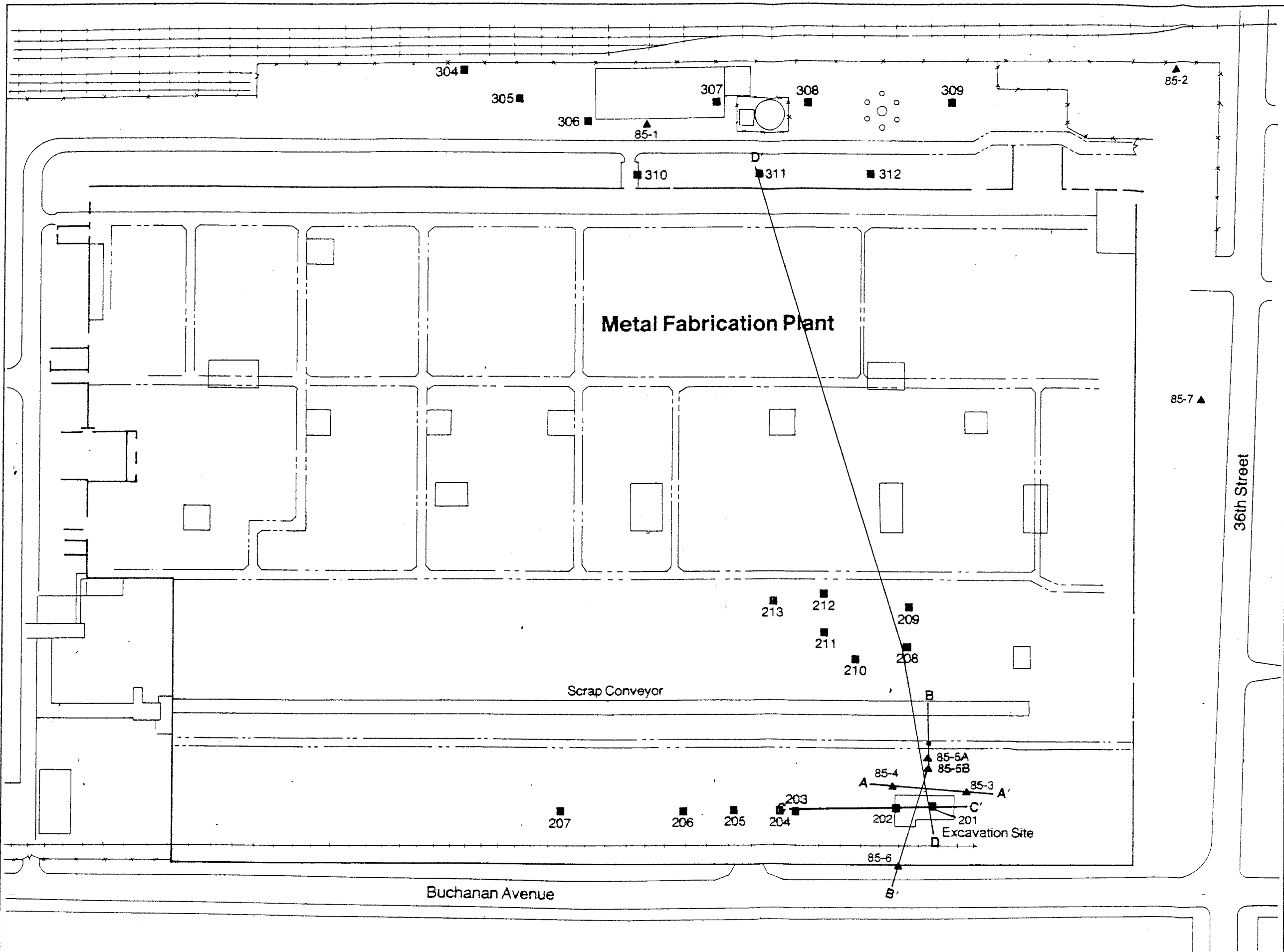
Boring #85-5A, which was not completed as a monitoring well, was drilled to a depth of 7.7 feet where concrete was encountered. Difficulty in penetrating the concrete resulted in the abandonment of 85-5A and moving to a new location 10.5 feet east which is designated as 85-5B.

The borings designated 201 through 213 and 304 through 312 were drilled by Soil and Materials Engineers, Inc. in March and April, 1985 prior to the construction of the excavation at column A-15. The excavation was completed during June, 1985.

### Geology:

The area occupied by the plant is underlaid by glacial outwash sediments consisting of sand and gravelly sand. Figure 3 shows the locations of cross sections A-A', B-B', and C-C' (Figures 4, 5, and 6) in the immediate area of Column A-15. Cross section C-C' (Figure 6) has the subsurface units dashed in the area of the excavation because part of boring 201 was removed during the construction of the excavation.

Monitoring wells 85-3, 85-4 and 85-5B, and boring 85-5A, are located inside the plant near the excavation. All of these wells penetrate a 0.3-foot wood block floor underlaid by a concrete floor varying in thickness from 0.8 foot



- Legend**
- ▲ Monitor Well  
Drilled by EDI November, 1985
  - Soil Boring  
Drilled by Soils and Materials  
Engineers March, 1985

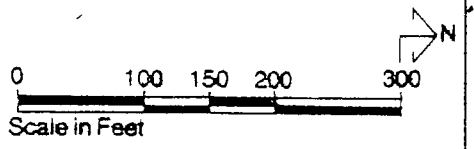
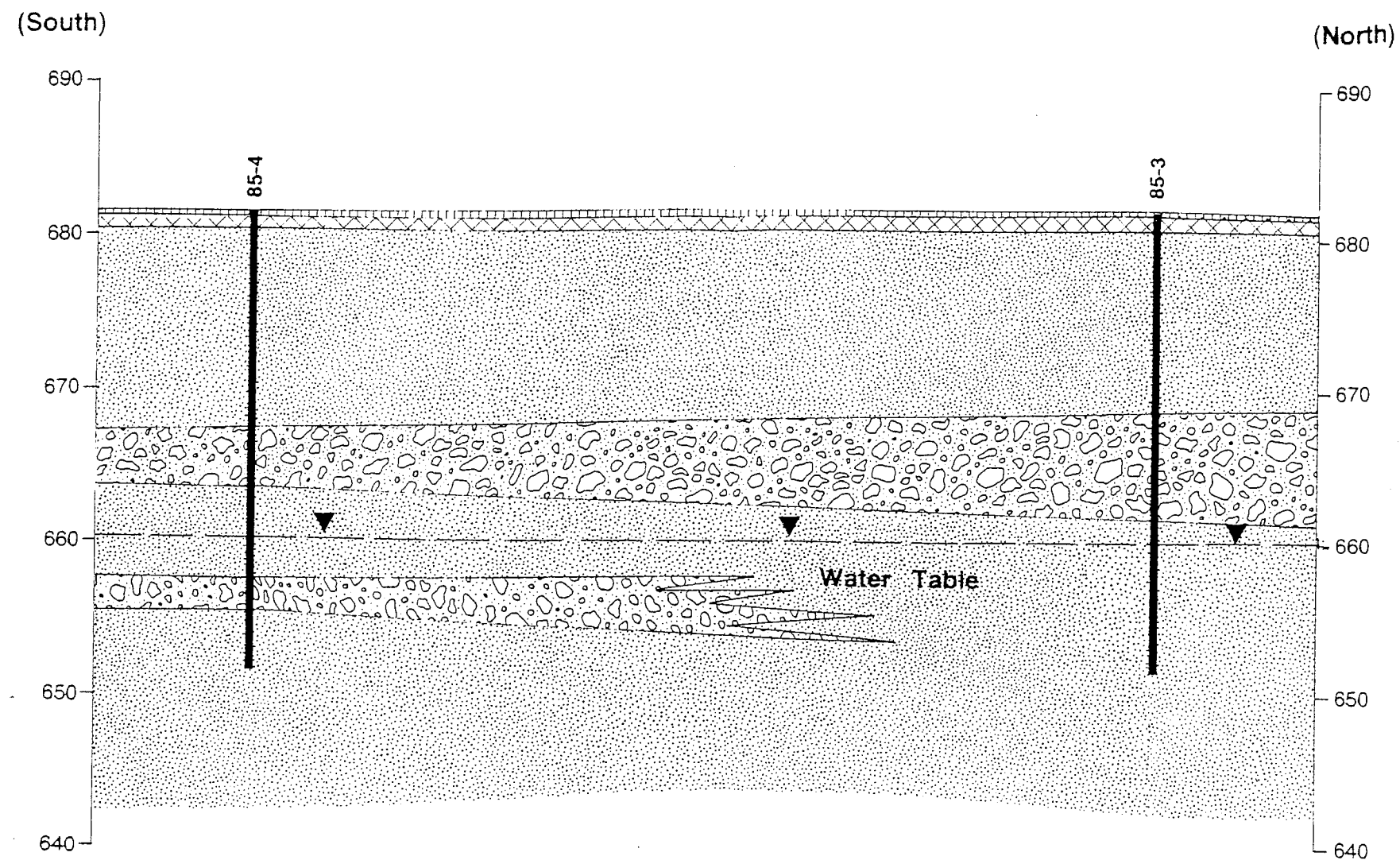






Figure 3  
 Plan Showing Locations  
 of Cross-Sections  
 General Motors Corporation-CPC Group  
 February, 1986 20456



### Legend

-  Wood Block Floor
-  Concrete Sub-Floor
-  Sand, Fine to Medium Grained
-  Sand, Gravelly, Medium to Coarse Grained

Horizontal Scale: 1 inch = 20'  
Vertical Exaggeration: 2X

Figure 4

### Cross Section A-A'

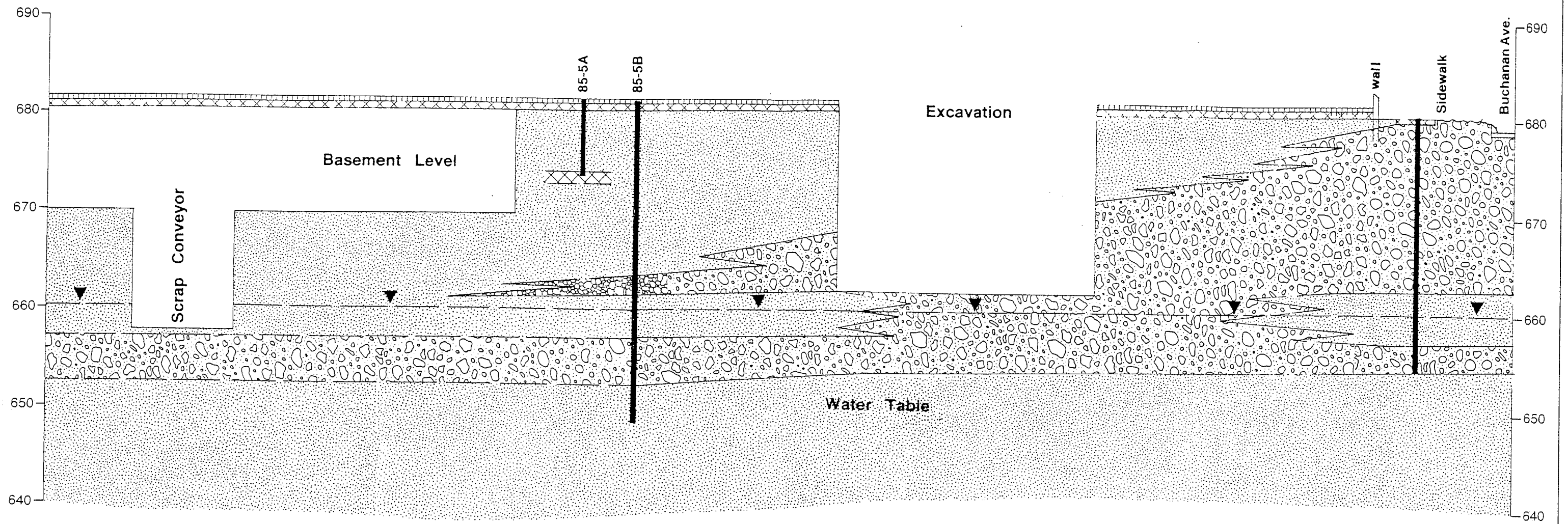
General Motors Corporation-CPC Group

February, 1986






20456

(West)

(East)



### Legend

-  Wood Block Floor
-  Concrete Sub-Floor
-  Sand, Fine to Medium Grained
-  Sand, Gravelly, Medium to Coarse Grained
-  Gravel, Medium to Coarse Grained

Horizontal Scale: 1 inch = 20'  
Vertical Exaggeration: 2X

Figure 5

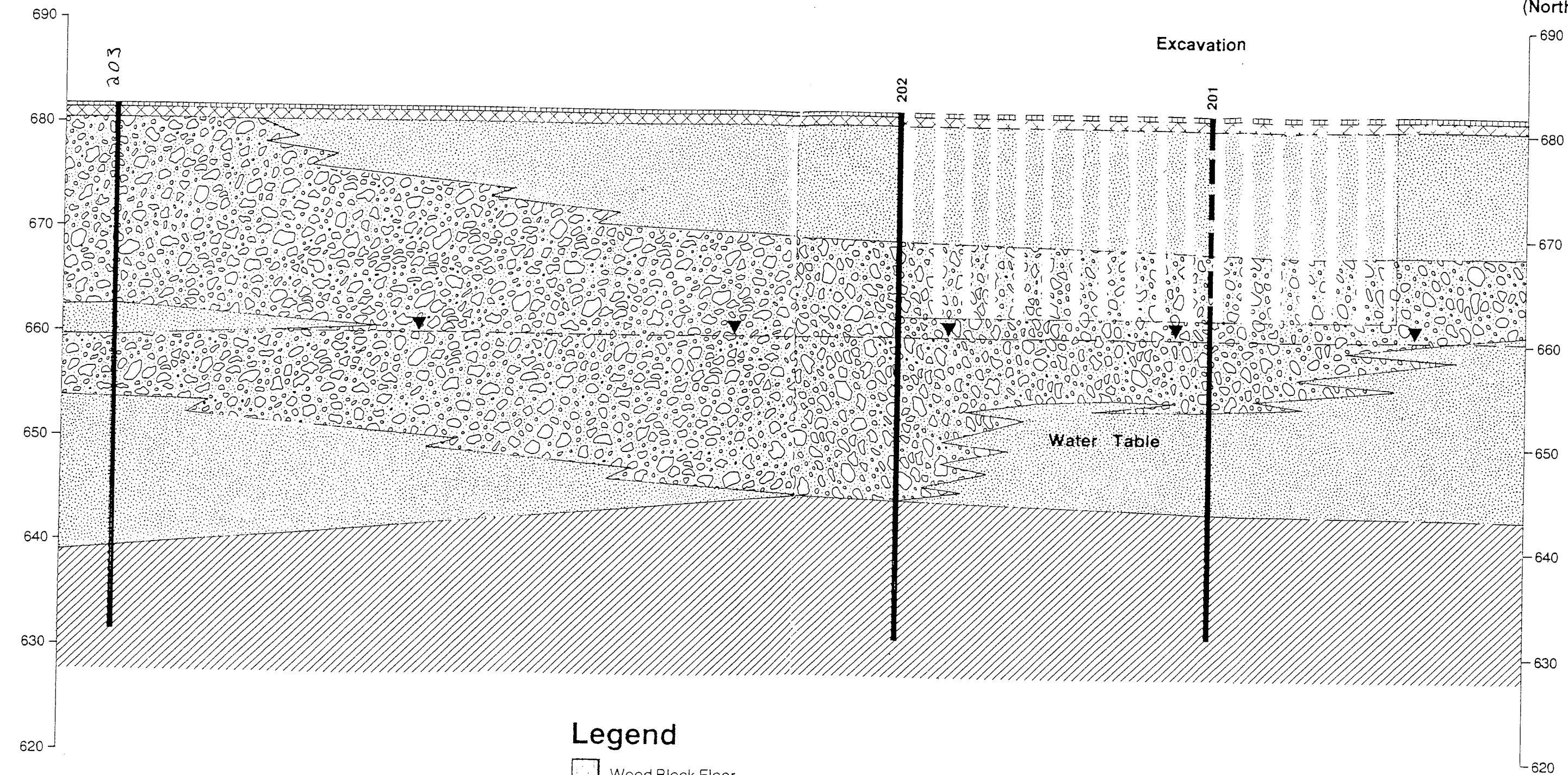
#### Cross Section B-B'

General Motors Corporation-CPC Group






February, 1986

20456

(South)



### Legend

-  Wood Block Floor
-  Concrete Sub-Floor
-  Sand, Fine to Medium Grained
-  Sand, Gravelly, Medium to Coarse Grained
-  Clay, Silty, Dark Brown

Horizontal Scale: 1 inch = 20'  
Vertical Exaggeration: 2X

Note: Wells 201 and 202 were drilled  
prior to the excavation.

Figure 6

### Cross Section C-C'

General Motors Corporation-CPC Group

February, 1986

20456

to 1 foot. Below the concrete floor is an upper fine-to-medium grained sand ranging in thickness from 11 to 17 feet, and this sand unit is continuous in the immediate area of the excavation.

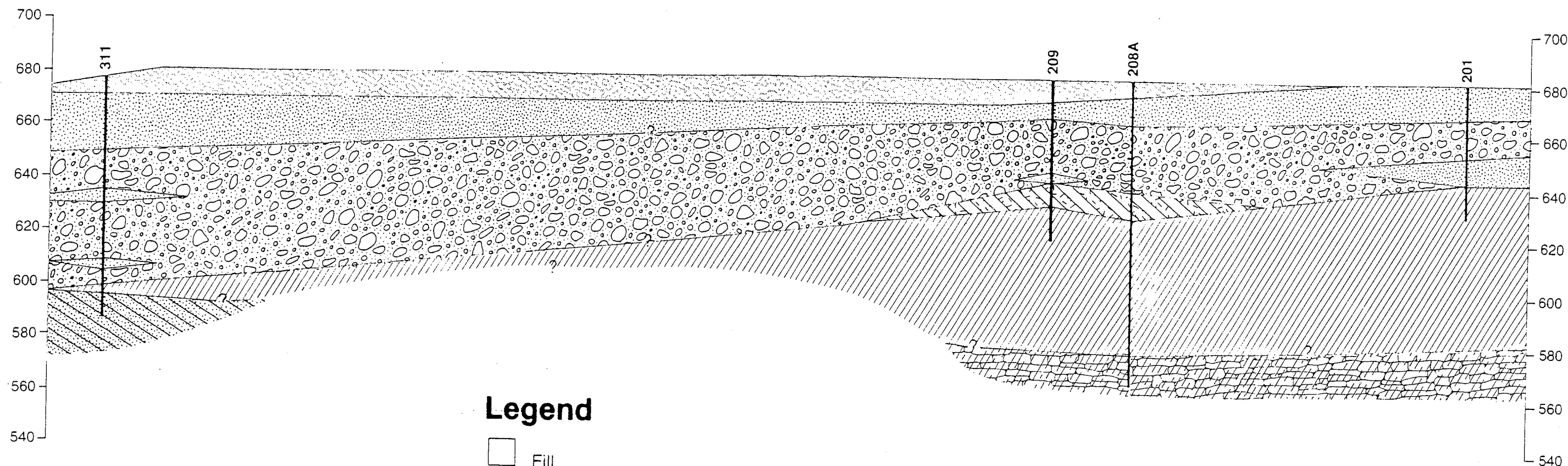
The upper sand thins to the east and interfingers with a fine-to-coarse grained gravelly sand unit found extensively in well 85-6 (see cross section B-B' which is Figure 5). The fine-to-coarse grained gravelly sand unit is interbedded with fine-to-medium grained sand toward the bottom of the unit. The total thickness of the gravelly sand layer varies from 7 to 25 feet within and near the excavation.

Below the gravelly sand is a lower unit of fine-to-medium grained sand. Only boring 201 penetrated completely through the lower sand into the underlying dark brown silty clay. The lower sand unit found in boring 201 is 10 feet thick, as shown on cross section C-C' (Figure 6).

The SME borings provide information deeper in the ground than the wells. In the area of the excavation there appears to be a clay layer beneath the sand and gravel at approximately 40 feet. To the west, the sand and gravel thicken substantially as shown in cross section D-D' (Figure 7). Note the change of scale of cross section D-D' compared to the others. However, the vertical exaggeration is two times the same as the other cross sections. On the west side of the plant the clay is much deeper. The clay is of substantial thickness in boring 208. On the west side of the plant, the one boring which penetrated it only encountered three feet.

The sedimentary units of fine-to-medium grained sand and gravelly sand contain no clay lenses or stringers and would behave as one unit hydraulically down to the top of the silty clay. The clay appears to be thick enough to segregate the upper saturated zone from water below the east side of the plant. On the west side of the plant the interpretation is less clear. Additional deep borings and wells would be required to define the shape of the clay. A pump test might then be necessary to prove or disprove connections between the upper saturated zone and a deeper aquifer.

D



## Legend

-  Fill
-  Clayey Sand
-  Silt & Clay Layers
-  Sand, Fine to Medium Grained
-  Sand, Gravelly, Medium to Coarse Grained
-  Clay, Silty, Dark Brown
-  Silty Clay, Bedrock

Horizontal Scale: 1" = 80'  
Vertical Scale: 1" = 40'  
Exaggeration: 2X

Note: Change of scale from  
previous cross sections.

Figure 7

### Cross Section D-D'

General Motors Corporation-CPC Group

February, 1986

20456

### Groundwater Flow and Presence of Hydrocarbons:

A measurable hydrocarbon layer was found in monitoring wells 85-3, 85-4 and 85-5B. Table 1 shows the thickness of the hydrocarbon layer in three wells and the equivalent thickness of water. It was necessary to convert the thickness of the hydrocarbon layer to an equivalent thickness of water so that accurate water level elevations could be calculated. A density of  $0.752 \text{ g/cm}^3$  was used for the hydrocarbon layer to convert from oil to water. Mineral spirits has a density of  $0.752 \text{ g/cm}^3$ , and this density was used because the sampling of the oil in the pit identified mineral spirits.

The thickest hydrocarbon layer was found in monitoring well 85-3 which is located at the north end of the excavation. Well 85-3 is located immediately adjacent to the large Verson cutting press #SE4-400-186-102. Thinner but measurable quantities of hydrocarbons were found in monitoring wells 85-4 and 85-5B, which are also located on the perimeter of the excavation.

A measurable hydrocarbon layer was not detected in wells 85-1, 85-2, 85-6, and 85-7. Monitoring well 85-6 is located immediately outside of the plant on the east side (Figure 2). This well is located upgradient of the excavation.

Water table elevations are shown on Table 2, and a water table contour map with the indicated directions of groundwater flow is shown in Figure 8. The water table contour map indicates that the principal direction of groundwater flow is toward the north and northwest. The gradient is 0.0032. Groundwater is moving toward Cole Drain and Plaster Creek, both of which are illustrated in Figure 1.

All of the wells were placed with the screen straddling the water table so in-situ permeability testing cannot be done on the wells. Based on the soil types, the permeability can be estimated to be between  $2 \times 10^{-5} \text{ m/sec}$  and  $2 \times 10^{-4} \text{ m/sec}$ , with an assumed average porosity of 25%. With the gradient of 0.0032, the groundwater velocity would range between 25 feet per year and 250 ft/yr.



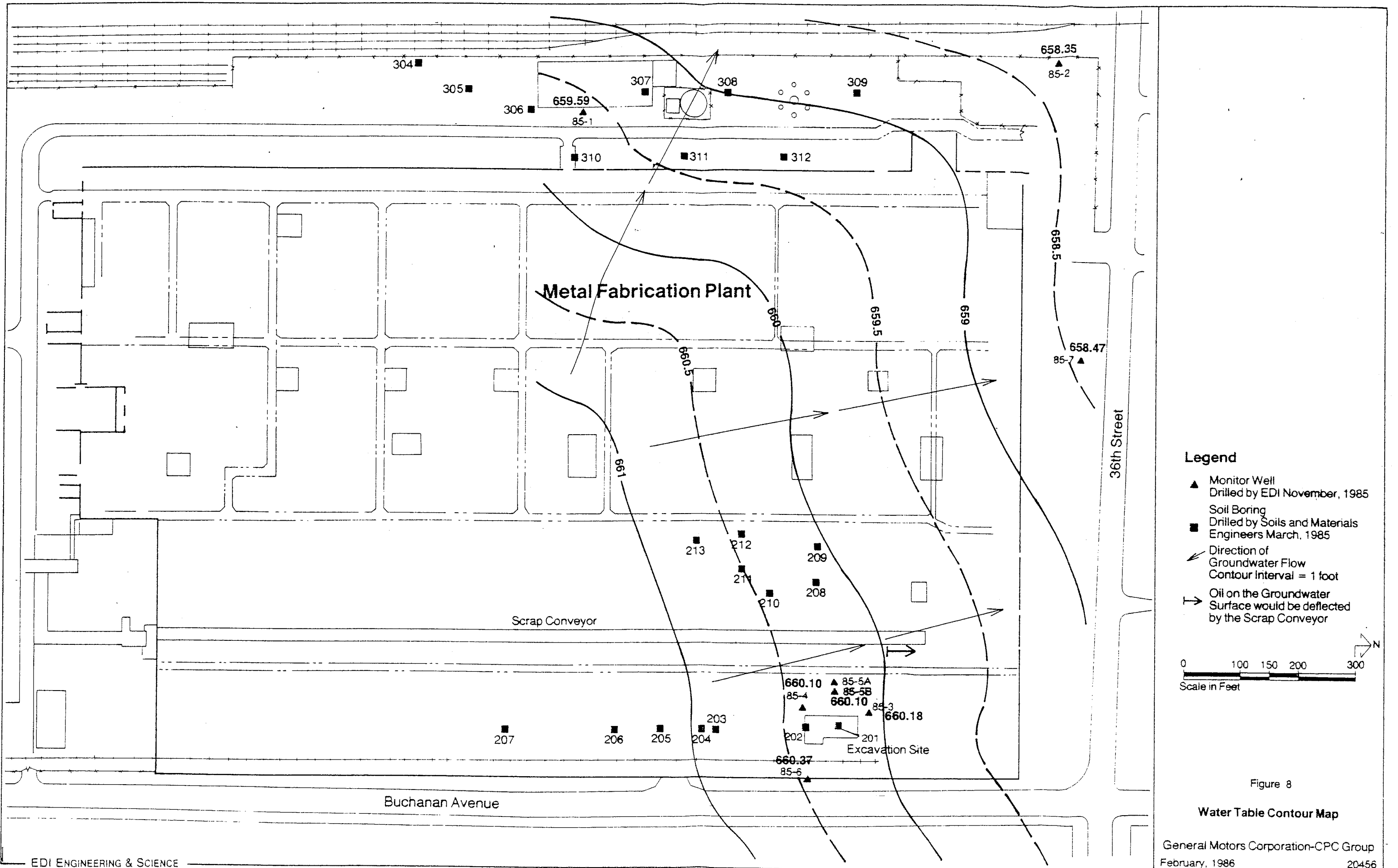


Figure 8

Water Table Contour Map

TABLE 1  
THICKNESS OF HYDROCARBON LAYER  
IN THE AREA OF THE EXCAVATION

WELL NUMBER	HYDROCARBON THICKNESS* (feet)	HYDROCARBON THICKNESS (inches)	EQUIVALENT WATER THICKNESS* (feet)
85-3	0.033	0.40	0.025
85-4	0.016	0.20	0.012
85-5B	0.008	0.10	0.006

-----  
\*To convert from oil to water, a density of  $0.725 \text{ g/cm}^3$  was used (the density of mineral spirits).

TABLE 2  
GROUNDWATER LEVELS  
AT THE  
GENERAL MOTORS - CPC METAL FABRICATION PLANT  
December 6, 1985

<u>WELL NUMBER</u>	<u>TOC ELEVATION (feet)</u>	<u>WATER LEVEL BELOW TOC* (feet)</u>	<u>WATER LEVEL ELEVATION (feet)</u>
85-1	675.87	16.28	659.59
85-2	672.48	14.13	658.35
85-3	681.37	21.19	660.18
85-4	681.29	21.19	660.10
85-5B	681.33	21.23	660.10
85-6	680.35	19.98	660.37
85-7	678.69	20.22	658.47

\*The water level below top of casing for the three wells with an oil layer is calculated as follows: Water level below TOC = actual observed water level below TOC less the equivalent water thickness for the hydrocarbon layer.

The metal scrap conveyor that is illustrated in Figures 5 and 8 runs through the entire length of the plant except for a small portion at the north end. In the area west of the excavation, the base of the scrap conveyor wall is approximately 2 feet below the water table with an elevation which is approximately 658 feet.

The direction of groundwater flow in the area of the scrap conveyor is toward the north-northwest. This suggests that if floatable hydrocarbons were present upgradient of the conveyor that they would not be trapped at the base of the conveyor wall. The conveyor would cause a perturbation of the flow of the groundwater at the surface and have the effect of diverting the floatables to the north until reaching the end of the conveyor system.

The lateral extent of the oil layer is estimated to be confined to the plant with floatables probably not going beyond the downgradient end of the scrap conveyor.

#### Groundwater Quality:

Water samples that were collected from each of the seven monitoring wells were analyzed for volatile and base neutral organic compounds that are on the priority pollutant list. The results for the volatile compounds are shown in Table 3, and the results for the base neutral compounds are shown in Table 4. The complete analytical results for volatiles and base neutrals are shown in Appendices B and C.

All of the water samples had detectable quantities of volatile organic compounds. The samples from wells 85-4 and 85-5B, located near the excavation, had the largest number of volatile compounds. Both samples contained detectable amounts of 1,1-dichloroethane, tetrachloroethylene, 1,1,1-trichloroethane, and trichloroethylene.

Water samples from wells 85-1, 85-2, 85-5B, and 85-7 had detectable amounts of trans-1,2-dichloroethylene. The highest concentrations of this compound were

TABLE 3

RESULTS OF CHEMICAL ANALYSES  
OF WATER SAMPLES  
VOLATILE FRACTION\*

(Concentrations in mg/l)

WELL	TRANS-1,2-DICHLORO- ETHYLENE	TRICHLORO- ETHYLENE	TOLUENE	1,1-DICHLORO- ETHANE	TETRACHLORO- ETHYLENE	1,1,1-TRICHLORO- ETHANE
85-1	0.012	---	---	---	---	---
85-2	0.021	0.006	---	---	---	---
85-3	---	---	0.003	---	---	---
85-4	---	0.002	---	0.002	0.002	0.005
85-5B	0.012	0.004	---	0.006	0.002	0.003
85-6	---	---	---	---	0.004	---
85-7	0.004	0.084	---	---	---	---
DETECTION LIMIT	0.002	0.002	0.001	0.002	0.002	0.002

\*The compounds shown here are those compounds in detectable concentrations from a scan of 28 volatile compounds.

TABLE 4

RESULTS OF CHEMICAL ANALYSES  
OF WATER SAMPLES  
BASE NEUTRAL FRACTION<sup>1</sup>

(Concentrations in mg/l)

<u>WELL</u>	<u>FLUORANTHENE</u>	<u>FLUORENE</u>	<u>NAPHTHALENE</u>	<u>PHENANTHRENE</u>	<u>PYRENE</u>	<u>BIS-(2-ETHYL HEXYL)- PHTHALATE</u>	<u>DI-N-BUTYL- PHTHALATE</u>
85-3 <sup>2</sup>	0.46	3.2	0.17	2.8	0.56	---	---
85-4	0.004	---	---	0.010	0.003	0.002	0.007
85-5B	---	0.004	---	0.003	0.005	---	---
DETECTION <sup>2</sup> LIMIT	0.001	0.002	0.10	0.001	0.001	0.002	0.001

<sup>1</sup> The compounds shown here are those compounds found in detectable concentrations from a scan of 44 base neutral compounds.

<sup>2</sup> The detection limits for well 85-3 are 0.10 mg/l for fluoranthene, phenanthrene, and pyrene; and 0.20 mg/l for fluorene.

from wells 85-1, 85-2, and 85-5B; namely, 0.012 mg/l, 0.021 mg/l, and 0.012 mg/l, respectively.

Only toluene with a concentration of 0.003 mg/l was detected in the water sample from well 85-3. This well is located immediately downgradient of the excavation and has the thickest hydrocarbon layer (0.033 feet). A relatively high concentration of trichloroethylene (0.084 mg/l) was detected in the water sample from well 85-7.

Base neutral compounds were detected in water samples from wells 85-3, 85-4, and 85-5B (Table 4). Well 85-3 has relatively high concentrations of fluoranthene (0.46 mg/l), fluorene (3.2 mg/l), naphthalene (0.17 mg/l), phenanthrene (2.8 mg/l), and pyrene (0.56 mg/l). Lesser amounts of fluoranthene, phenanthrene and pyrene were detected in the samples from wells 85-4 and 85-5B.

## CONCLUSIONS

Information obtained during the drilling of the seven monitoring wells and the previous borings indicates that the plant area is underlaid by a continuous sand and gravelly sand unit which is approximately 35 to 40 feet thick in the area of the excavation. The saturated thickness is 15 to 20 feet. To the west the unit thickens substantially downward.

Locally, groundwater flows to the north and northwest from the plant toward Cole Drain and Plaster Creek. The shallow saturated zone has a gently sloping gradient. The water table falls only two feet from the east wall of the building to the northwest corner of the plant.

A layer of hydrocarbons probably consisting mainly of mineral spirits was detected in the three wells on the perimeter of the excavation. The thickness of the hydrocarbon layer varies from 0.008 to 0.033 feet.

Only monitoring wells 85-3, 85-4 and 85-5B have detectable levels of base neutral compounds that are on the priority pollutant list. Well 85-3 has the highest concentrations of base neutrals with detectable levels of fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene.

Because the oil in the soils is under the building, rainfall should not drive the oil down to the water table. Also, a significant portion of the oil-contaminated soil was removed in the excavation, reducing the amount of oil likely to reach the groundwater. Coupled with the limited thickness of the oil presently on the surface of the groundwater, the potential for significant movement of the oil is low. Although the conveyor foundations are deep enough to intersect the water levels, the flow direction is to the north-northwest. The foundation would divert the oil if it moves, but probably not act as a significant barrier.

A thick pad with slopes to a sump will be placed under new equipment in the



area of the excavation. This will prevent spills or leakage from the new equipment from getting into the groundwater.

Volatile organic compounds appear in all of the monitoring wells, although the levels in some of the wells are at or near the detection limit. The wells near the excavation which contained oil showed minimal amounts of volatile compounds. Wells 85-1 and 85-2 showed levels of trans-1,2-dichloroethylene in the 10 to 20 ppb range. Well 85-7 had trichloroethylene (TCE) at 84 ppb. This well is downgradient of the plant based on the water levels of the seven wells. A source for the TCE is not known at present.

## RECOMMENDATIONS

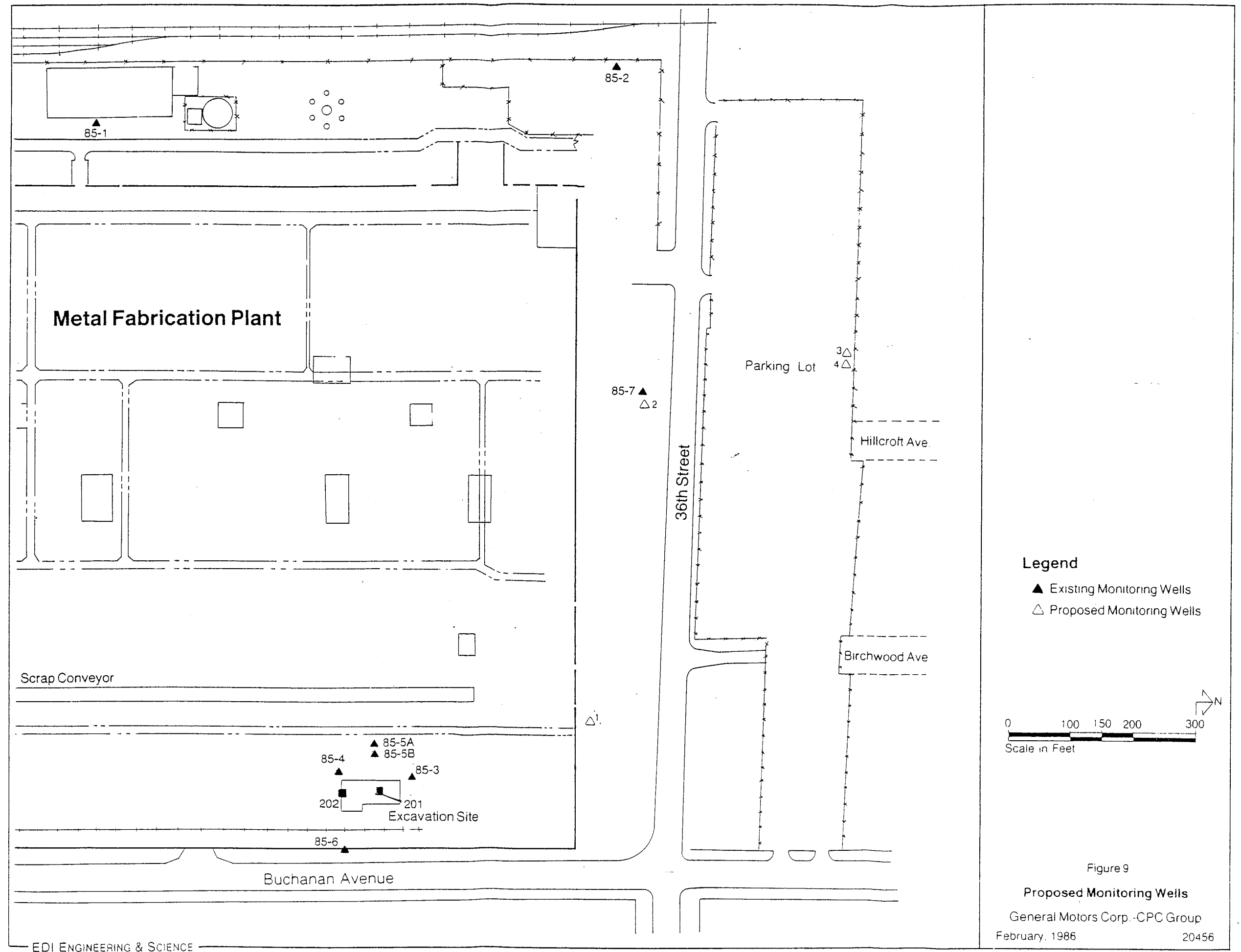
Water samples from the seven monitoring wells should be collected semi-annually. The samples from wells 85-3, 85-4, and 85-5B should be analyzed for volatiles and base neutrals; and wells 85-1, 85-2, 85-6, and 85-7 should be analyzed for volatiles only (using priority pollutant scans).

After one year, the monitoring should include only those compounds that were detectable and had significant concentrations during previous analyses.

It is recommended that four monitoring wells be drilled on the north side of the plant (Figure 9). One well should be drilled northwest of the excavation just north of the plant wall. The well should be set with the screen straddling the water table (for the detection of hydrocarbons). The water samples from this well should be analyzed for volatiles and base neutrals.

A second well should be drilled next to monitoring well 85-7. The screen should be placed near the bottom of the upper saturated zone for the detection of trichloroethylene (TCE). TCE is denser than water and can sink to the bottom of the sand unit as a separate phase.

It is recommended that a well cluster consisting of two wells be drilled on the north edge of the plant property downgradient of well 85-7 (Figure 8). One well should have its screen submerged just below the water table. A second well should have its screen placed near the bottom of the saturated zone. The water samples from both wells should be analyzed for volatiles using priority pollutant scans.



APPENDIX A  
CONSTRUCTION RECORDS FOR  
MONITORING WELLS AND BORINGS

[illegible]



Page: \_\_\_\_\_ of \_\_\_\_\_ 85-2  
Well/Boring No.: \_\_\_\_\_  
Client: General Motors - CPC  
Project No.: 20456  
Permit No.: \_\_\_\_\_  
Date Started 11/26 Finished 11/26/85

# Well / Boring Log Sheet

County KENT	Township CITY OF WYOMING	Fraction NW <sup>1</sup> / <sub>4</sub> NW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub>	Section 24	T 6N	R 12W
-------------	-----------------------------	--	---------------	---------	----------

Contractor: Stearns Drilling  
Address: Dutton, MI

Equipment: CME 45

Supervisor: D. Johnson  
J. Venn

Drilling Method(s)	Depth
Hollow Stem	0-20'
Auger & Split Spoons	

Grouting/Seal		
Depth	To	Material
0	18.5'	Natural Soils
		and Benseal;
		Cement at Sur
		face

Development: Ball lowered  
on rope; three casing  
volumes removed.

Water Level: 14.13 Ft. Below: TQC  
Measured On: 12/6/85

**Screen:**  
 Manufacturer: Johnson  
 Material: Stainless Steel  
 Model: 960  
 Slot/Gauze: 10 Dia.: 2"  
 Length: 5'  
 Depth Set: 13.5 To: 18.5'

**Casing**  
Dia. 2" Type Galv. Depth Set 0 To 13.5'  
To

**Elevation** 672.5'  
Casing: \_\_\_\_\_  
Ground: \_\_\_\_\_  
Ref. Pt: \_\_\_\_\_

Remarks (include here, other data available)

Well has flush-mounted sealed metal cap with enclosed locking cap. Top of casing is cemented into asphalt parking lot.

[illegible]



Well has flush-mounted sealed metal cap with enclosed locking cap. Top of casing is cemented into concrete floor.

[illegible]



Auger hit concrete with rebar at 7.5 feet below surface. After penetrating 0.2 feet into concrete, we decided to abandon well and move over and drill 85-58.

[illegible]

Well has flush-mounted sealed metal cap with enclosed locking cap. Top of casing is cemented into concrete floor. This well was drilled after Well 85-5A was plugged and abandoned.

[illegible]

[illegible]



Page: \_\_\_\_\_ of \_\_\_\_\_ 85-7  
Well/Boring No.: \_\_\_\_\_  
Client: General Motors - CPC  
Project No.: 20456  
Permit No.: \_\_\_\_\_  
Date Started 11/27 Finished 11/27/85

# Well / Boring Log Sheet

County	KENT	Township	CITY OF WYOMING	Fraction	NE 1/4 NW 1/4 NE 1/4	Section	24	T	6N	R	12W
--------	------	----------	-----------------	----------	----------------------	---------	----	---	----	---	-----

Contractor: Stearns Drilling  
Address: Dutton, MI

Equipment: CME 45

Supervisor: D. Johnson  
J. Venn

Drilling Method(s)	Depth
Hollow Stem	0-25'
Auger & Split Spoons	

Grouting/Seal

Depth	To	Material
0	25.6'	Natural Soils
		and Benseal;
		Cement at Sur
		face

**Development:** Ball lowered  
on rope; three casing  
volumes removed.

Water Level: 20.22 Ft. Below: TOC  
Measured On: 12/6/85

**Screen:**

Manufacturer: Johnson

Material: Stainless Steel

Model: 960

Slot/Gauze: 10 Dia.: 2"

Length: 5'

Depth Set: 20.6 To: 25.6'

## Casing

Dia.	Type	Depth Set
2"	Galy.	0 To 20.6'
		To

### Elevation

Casing: 678.7'

Ground: \_\_\_\_\_

Ref. Pt.: \_\_\_\_\_

Remarks (include here, other data available)

Well has flush-mounted sealed metal cap with enclosed locking cap. Top of casing is cemented into area of loose soil surrounding well.

[illegible]

OWNER GENERAL MOTORS CORPORATION-CPC GROUP				ARCHITECT / ENGINEER ALBERT KAHN ASSOCIATES, INC.			
LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND	
						STANDARD PENETRATION, "N BLOWS/FT NATURAL WATER CONTENT, % ATTERBERG LIMITS UNCONFINED COMPRESSIVE STRENGTH, lbf CALIBRATED HAND PENETROMETER, STRENGTH, lbf	SCALE 1 2 3 4 5 lbf 10 20 30 40 50 %N
				Driller reported 3" of Wood Blocks over 15" of Concrete			
			10	Driller reported Fine Sand with a 1.5' thick layer of fine to coarse sand & gravel at 4.5'- Dark Brown to Black changing to Brown at 4.5'			
1	SS			Fine to Coarse Sand-Trace to Some Gravel-Moist-Light Brown-Medium (SW)			
2	SS		20	Fine to Coarse Sand-Trace Silt & Gravel-Wet-Brown-Dense (SP) (Chemical odor noted in Sample 2)			
3	SS			Fine to Coarse Sand & Gravel-Trace to Some Silt-Wet-Brown-Dense (SP)			
4	SS		30	Silty Fine Sand-Wet-Light Brown- Dense (SM)			
5	SS						
6	SS		40				
7	SS			Silty Clay-Trace Sand-Dark Brown- Stiff to Hard (CL)			
8	SS		50				
				END OF BORING			
				30' of hollow stem auger was used			
				*Drilling water was used below 27"			
				Boring backfilled with bentonite and natural soils.			

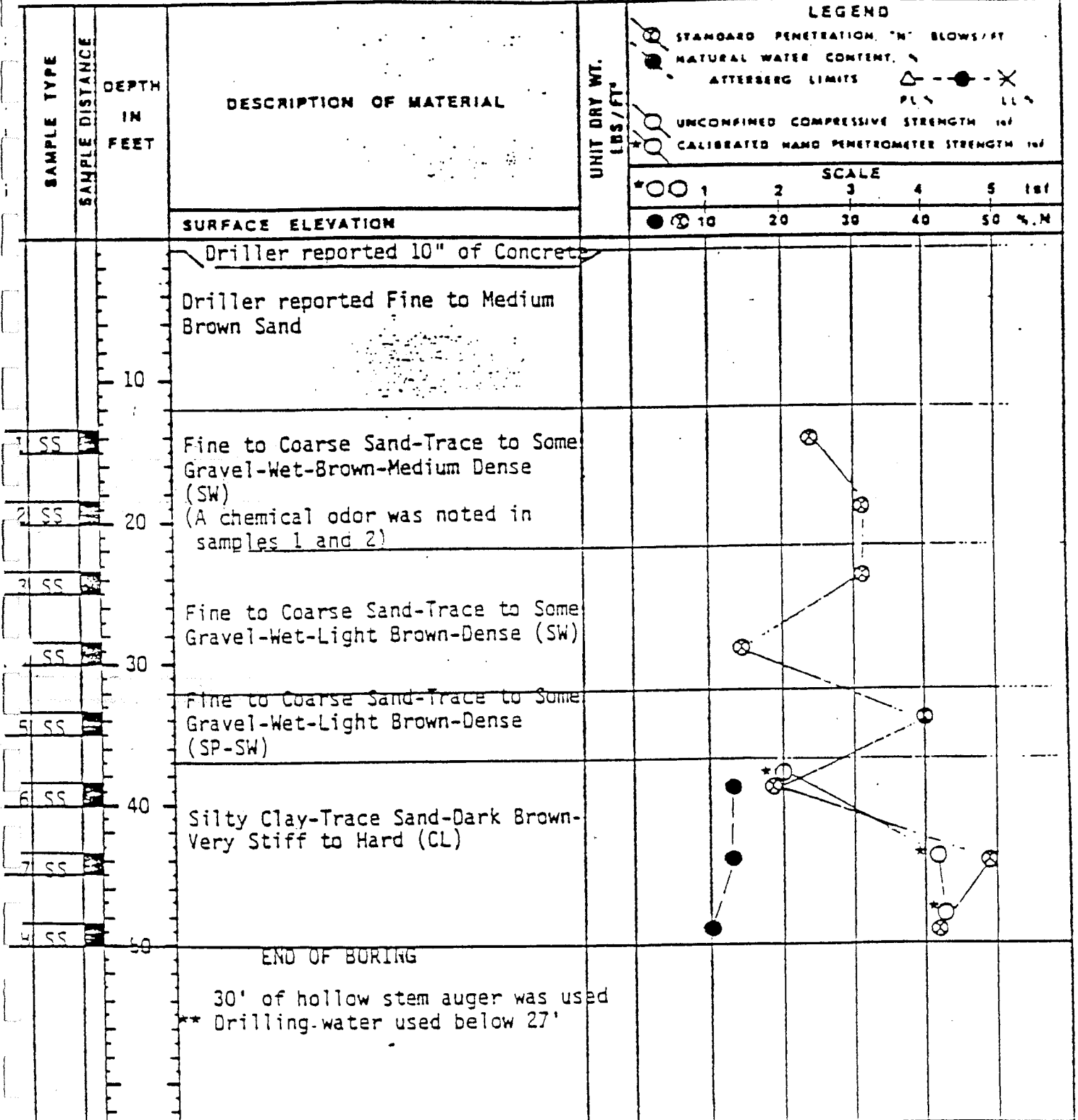
  

NOTE: The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.		MINERAL WELL PERMIT NO.	
WATER LEVEL OBSERVATIONS **		BORING STARTED	3/31/85
22' WHILE SAMPLING OR WHILE DRILLING 19' 11" IMMEDIATELY AFTER COMPLETION _____ AFTER COMPLETION		BORING COMPLETED	
		RIG: SD	DRAWN BY: PT
		FOREMAN: Heff	APPROVED: AMS/GM
		JOB: L8109	SHEET: 1/1
NOTE: Boring backfilled with natural soils unless otherwise noted.			

**soil and materials  
engineers, inc.**

LOCATION  
GRAND RAPIDS, MICHIGAN

PROJECT NAME  
PLANT MODERNIZATION PROGRAM



NOTE: The indicated stratification lines are approximate.  
In situ, the transition between materials may be gradual.

MINERAL WELL  
PERMIT NO.

WATER LEVEL OBSERVATIONS \*\*

BORING STARTED 3/31/85

BORING COMPLETED

RIG: SD

DRAWN BY: PT

FOREMAN: JG

APPROVED: AMS/GM

JOB: L6109

SHEET: 1 of 1

NOTE: Boring backfilled with natural soils unless otherwise noted.



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OWNER GENERAL MOTORS CORPORATION-CPC GROUP	ARCHITECT/ENGINEER ALBERT KAHN ASSOCIATES, INC.
LOCATION GRAND RAPIDS, MICHIGAN	PROJECT NAME PLANT MODERNIZATION PROGRAM

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.	LEGEND					
						○ STANDARD PENETRATION, "N" (BLOWS/FT.)	● NATURAL WATER CONTENT, %	△ - ● - X ATTERBERG LIMITS	○ UNCONFINED COMPRESSIVE STRENGTH (lb/ft²)	○ CALIBRATED HAND PENETROMETER STRENGTH (lb/ft²)	P.L. %
						SCALE					
						○ 1	2	3	4	5	lb/ft²
						● X 10	20	30	40	50	% N
				Driller Reported 18" of Concrete							
				Driller Reported Dark Brown Sand & Gravel							
			10								
1	SS			Fine to Coarse Sand-Trace to Some Gravel-Trace Silt-Light Brown-Moist-Medium Dense (SW)							
2	SS		20	Fine Sand-Brown-Moist-Dense (SP)							
3	SS			Silty Fine to Coarse Sand-Trace to Some Gravel-Brown-Wet-Medium Dense (SM)							
4	SS		30	Silty Fine Sand-Brown-Wet-Dense to Medium Dense (SM)							
5	SS										
6	SS		40	Silty Fine Sand-Gray-Saturated-Loose (SM)							
7	SS			Silty Clay-Trace Sand & Gravel-With Occasional Silt Seams-Gray-Very Stiff to Hard (CL)							
8	SS		50								
				END OF BORING							
				NOTE: 50' of Hollow Stem Auger Used							

NOTE: The indicated stratification lines are approximate.  
In situ, the transition between materials may be gradual.

MINERAL WELL  
PERMIT NO.

## WATER LEVEL OBSERVATIONS

BORING STARTED 4-21-85  
BORING COMPLETED 4-21-85

RIG: CME 45B DRAWN BY: PT  
FOREMAN: ST, APPROVED: AS/PL  
JOB: L8109 SHEET: 1 of 1



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18' WHILE SAMPLING OR WHILE DRILLING  
10.5' IMMEDIATELY AFTER COMPLETION  
AFTER COMPLETION

OWNER

GENERAL MOTORS CORPORATION-CPC GROUP

ARCHITECT / ENGINEER

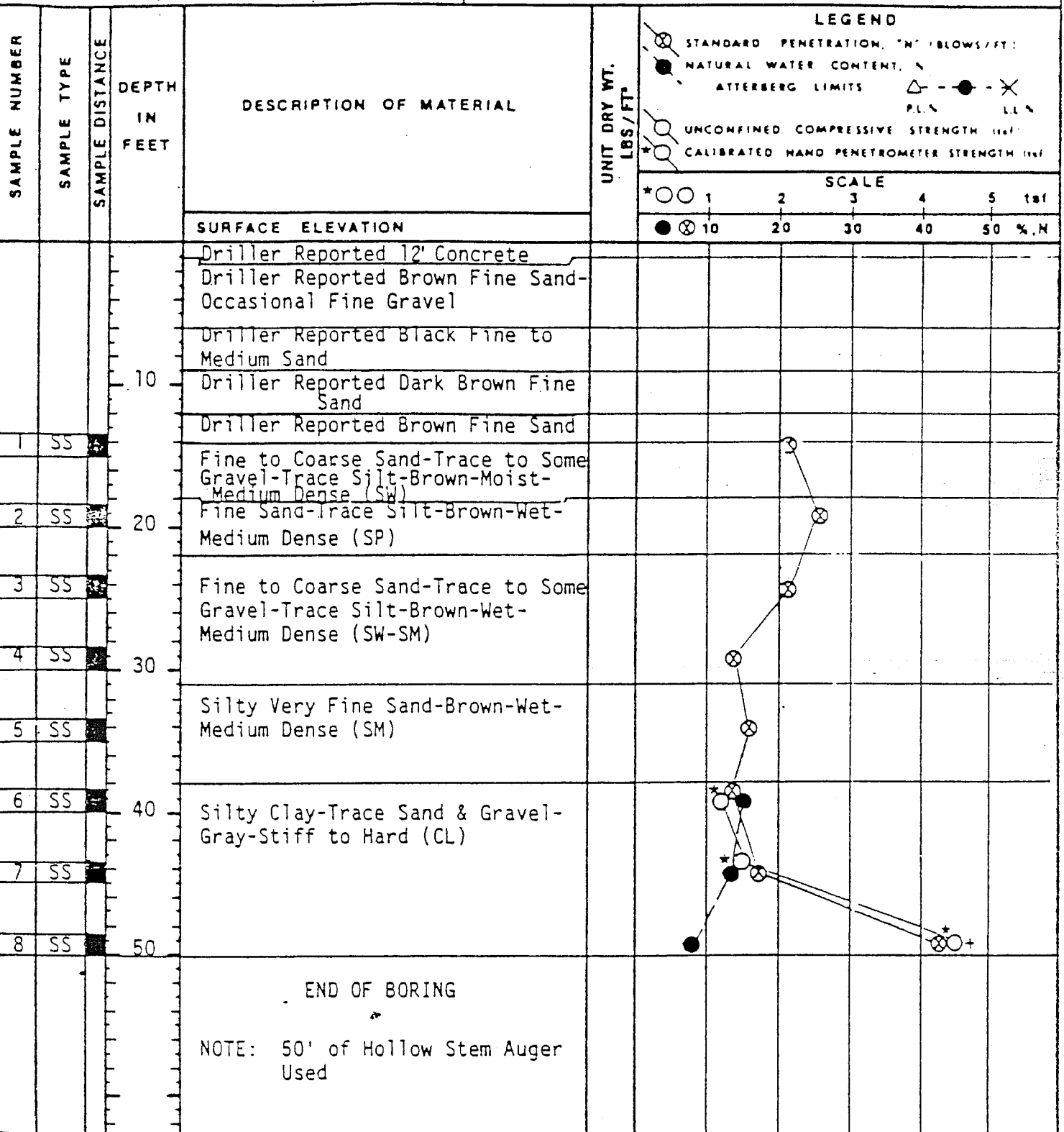
ALBERT KAHN ASSOCIATES, INC.

LOCATION

GRAND RAPIDS, MICHIGAN

PROJECT NAME

PLANT MODERNIZATION PROGRAM



NOTE: The indicated stratification lines are approximate.

In situ, the transition between materials may be gradual.

MINERAL WELL

PERMIT NO.

## WATER LEVEL OBSERVATIONS

BORING STARTED

4-21-85

BORING COMPLETED

4-21-85

RIG: Acker

DRAWN BY: PT

FOREMAN: Heff

APPROVED: AS/TM

JOB: L8109

SHEET: 1 of 1

NOTE: Boring backfilled with nat

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20'

 WHILE SAMPLING OR WHILE DRILLING  
 IMMEDIATELY AFTER COMPLETION  
 AFTER COMPLETION



OWNER GENERAL MOTORS CORPORATION CPC GROUP				ARCHITECT / ENGINEER ALBERT KAHN ASSOCIATES, INC.			
LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND	
						STANDARD PENETRATION, "N" (BLOWS/FT.)	NATURAL WATER CONTENT, %
						ATTERBERG LIMITS	
						UNCONFINED COMPRESSIVE STRENGTH (TSF) CALIBRATED HAND PENETROMETER STRENGTH (HPS)	
						SCALE * ○ 1 2 3 4 5 tsf ● ⊗ 10 20 30 40 50 %N	
				SURFACE ELEVATION			
				Driller Reported 12" of Concrete			
				Driller Reported Fine to Coarse Sand-Some Fine Gravel-Dark Brown			
1	SS		10	Fine to Coarse Sand-Trace Gravel-Brown-Moist Loose to Medium Dense (SP)			
2	SS						
3	SS		20	Fine Sand-Trace to Some Silt-Brown-Wet-Dense (SM)			
4	SS			Fine to Coarse Sand-Trace to Some Silt & Gravel-Brown-Wet-Medium Dense (SM)			
5	SS		30	Fine Sand-Trace to Some Silt-Brown-Wet-Very Dense to Dense (SM)			
6	SS						
7	SS		40	Fine Sandy Silt-With Occasional Fine Sand Layers-Gray-Saturated-Medium Dense to Dense (ML)			
8	SS						
9	SS		50	Silty Clay-Trace Sand & Gravel-Gray-Hard (CL)			
				END OF BORING			
				NOTE: 50' of Hollow Stem Auger Used-Boring Performed Below A 25' Depth			

NOTE: The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.		MINERAL WELL PERMIT NO.	
WATER LEVEL OBSERVATIONS		BORING STARTED	4-14-85
		BORING COMPLETED	4-14-85
20' WHILE SAMPLING OR WHILE DRILLING 28' IMMEDIATELY AFTER COMPLETION WCI @ 19.5' AFTER COMPLETION		RIG: CME 550 DRAWN BY: PT FOREMAN: GRY APPROVED: AS/PL JOB: L 8109 SHEET: 1 of 1	
NOTE: Boring backfilled with natural soils unless otherwise noted.			

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OWNER GENERAL MOTORS CORPORATION-CPC GROUP				ARCHITECT / ENGINEER ALBERT KAHN ASSOCIATES, INC.			
LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND	
						STANDARD PENETRATION, "N" (BLOWS/FT.)	NATURAL WATER CONTENT, % ATTERBERG LIMITS
						UNCONFINED COMPRESSIVE STRENGTH (tsf) CALIBRATED HAND PENETROMETER STRENGTH (tsf)	
						SCALE * ○ 1      2      3      4      5 tsf ● ⊗ 10    20    30    40    50 %N	
SURFACE ELEVATION							
1	SS			Driller reported 12" Concrete			
2	SS			Fine to Coarse Sand Fill-Trace to Some Silt & Gravel Dark Brown Moist-Dense (SP-Fill)			
3	SS			Fine to Coarse Sand-Trace Gravel			
4	SS		10	Light Brown-Moist-Medium Dense (SP)			
5	SS			Fine to Medium Sand-Trace Gravel			
6	SS		20	Light Brown-Moist to Wet-Medium Dense to Dense (SP) NOTE: Sample 6 Had a Chemical Odor			
7	SS			Fine to Coarse Sand-Trace to Some Gravel-Brown-Wet-Medium Dense (SW)			
8	SS		30				
9	SS						
10	SS		40	Fine Sandy Silt-Gray-Saturated-Medium Dense (ML)			
11	SS						
12	SS		50	Silty Clay-Trace Sand & Gravel-Gray-Hard (CL)			
				End of Boring			
				NOTE: 50' of Hollow Stem Auger Used			

NOTE: The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.		MINERAL WELL PERMIT NO.	
WATER LEVEL OBSERVATIONS		BORING STARTED    4-14-85	
22.5' WHILE SAMPLING OR WHILE DRILLING		BORING COMPLETED    4-14-85	
CI @ 9.5' IMMEDIATELY AFTER COMPLETION		RIG: CME 45B    DRAWN BY: PT	
AFTER COMPLETION		FOREMAN: ST    APPROVED: AS/PL	
		JOB: L8109    SHEET: 1 of 1	
NOTE: Boring backfilled with natural soils unless otherwise noted.			

  
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OWNER GENERAL MOTORS CORPORATION-CPC GROUP		ARCHITECT / ENGINEER ALBERT KAHN ASSOCIATES, INC.					
LOCATION GRAND RAPIDS, MICHIGAN		PROJECT NAME PLANT MODERNIZATION PROGRAM					
SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND	
						STANDARD PENETRATION, "N" (BLOWS/FT.) NATURAL WATER CONTENT, % ATTERBERG LIMITS UNCONFINED COMPRESSIVE STRENGTH (tsf) CALIBRATED HAND PENETROMETER STRENGTH (tsf)	SCALE 1 2 3 4 5 tsf 10 20 30 40 50 % N
				SURFACE ELEVATION			
1	SS			Driller Reported 12" Concrete			
2	SS			Fine to Medium Sand Fill-Trace			
3	SS			Silt & Gravel-Brown-Moist-Very			
4	SS		10	Dense (SP-Fill)			
				Fine to Coarse Sand Fill-Trace to			
				Some Black Cinders-Black-Moist-			
				Dense (SP-Fill)			
5	SS			Fine to Coarse Sand -Trace Silt &			
				Gravel-Brown-Moist to Wet-Medium			
				Dense to Loose (SP)			
6	SS		20	NOTE: Sample 6 had a chemical			
				Odor.			
7	SS			Silty Fine to Coarse Sand-Trace			
				to Some Gravel-Brown-Wet-Medium			
				to Dense (SM-GM)			
8	SS		30				
9	SS						
10	SS		40	Fine Sandy Silt-Gray-Saturated-			
				Medium Dense (ML)			
				Silty Clay-Trace Sand & Gravel-			
				Gray-Very Stiff (CL)			
11	SS						
				Trace to Some Sand-Trace Gravel-			
				Gray-Hard-Silty Clay (CL)			
12	SS		50 1/2				
				END OF BORING			
				NOTE: 50' of Hollow Stem Auger			
				Used.			
NOTE: The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.					MINERAL WELL 335-832-141 PERMIT NO.		 soil and materials engineers, inc.
WATER LEVEL OBSERVATIONS					BORING STARTED	4-14-85	
					BORING COMPLETED	4-14-85	
18' WHILE SAMPLING OR WHILE DRILLING					RIG: CME 45B	DRAWN BY: PT	
- IMMEDIATELY AFTER COMPLETION					FOREMAN: ST	APPROVED: AS/PL	
CI @ 8' AFTER COMPLETION					JOB: L8109	SHEET: 1 of 1	
NOTE: Boring backfilled with natural soils unless otherwise noted.							


OWNER GENERAL MOTORS CORPORATION-CPC GROUP				ARCHITECT / ENGINEER ALBERT KAHN ASSOCIATES, INC.			
LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND						
						STANDARD PENETRATION, "N" (BLOWS/FT.) NATURAL WATER CONTENT, % ATTERBERG LIMITS UNCONFINED COMPRESSIVE STRENGTH (tsf) CALIBRATED HAND PENETROMETER STRENGTH (tsf)						
						SCALE * ○ 1      2      3      4      5    tsf ● ⊗ 10    20    30    40    50    %N						
				SURFACE ELEVATION								
				Driller Reported 11" Concrete								
1	SS			Fine Sand-Fill-Light Brown-Moist- Very Loose (SP-Fill)		⊗						
			9	Driller Reported Concrete With Reinforcing Steel								
				END OF BORING								
				Boring Offset and redrilled - See Boring 208A								
				NOTE: 10' of Hollow Stem Auger Used.								

NOTE: The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.		MINERAL WELL PERMIT NO.	
WATER LEVEL OBSERVATIONS		BORING STARTED	4-14-85
None WHILE SAMPLING OR WHILE DRILLING None IMMEDIATELY AFTER COMPLETION _____ AFTER COMPLETION		BORING COMPLETED	4-14-85
		RIG:	DRAWN BY: PT
		FOREMAN:	APPROVED: AS/PL
		JOB: L8109	SHEET: 1 of 1
NOTE: Boring backfilled with natural soils unless otherwise noted.			

  
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OWNER GENERAL MOTORS CORPORATION-CPC GROUP				ARCHITECT/ ENGINEER ALBERT KAHN ASSOCIATES, INC.			
LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			
SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. <sup>3</sup>	LEGEND	
						STANDARD PENETRATION, "N" BLOWS/FT. NATURAL WATER CONTENT, % ATTERBERG LIMITS UNCONFINED COMPRESSIVE STRENGTH (psi) CALIBRATED HAND PENETROMETER STRENGTH (psi)	PLU CLN
SURFACE ELEVATION					SCALE		
					1 2 3 4 5 tsf 10 20 30 40 50 % N		
				Driller Reported 11" of Concrete			
1	SS			Fine to Medium Sand Fill-Trace Silt, Gravel & Cinders-Brown-Moist-Very Loose- (SP-Fill)			
2	SS		10	Fine to Medium Sand-Trace Silt & Gravel-Brown-Moist-Very Loose (SP)			
3	SS						
4	SS		20	Fine to Coarse Sand-Trace to Some Gravel-Trace Silt-Brown-Moist to Wet-Medium Dense to Loose (SW)			
5	SS						
6	SS		30				
7	SS						
8	SS		40				125
9	SS			Fine Sandy Silt With Occasional Silty Clay Layers-Gray-Medium Dense (ML)			
10	SS		50				
11	SS			Silty Clay-Trace Sand-With Occasional Silty Layers-Gray-Medium (CL)			
12	SS		60				
13	SS						
14	SS		70	Silty Clay-Trace to Some Sand-Trace Gravel-Gray-Stiff to Very Stiff (CL)			

CONTINUED ON PAGE 2

CONTINUED ON PAGE 2

OWNER GENERAL MOTORS CORPORATION-CPC GROUP				ARCHITECT / ENGINEER ALBERT KAHN ASSOCIATES, INC.			
LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND	
						(X) STANDARD PENETRATION, "N" (BLOWS/FT.) (●) NATURAL WATER CONTENT, % (Δ) ATTERBERG LIMITS (○) UNCONFINED COMPRESSIVE STRENGTH (tsf) (*) CALIBRATED HAND PENETROMETER STRENGTH (tsf)	P.L.N.      U.L.N. SCALE 1 2 3 4 5 tsf 10 20 30 40 50 %N
				CONTINUED FROM PAGE 2			
15	SS		70	Silty Clay-Trace to Some Sand- Trace Gravel-Gray-Stiff to Very Stiff (CL)			
16	SS		80				
17	SS						
18	SS		90				
19	SS						
20	SS		100	Fine Sandy Silt-Saturated-Very Dense (ML)			
21	SS		110	Silty Clay-Trace to Some Sand-Trace Weathered Black Shale & Limestone-Gray (CL)			
			115	END OF BORING NOTE: 40' of Hollow Stem Auger Used. Rotary Drilling Was Performed Below a 40' Depth			

NOTE: The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.		MINERAL WELL PERMIT NO.	
WATER LEVEL OBSERVATIONS		BORING STARTED	4-21-85
22' WHILE SAMPLING OR WHILE DRILLING _____ IMMEDIATELY AFTER COMPLETION _____ AFTER COMPLETION		BORING COMPLETED	4-21-85
		RIG: CME 550 DRAWN BY: PT FOREMAN: GRY APPROVED: AS/PL JOB: L8109 SHEET: 2 of 2	
		NOTE: Boring backfilled with natural soils unless otherwise noted.	

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OWNER GENERAL MOTORS CORPORATION-CPC GROUP	ARCHITECT/ENGINEER ALBERT KAHN ASSOCIATES, INC.
LOCATION GRAND RAPIDS, MICHIGAN	PROJECT NAME PLANT MODERNIZATION PROGRAM

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND	
						⊗ STANDARD PENETRATION, "N" (BLOWS/FT.) ● NATURAL WATER CONTENT, % Δ - - - X P.U.S. U.L.S. ○ UNCONFINED COMPRESSIVE STRENGTH (tsf) * ○ CALIBRATED HAND PENETROMETER STRENGTH (tsf)	SCALE * ○ 1 2 3 4 5 tsf ● ⊗ 10 20 30 40 50 %N
				SURFACE ELEVATION			
1	SS			Driller Reported 7" of Concrete Fine to Medium Sand Fill-Trace Gravel-Brown-Moist-Medium Dense (SP-Fill)			
2	SS		10	Fine Sand-Light Brown-Moist- Loose (SP)			
3	SS						
4	SS		20	Fine to Coarse Sand-Trace to Some Gravel-Trace Silt-Brown- Moist to Wet-Medium Dense (SW)			
5	SS						
6	SS		30				
7	SS			Silty Fine Sand-Trace to Some Gravel-Brown-Wet-Dense (SM)			
8	SS		40	Fine Sandy Silt-Wet-Gray-Dense (ML)			
9	SS						
10	SS		50	Silty Clay-Trace to Some Sand- Trace Gravel-Very Stiff to Hard (CL)			
11	SS						
12	SS		60				
				END OF BORING			

NOTE: The indicated stratification lines are approximate.  
In situ, the transition between materials may be gradual.

MINERAL WELL  
PERMIT NO.

## WATER LEVEL OBSERVATIONS

22' WHILE SAMPLING OR WHILE DRILLING  
32' IMMEDIATELY AFTER COMPLETION  
CI @ 17' AFTER COMPLETION

BORING STARTED 4-14-85  
BORING COMPLETED 4-14-85

RIG: CME 550 DRAWN BY: PT  
FOREMAN: GRY APPROVED: AS/PL  
JOB: L8109 SHEET: 1 of 1

NOTE: Boring backfilled with natural soils unless otherwise noted.

**sme**  
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OWNER GENERAL MOTORS CORPORATION-CPC GROUP				ARCHITECT / ENGINEER ALBERT KAHN ASSOCIATES, INC.			
LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND	
						STANDARD PENETRATION, "N" (BLOWS/FT.)	NATURAL WATER CONTENT, %
						ATTERBERG LIMITS	
						<div style="display: flex; justify-content: space-around;"> <div>  STANDARD PENETRATION, "N" (BLOWS/FT.)   NATURAL WATER CONTENT, %   ATTERBERG LIMITS  <div style="display: flex; justify-content: space-between; width: 100%;"> <span>P.L.L.</span> <span>U.C.L.</span> </div> </div> <div>  UNCONFINED COMPRESSIVE STRENGTH (tsf)   CALIBRATED HAND PENETROMETER STRENGTH (tsf) </div> </div>	
						<div style="display: flex; justify-content: space-between;"> <div> <p>SCALE</p> <p>* ○ 1 2 3 4 5 tsf</p> <p>● ⊗ 10 20 30 40 50 % N</p> </div> </div>	
SURFACE ELEVATION							
				Driller Noted 12" Concrete			
1	SS			Fine Sand Fill-Trace Medium Sand-Light Brown-Moist-Loose (SP-Fill)		⊗	
2	SS		10	Fine to Medium Sand-Trace Silt & Gravel-Brown-Moist-Loose (SP-SM)		⊗	
3	SS					⊗	
4	SS		20	Fine to Coarse Sand-Trace to Some Gravel-Trace Silt Brown-Moist to Wet-Loose to Medium Dense (SW)		⊗	
5	SS					⊗	
6	SS		30	NOTE: Samples 5 & 6 had a chemical odor.		⊗	
7	SS						
8	SS		40	Silty Fine Sand With Fine Sandy Silt Layers-Gray-Saturated-Dense (SM-ML)		⊗	
9	SS					⊗	
10	SS		50	Silty Clay-Trace to Some Sand-Trace Gravel-With Occasional Silt Seams-Gray-Stiff to Very Stiff (CL)		⊗	
11	SS					●	
12	SS		60			⊗	
END OF BORING							
NOTE: 60' of Hollow Stem Auger Used							

NOTE: The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.		MINERAL WELL PERMIT NO.	
WATER LEVEL OBSERVATIONS		BORING STARTED 4-21-85	
22.2' WHILE SAMPLING OR WHILE DRILLING _____ IMMEDIATELY AFTER COMPLETION _____ AFTER COMPLETION		BORING COMPLETED 4-21-85	
		RIG: Acker      DRAWN BY: PT FOREMAN: Heff      APPROVED: AS/PL JOB: L8109      SHEET:	
		NOTE: Boring backfilled with natural soils unless otherwise noted.	

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LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND	
						STANDARD PENETRATION, "N" BLOWS/FT NATURAL WATER CONTENT, % ATTERBERG LIMITS UNCONFINED COMPRESSIVE STRENGTH, lbf CALIBRATED HAND PENETROMETER STRENGTH, lbf	SCALE 1 2 3 4 5 (ft) 10 20 30 40 50 %N
1	SS			Fine to Medium Sand-Trace Gravel-Moist-Brown-Loose (SP) - Possible Fill		X	
2	SS					X	
3	SS					X	
4	SS		10			X	
5	SS			Fine to Coarse Sand-Some Gravel-Trace Silt-Moist-Brown-Medium Dense (SW)		X	
6	SS		20			X	
7	SS					X	
8	SS		30			X	
9	SS			Fine to Medium Sand-Wet- Brown-Medium Dense (SP)		X	
10	SS		40			X	
11	SS			Fine Sand-Trace Silt & Clay-Wet-Gray- Dense (SP-SC)			X
12	SS		50	Silty Clay-Trace Sand-Gray-Very Stiff to Hard (CL)		X	
13	SS					X	
14	SS		60			X	
				END OF BORING			
				30' of hollow stem auger was used			

NOTE: The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.		MINERAL WELL PERMIT NO.	
WATER LEVEL OBSERVATIONS		BORING STARTED	3/31/85
23' _____ WHILE SAMPLING OR WHILE DRILLING _____ IMMEDIATELY AFTER COMPLETION _____ AFTER COMPLETION Drilling water used below 30'		BORING COMPLETED	"
		RIG: SD	DRAWN BY: PT
		FOREMAN: Heff	APPROVED: AMS/GH
		JOB: L8109	SHEET: 1 of 1
NOTE: Boring backfilled with natural soils unless otherwise noted.			

  
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LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			

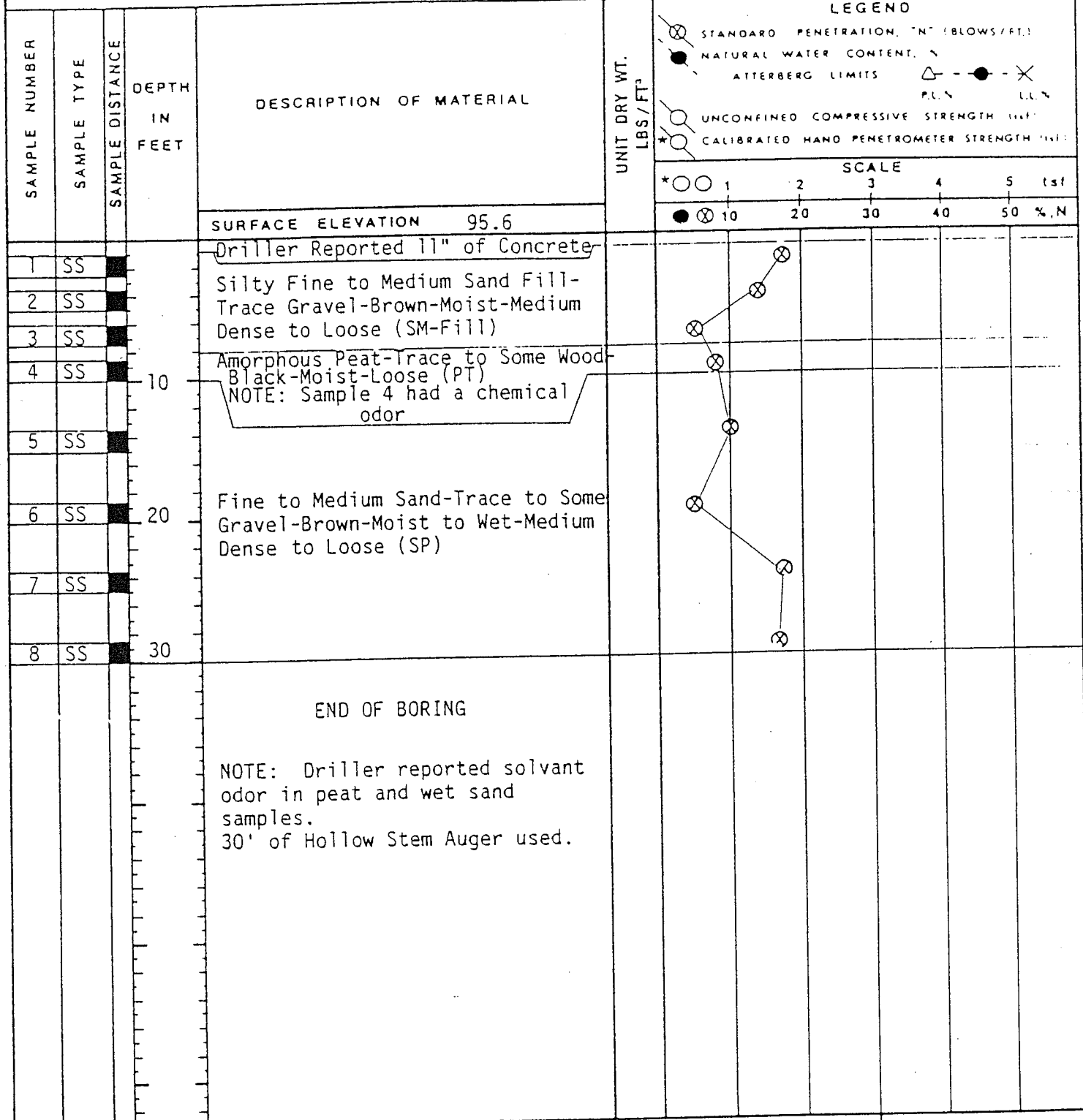
SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND					
						STANDARD PENETRATION, "N" (BLOWS/FT.) NATURAL WATER CONTENT, % ATTERBERG LIMITS <span style="margin-left: 20px;">△ --- ● --- ×</span> P.L.N. <span style="margin-left: 20px;">U.L.N.</span> UNCONFINED COMPRESSIVE STRENGTH (14.7) CALIBRATED HAND PENETROMETER STRENGTH (14.7)					
						SCALE					
						* ○ 1      2      3      4      5 (sf) ● ⊗ 10    20    30    40    50 %N					
				CONTINUED FROM PAGE 1							
			70	Silty Clay-Trace Sand & Gravel- Gray-Hard (CL)							
15	SS										
16	SS		80								
17	SS										
18	SS		90								
				Fine Sand-Trace Silt-Gray-Wet- Very Dense (SP)							
19	SS										
				Medium to Coarse Sand With Gravel-Gray -Wet-Dense (SW)							
20	SS		100								
				END OF BORING							
				NOTE: 35' of Hollow Stem Auger Used. Rotary Drilling per- formed Below a 35' depth.							

NOTE: The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.		MINERAL WELL PERMIT NO.	
WATER LEVEL OBSERVATIONS		BORING STARTED	4-14-85
<div style="display: flex; justify-content: space-between;"> <div>22'</div> <div>WHILE SAMPLING OR WHILE DRILLING</div> </div> <div style="display: flex; justify-content: space-between;"> <div>None</div> <div>IMMEDIATELY AFTER COMPLETION</div> </div> <div style="display: flex; justify-content: space-between;"> <div></div> <div>AFTER COMPLETION</div> </div>		BORING COMPLETED	4-14-85
		RIG: Acker      DRAWN BY: PT FOREMAN: Heff      APPROVED: AS/TM JOB: L8109      SHEET: 2 of 2	
		NOTE: Boring backfilled with nat- ural soils unless otherwise noted.	

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LOCATION GRAND RAPIDS, MICHIGAN	PROJECT NAME PLANT MODERNIZATION PROGRAM



NOTE: The indicated stratification lines are approximate.  
 In situ, the transition between materials may be gradual.

MINERAL WELL  
 PERMIT NO.

#### WATER LEVEL OBSERVATIONS

17' WHILE SAMPLING OR WHILE DRILLING  
 15' IMMEDIATELY AFTER COMPLETION  
 AFTER COMPLETION

WCI @ 13'

BORING STARTED 4-11-85  
 BORING COMPLETED 4-11-85  
 RIG: CME 550 DRAWN BY: PT  
 FOREMAN: GRY APPROVED: AS/PL  
 JOB: L8109 SHEET: 1 of 1

NOTE: Boring backfilled with natural soils unless otherwise noted.

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LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND					
						STANDARD PENETRATION, "N" (BLOWS/FT.) NATURAL WATER CONTENT, % ATTERBERG LIMITS UNCONFINED COMPRESSIVE STRENGTH (TSF) CALIBRATED HAND PENETROMETER STRENGTH (TSF)					
						SCALE					
						1	2	3	4	5	tsf
						10	20	30	40	50	%N
SURFACE ELEVATION 95.5											
1	SS			Driller Reported 9 1/2" of Concrete							
2	SS			Silty Fine to Coarse Sand Fill- Trace to Some Gravel-Dark Gray							
3	SS			Turning Brown @ 4'-Moist-Dense to Medium Dense (SM-Fill)							
4	SS		10	Driller Reported 12" Concrete See Note A							216
5	SS			Amorphous Peat-Trace Wood Fibers- Black-Moist-Loose (PT)							
6	SS		20	Fine to Medium Sand-Trace Silt & Gravel-Brown-Wet-Loose to Medium Dense (SP)							
7	SS										
8	SS		30								
END OF BORING											
Note A: Fine to Medium Sand Fill-Trace Silt & Gravel-Brown- Moist-Very Loose (SP-Fill)											
NOTE: 30' of Hollow Stem Auger Used											

NOTE: The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.		MINERAL WELL PERMIT NO.	
WATER LEVEL OBSERVATIONS		BORING STARTED	4-11-85
		BORING COMPLETED	4-11-85
16' WHILE SAMPLING OR WHILE DRILLING 9.7' IMMEDIATELY AFTER COMPLETION AFTER COMPLETION		RIG: CME 45 B DRAWN BY: PT FOREMAN: ST APPROVED: AS/PL JOB: L8109 SHEET: 1 of 1	
		NOTE: Boring backfilled with nat- ural soils unless otherwise noted.	



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LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND	
						STANDARD PENETRATION, "N" (BLOWS/FT.)	NATURAL WATER CONTENT, % ATTERBERG LIMITS
						UNCONFINED COMPRESSIVE STRENGTH (LBS/IN <sup>2</sup> ) CALIBRATED HAND PENETROMETER STRENGTH (LBS)	
						SCALE * O O 1 2 3 4 5 1st ● ⊗ 10 20 30 40 50 %N	
SURFACE ELEVATION 96.2							
Driller Reported 9" of Concrete							
1	SS			Fine to Medium Sand fill-Trace to Some Silt-Brown-Moist-Medium Dense to Very Loose (SM-Fill)		⊗	
2	SS					⊗	
3	SS					⊗	
4	SS		10	Fine to Medium Sand-Trace Gravel With Occasional Peat Layers-Gray-Wet-Very Loose (SP)		⊗	
5	SS					⊗	
6	SS		20	Fine to Coarse Sand-Trace to Some Gravel-Brown-Wet-Loose to Medium Dense (SW)		⊗	
7	SS					⊗	
8	SS		30			⊗	
9	SS					⊗	
10	SS		40	Fine Sand-Trace Silt-Brown-Wet-Dense (SP)		⊗	
END OF BORING							
NOTE: 40' of Hollow Stem Auger Used.							

NOTE: The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.		MINERAL WELL PERMIT NO.	
WATER LEVEL OBSERVATIONS		BORING STARTED	4-11-85
17' WHILE SAMPLING OR WHILE DRILLING 20' IMMEDIATELY AFTER COMPLETION CI @ 10' AFTER COMPLETION		BORING COMPLETED	4-11-85
		RIG: CME 550	DRAWN BY: PT
		FOREMAN: GRY	APPROVED: AS/PL
		JOB: L8109	SHEET: 1 of 1
NOTE: Boring backfilled with natural soils unless otherwise noted.			

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LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND	
						STANDARD PENETRATION, "N" BLOWS/FT.	NATURAL WATER CONTENT, %
SURFACE ELEVATION 93.4						UNCONFINED COMPRESSIVE STRENGTH (psi) CALIBRATED HAND PENETROMETER STRENGTH (H)	
						SCALE * ○ ○ 1 2 3 4 5 (psi) ● ⊗ 10 20 30 40 50 % N	
1	SS			Driller Reported 3" of Asphalt			
2	SS			Fine-Medium Sand Fill-Trace			
3	SS			Silt & Gravel-Brown-Moist-			
4	SS		10	Medium Dense to Loose (SP-Fill)			
5	SS			Fine to Medium Sand-Trace Silt			
6	SS		20	& Gravel-Brown-Moist to Wet-			
7	SS			Loose to Medium Dense (SP)			
8	SS		30	Silty Fine Sand-Brown-Wet-			
9	SS			Medium Dense to Dense (SM)			
10	SS.		40				
11	SS						
12	SS		50	Fine to Coarse Sand-Trace to			
13	SS			Some Gravel-Brown-Wet-Medium			
14	SS		60	Dense to Loose (SW)			

CONTINUED ON PAGE 2

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LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND					
						STANDARD PENETRATION, "N" (BLOWS/FT.) NATURAL WATER CONTENT, % ATTERBERG LIMITS     P.L. %     L.L. % UNCONFINED COMPRESSIVE STRENGTH (tsf) CALIBRATED HAND PENETROMETER STRENGTH (tsf)					
						SCALE					
						1	2	3	4	5	tsf
						10	20	30	40	50	% N
CONTINUED FROM PAGE 1											
			60								
14	SS										
15	SS		70								
END OF BORING											
NOTE: 55' of Hollow Stem Auger Used.  Rotary Drilling was performed below a 55' depth.											

NOTE: The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.		MINERAL WELL PERMIT NO.	
WATER LEVEL OBSERVATIONS		BORING STARTED     4-11-85	
14.5' WHILE SAMPLING OR WHILE DRILLING 15' IMMEDIATELY AFTER COMPLETION _____ AFTER COMPLETION		BORING COMPLETED     4-11-85	
CT @ 15'		RIG: CME 550     DRAWN BY: PT FOREMAN: GRY     APPROVED: AS/PL JOB: L8109     SHEET: 2 of 2	
		NOTE: Boring backfilled with natural soils unless otherwise noted.	

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LOCATION GRAND RAPIDS, MICHIGAN	PROJECT NAME PLANT MODERNIZATION PROGRAM

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND	
						⊗ STANDARD PENETRATION, "NT" (BLOWS/FT.) ● NATURAL WATER CONTENT, % △ -- ● -- X PL%    LL% ○ UNCONFINED COMPRESSIVE STRENGTH (ksf) * CALIBRATED HAND PENETROMETER STRENGTH (lbf)	SCALE
				SURFACE ELEVATION 96.5			* ○ 1 2 3 4 5 tsf ● ⊗ 10 20 30 40 50 %N
				Driller Reported 8 1/2" of Concrete			
1	SS			Fine to Medium Sand fill-Trace			
2	SS			to Some Silt-Trace Gravel-Brown-			
3	SS			Moist-Loose to Medium Dense			
				(SM-Fill)			
4	SS		10	Mixed Sand & Cinder Fill-Gray-			
				Moist-Loose (SP-Fill)			
5	SS			Amorphous Peat-Trace to Some			
				Roots-Black-Loose (PT)			
6	SS		20				
7	SS						
				Fine to Medium Sand-Trace Silt-			
8	SS		30	Brown-Wet-Loose to Medium Dense			
				(SP)			
9	SS						
10	SS		40 1/2				
				END OF BORING			
				NOTE: 40' of Hollow Stem Auger			
				Used.			

NOTE: The indicated stratification lines are approximate.  
In situ, the transition between materials may be gradual.

MINERAL WELL 335-832-141  
PERMIT NO.

## WATER LEVEL OBSERVATIONS

BORING STARTED 4-11-85  
BORING COMPLETED 4-11-85

18 1/2' WHILE SAMPLING OR WHILE DRILLING  
11' 8" IMMEDIATELY AFTER COMPLETION  
CI @ 11' 8" AFTER COMPLETION

RIG: CME 45 BORAWN BY: PT  
FOREMAN: ST APPROVED: AS./PL  
JOB: L8109 SHEET: 1 of 1


NOTE: Boring backfilled with natural soils unless otherwise noted.



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LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			
SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND	
						STANDARD PENETRATION, "N" (BLOWS/FT.)	NATURAL WATER CONTENT, % ATTERBERG LIMITS P.L. %      L.L. %
SURFACE ELEVATION      96.8						SCALE	
						1	2
						3	4
						5	tsf
						10	20
						30	40
						50	% N
1	SS			Driller Reported 7" of Concrete			
2	SS			Silty Fine Sand Fill-Trace to			
3	SS			Some Cinders-Trace Gravel-Dark			
4	SS		10	Gray-Moist-Medium Dense (SM-Fill)			
5	SS			Silty Fine to Medium Sand Fill-			
6	SS			Trace Gravel Brown-Moist-Medium			
7	SS		20	Dense (SP-SM-Fill)			
8	SS			Fine to Medium Sand-Trace Silt-			
9	SS			Brown-Moist-Loose to Very Loose			
10	SS			(SP)			
11	SS		30	Fine to Medium Sand-Brown-Wet-			
12	SS			Loose to Medium Dense (SP)			
13	SS		40	Fine to Coarse Sand-Trace to			
14	SS			Some Gravel-Brown-Wet-Dense to			
15	SS			Medium Dense (SW)			
16	SS		50	Fine Sand-Trace Silt-Brown-Wet-			
17	SS			Medium Dense (SP)			
18	SS		60	Fine to Coarse Sand-Trace to Some			
19	SS			Gravel-Seams of Very Fine Sand-			
20	SS			Brown-Wet-Medium Dense to Loose			
21	SS			(SP)			

CONTINUED ON PAGE 2




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LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND					
						STANDARD PENETRATION, "N" (BLOWS/FT.) NATURAL WATER CONTENT, % ATTERBERG LIMITS UNCONFINED COMPRESSIVE STRENGTH (KSI) CALIBRATED HAND PENETROMETER STRENGTH (LBS)					
						SCALE					
						1	2	3	4	5	1st
						10	20	30	40	50	%N
CONTINUED FROM PAGE 1											
			60								
15	SS			Fine to Coarse Sand-Trace to Some Gravel-Seams of Very Fine Sand-Brown-Wet-Medium Dense to Loose (SP)							
16	SS		70	Fine Sand-Trace to Some Medium Sand-Brown-Wet-Medium Dense (SP)							
17	SS			Fine to Coarse Sand-Trace to Some Gravel-Seams of Fine Sand-Brown-Wet-Loose (SW)							
18	SS		80	Silty Clay-Trace Sand & Fine Gravel-Gray (CL)							
				Clayey Fine to Coarse Sand-Trace Gravel-Gray-Saturated (SC)							
19	SS		90								
END OF BORING											
NOTE: Driller lost mud circulation at 81' borehole collapsed-Borehole redrilled. Lost mud again plus 8 bags Bentonite.  25' of Hollow Stem Auger Used. Rotary Drilling Performed Below a 25'Depth.											

NOTE: The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.		MINERAL WELL 335-832-141 PERMIT NO.	
WATER LEVEL OBSERVATIONS		BORING STARTED 4-12-85	
18' WHILE SAMPLING OR WHILE DRILLING None IMMEDIATELY AFTER COMPLETION _____ AFTER COMPLETION		BORING COMPLETED 4-12-85	
		RIG: Acker DRAWN BY: PT FOREMAN: Heff APPROVED: AS/TM JOB: L8109 SHEET: 2 of 2	
		NOTE: Boring backfilled with natural soils unless otherwise noted.	

  
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LOCATION GRAND RAPIDS, MICHIGAN				PROJECT NAME PLANT MODERNIZATION PROGRAM			

SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	DEPTH IN FEET	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT <sup>3</sup>	LEGEND					
						STANDARD PENETRATION, "N" (BLOWS/FT.) NATURAL WATER CONTENT, % ATTERBERG LIMITS      P.L. %      L.L. % UNCONFINED COMPRESSIVE STRENGTH (LBS/IN <sup>2</sup> ) CALIBRATED HAND PENETROMETER STRENGTH (LBS)					
						SCALE					
						* ○ ○ 1	2	3	4	5	(LBS)
						● ⊗ 10	20	30	40	50	% N
				SURFACE ELEVATION 96.5							
				Driller Reported 8" of Concrete							
1	SS			Fine to Medium Sand Fill-Trace							
2	SS			to Some Silt-Trace Gravel-Dark							
3	SS			Brown-Moist-Medium Dense to							
4	SS		10	Loose (SM-Fill)							
5	SS			Fine to Medium Sand-Trace Silt-							
				Brown-Moist to Wet-Loose (SP)							
6	SS		20								
7	SS			Fine to Coarse Sand-Trace Silt &							
				Gravel-Brown-Wet-Loose (SW)							
8	SS		30								
				Fine Sand-Trace Silt-Brown-Wet-							
				Loose to Medium Dense (SP)							
9	SS										
10	SS		40								
				END OF BORING							
				NOTE: 40' of Hollow Stem Auger Used.							

NOTE: The indicated stratification lines are approximate. In situ, the transition between materials may be gradual.		MINERAL WELL 335-832-141 PERMIT NO.	
WATER LEVEL OBSERVATIONS		BORING STARTED 4-11-85	
18' WHILE SAMPLING OR WHILE DRILLING 15' IMMEDIATELY AFTER COMPLETION _____ AFTER COMPLETION		BORING COMPLETED 4-11-85	
CI @ 15'		RIG: CME 550 DRAWN BY: PT FOREMAN: GRY APPROVED: AS/PL JOB: L8109 SHEET: 1 of 1	
		NOTE: Boring backfilled with nat- ural soils unless otherwise noted.	

  
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APPENDIX B

ANALYTICAL RESULTS FOR  
VOLATILE ORGANIC COMPOUNDS

ANALYTICAL SERVICES  
PRIORITY POLLUTANT ANALYSIS

TABLE 1  
VOLATILE FRACTION

CLIENT: GMC-CPC DIVISION  
PROJECT NO.: 25554  
SAMPLE: 85-1

DATE SAMPLED: 12/06/85 TIME: 2:30 PM  
DATE RECEIVED: 12/09/85 TIME: 7:00 AM  
DATE COMPLETED: 12/16/85

SAMPLE NO. 58324

COMPOUND	RESULT (mg/l )	D.L.	COMPOUND	RESULT (mg/l )	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	0.012	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYL VINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

\*COMPOUND NOT PRESENT AT DETECTION LIMIT



ANALYTICAL SERVICES  
PRIORITY POLLUTANT ANALYSIS

TABLE 1  
VOLATILE FRACTION

CLIENT: GMC-CPC DIVISION  
PROJECT NO.: 25554  
SAMPLE: 85-3

DATE SAMPLED: 12/06/85 TIME: 12:10 PM  
DATE RECEIVED: 12/09/85 TIME: 7:00 AM  
DATE COMPLETED: 12/16/85

SAMPLE NO. 58326

COMPOUND	RESULT	D.L.	COMPOUND	RESULT	D.L.
	(mg/l )			(mg/l )	
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYL VINYL ETHER	*	0.010	TOLUENE	0.003	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

\*COMPOUND NOT PRESENT AT DETECTION LIMIT





ANALYTICAL SERVICES  
PRIORITY POLLUTANT ANALYSIS

TABLE 1  
VOLATILE FRACTION

CLIENT: GMC-CPC DIVISION  
PROJECT NO.: 25554  
SAMPLE: 85-4

DATE SAMPLED: 12/06/85 TIME: 10:50 AM  
DATE RECEIVED: 12/09/85 TIME: 7:00 AM  
DATE COMPLETED: 12/17/85

SAMPLE NO. 58327

COMPOUND	RESULT	D.L.	COMPOUND	RESULT	D.L.
	(mg/l )			(mg/l )	
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	0.002	0.002
2-CHLOROETHYL VINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.005	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	0.002	0.002	TRICHLOROETHYLENE	0.002	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

\*COMPOUND NOT PRESENT AT DETECTION LIMIT



ANALYTICAL SERVICES  
PRIORITY POLLUTANT ANALYSIS

TABLE 1  
VOLATILE FRACTION

CLIENT: GMC-CPC DIVISION  
PROJECT NO.: 25554  
SAMPLE: 85-5B

DATE SAMPLED: 12/06/85 TIME: 11:30 AM  
DATE RECEIVED: 12/09/85 TIME: 7:00 AM  
DATE COMPLETED: 12/17/85

SAMPLE NO. 58328

COMPOUND	RESULT (mg/l )	D.L.	COMPOUND	RESULT (mg/l )	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	0.012	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	0.002	0.002
2-CHLOROETHYL VINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	0.003	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	0.006	0.002	TRICHLOROETHYLENE	0.004	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

\*COMPOUND NOT PRESENT AT DETECTION LIMIT



ANALYTICAL SERVICES  
PRIORITY POLLUTANT ANALYSIS

TABLE 1  
VOLATILE FRACTION

CLIENT: GMC-CPC DIVISION  
PROJECT NO.: 25554  
SAMPLE: 85-6

DATE SAMPLED: 12/06/85 TIME: 3:25 PM  
DATE RECEIVED: 12/09/85 TIME: 7:00 AM  
DATE COMPLETED: 12/16/85

SAMPLE NO. 58329

COMPOUND	RESULT (mg/l )	D.L.	COMPOUND	RESULT (mg/l )	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	*	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	0.004	0.002
2-CHLOROETHYL VINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	*	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

\*COMPOUND NOT PRESENT AT DETECTION LIMIT



ANALYTICAL SERVICES  
PRIORITY POLLUTANT ANALYSIS

TABLE 1  
VOLATILE FRACTION

CLIENT: GMC-CPC DIVISION  
PROJECT NO.: 25554  
SAMPLE: 85-7

DATE SAMPLED: 12/06/85 TIME: 3:10 PM  
DATE RECEIVED: 12/09/85 TIME: 7:00 AM  
DATE COMPLETED: 12/16/85

SAMPLE NO. 58330

COMPOUND	RESULT (mg/l )	D.L.	COMPOUND	RESULT (mg/l )	D.L.
BENZENE	*	0.001	TRANS-1,2-DICHLOROETHYLENE	0.004	0.002
BROMODICHLOROMETHANE	*	0.002	1,2-DICHLOROPROPANE	*	0.003
BROMOFORM	*	0.015	CIS-1,3-DICHLOROPROPYLENE	*	0.004
BROMOMETHANE	*	0.010	TRANS-1,3-DICHLOROPROPYLENE	*	0.004
CARBON TETRACHLORIDE	*	0.004	ETHYL BENZENE	*	0.001
CHLOROBENZENE	*	0.001	METHYLENE CHLORIDE	*	0.002
CHLORODIBROMOMETHANE	*	0.003	1,1,2,2-TETRACHLOROETHANE	*	0.002
CHLOROETHANE	*	0.010	TETRACHLOROETHYLENE	*	0.002
2-CHLOROETHYL VINYL ETHER	*	0.010	TOLUENE	*	0.001
CHLOROFORM	*	0.001	1,1,1-TRICHLOROETHANE	*	0.002
CHLOROMETHANE	*	0.010	1,1,2-TRICHLOROETHANE	*	0.003
1,1-DICHLOROETHANE	*	0.002	TRICHLOROETHYLENE	0.084	0.002
1,2-DICHLOROETHANE	*	0.002	TRICHLOROFLUOROMETHANE	*	0.003
1,1-DICHLOROETHYLENE	*	0.002	VINYL CHLORIDE	*	0.010

\*COMPOUND NOT PRESENT AT DETECTION LIMIT



APPENDIX C  
ANALYTICAL RESULTS FOR  
BASE NEUTRAL ORGANIC COMPOUNDS

ANALYTICAL SERVICES  
PRIORITY POLLUTANT ANALYSIS

TABLE 2  
BASE-NEUTRAL FRACTION

CLIENT: GMC-CPC DIVISION  
PROJECT NO.: 25554  
SAMPLE: 85-1

DATE SAMPLED: 12/06/85 TIME: 2:30 PM  
DATE RECEIVED: 120985 TIME: 7:00 AM  
DATE COMPLETED: 12/19/85

SAMPLE NO. 58324

COMPOUND	RESULT (mg/l )	D.L.	COMPOUND	RESULT (mg/l )	D.L.
ACENAPHTHENE	*	0.002	3,3'-DICHLOROBENZIDINE	*	0.020
ACENAPHTHYLENE	*	0.001	DIETHYL PHTHALATE	*	0.002
ANTHRACENE	*	0.001	DIMETHYL PHTHALATE	*	0.002
BENZIDINE	*	0.050	2,4-DINITROTOLUENE	*	0.010
BENZO (A) ANTHRACENE	*	0.005	2,6-DINITROTOLUENE	*	0.009
BENZO (K) FLUORANTHENE	*	0.005	DI-N-OCTYLPHTHALATE	*	0.002
BENZO (A) PYRENE	*	0.005	1,2-DIPHENYLHYDRAZINE	*	0.001
BENZO (G,H,I) PERYLENE	*	0.010	FLUORANTHENE	*	0.001
BIS-(2-CHLOROETHYL) ETHER	*	0.004	FLUORENE	*	0.002
BIS(2-CHLOROETHOXY) METHANE	*	0.004	HEXACHLOROBENZENE	*	0.005
BIS(2-CHLOROISOPROPYL) - ETHER	*	0.001	HEXACHLOROBUTADIENE	*	0.005
BIS-(2-ETHYL HEXYL) - PHTHALATE	*	0.002	HEXACHLOROETHANE	*	0.007
4-BROMOPHENYL PHENYL ETHER	*	0.007	HEXACHLOROCYCLOPENTADIENE	*	0.005
BUTYL BENZYL PHTHALATE	*	0.003	INDENO (1,2,3-CD) PYRENE	*	0.010
2-CHLORONAPHTHALENE	*	0.002	ISOPHORONE	*	0.002
4-CHLOROPHENYL PHENYL ETHER	*	0.003	NAPHTHALENE	*	0.001
CHRYSENE	*	0.005	NITROBENZENE	*	0.004
DIBENZO (A,H) ANTHRACENE	*	0.010	N-NITROSODI-N-PROPYLAMINE	*	0.004
DI-N-BUTYL PHTHALATE	*	0.001	N-NITROSODIPHENYLAMINE	*	0.003
1,2-DICHLOROBENZENE	*	0.003	PHENANTHRENE	*	0.001
1,3-DICHLOROBENZENE	*	0.003	PYRENE	*	0.001
1,4-DICHLOROBENZENE	*	0.003	1,2,4-TRICHLOROBENZENE	*	0.003

\*COMPOUND NOT PRESENT AT DETECTION LIMIT



ANALYTICAL SERVICES  
PRIORITY POLLUTANT ANALYSIS

TABLE 2  
BASE-NEUTRAL FRACTION

CLIENT: GMC-CPC DIVISION  
PROJECT NO.: 25554  
SAMPLE: 85-2

DATE SAMPLED: 12/06/85 TIME: 2:50 PM  
DATE RECEIVED: 120985 TIME: 7:00 AM  
DATE COMPLETED: 12/20/85

SAMPLE NO. 58325

COMPOUND	RESULT	D.L.	COMPOUND	RESULT	D.L.
	(mg/l )			(mg/l )	
ACENAPHTHENE	*	0.002	3,3'-DICHLOROBENZIDINE	*	0.020
ACENAPHTHYLENE	*	0.001	DIETHYL PHTHALATE	*	0.002
ANTHRACENE	*	0.001	DIMETHYL PHTHALATE	*	0.002
BENZIDINE	*	0.050	2,4-DINITROTOLUENE	*	0.010
BENZO (A) ANTHRACENE	*	0.005	2,6-DINITROTOLUENE	*	0.009
BENZO (K) FLUORANTHENE	*	0.005	DI-N-OCTYLPHTHALATE	*	0.002
BENZO (A) PYRENE	*	0.005	1,2-DIPHENYLHYDRAZINE	*	0.001
BENZO (G,H,I) PERYLENE	*	0.010	FLUORANTHENE	*	0.001
BIS-(2-CHLOROETHYL) ETHER	*	0.004	FLUORENE	*	0.002
BIS(2-CHLOROETHOXY) METHANE	*	0.004	HEXACHLOROBENZENE	*	0.005
BIS(2-CHLOROISOPROPYL) - ETHER	*	0.001	HEXACHLOROBUTADIENE	*	0.005
BIS-(2-ETHYL HEXYL) - PHTHALATE	*	0.002	HEXACHLOROETHANE	*	0.007
4-BROMOPHENYL PHENYL ETHER	*	0.007	HEXACHLOROCYCLOPENTADIENE	*	0.005
BUTYL BENZYL PHTHALATE	*	0.003	INDENO (1,2,3-CD) PYRENE	*	0.010
2-CHLORONAPHTHALENE	*	0.002	ISOPHORONE	*	0.002
4-CHLOROPHENYL PHENYL ETHER	*	0.003	NAPHTHALENE	*	0.001
CHRYSENE	*	0.005	NITROBENZENE	*	0.004
DIBENZO (A,H) ANTHRACENE	*	0.010	N-NITROSODI-N-PROPYLAMINE	*	0.004
DI-N-BUTYL PHTHALATE	*	0.001	N-NITROSODIPHENYLAMINE	*	0.003
1,2-DICHLOROBENZENE	*	0.003	PHENANTHRENE	*	0.001
1,3-DICHLOROBENZENE	*	0.003	PYRENE	*	0.001
1,4-DICHLOROBENZENE	*	0.003	1,2,4-TRICHLOROBENZENE	*	0.003

\*COMPOUND NOT PRESENT AT DETECTION LIMIT



ANALYTICAL SERVICES  
PRIORITY POLLUTANT ANALYSIS

TABLE 2  
BASE-NEUTRAL FRACTION

CLIENT: GMC-CPC DIVISION  
PROJECT NO.: 25554  
SAMPLE: 85-3

DATE SAMPLED: 12/06/85 TIME: 12:10 PM  
DATE RECEIVED: 120985 TIME: 7:00 AM  
DATE COMPLETED: 12/23/85

SAMPLE NO. 58326

COMPOUND	RESULT	D.L.	COMPOUND	RESULT	D.L.
	(mg/l )			(mg/l )	
ACENAPHTHENE	*	0.20	3,3'-DICHLOROBENZIDINE	*	2.0
ACENAPHTHYLENE	*	0.10	DIETHYL PHTHALATE	*	0.20
ANTHRACENE	*	0.10	DIMETHYL PHTHALATE	*	0.20
BENZIDINE	*	5.0	2,4-DINITROTOLUENE	*	1.0
BENZO (A) ANTHRACENE	*	0.50	2,6-DINITROTOLUENE	*	0.90
BENZO (K) FLUORANTHENE	*	0.50	DI-N-OCTYLPHTHALATE	*	0.20
BENZO (A) PYRENE	*	0.50	1,2-DIPHENYLHYDRAZINE	*	0.10
BENZO (G,H,I) PERYLENE	*	1.0	FLUORANTHENE	0.46	0.10
BIS-(2-CHLOROETHYL) ETHER	*	0.40	FLUORENE	3.2	0.20
BIS(2-CHLOROETHOXY) METHANE	*	0.40	HEXACHLOROBENZENE	*	0.50
BIS(2-CHLOROISOPROPYL) - ETHER	*	0.10	HEXACHLOROBUTADIENE	*	0.50
BIS-(2-ETHYL HEXYL) - PHTHALATE	*	0.20	HEXACHLOROETHANE	*	0.70
4-BROMOPHENYL PHENYL ETHER	*	0.70	HEXACHLOROCYCLOPENTADIENE	*	0.50
BUTYL BENZYL PHTHALATE	*	0.30	INDENO (1,2,3-CD) PYRENE	*	1.0
2-CHLORONAPHTHALENE	*	0.20	ISOPHORONE	*	0.20
4-CHLOROPHENYL PHENYL ETHER	*	0.30	NAPHTHALENE	0.17	0.10
CHRYSENE	*	0.50	NITROBENZENE	*	0.40
DIBENZO (A,H) ANTHRACENE	*	1.0	N-NITROSODI-N-PROPYLAMINE	*	0.004
DI-N-BUTYL PHTHALATE	*	0.10	N-NITROSODIPHENYLAMINE	*	0.40
1,2-DICHLOROBENZENE	*	0.30	PHENANTHRENE	2.8	0.10
1,3-DICHLOROBENZENE	*	0.30	PYRENE	0.56	0.10
1,4-DICHLOROBENZENE	*	0.30	1,2,4-TRICHLOROBENZENE	*	0.30

\*COMPOUND NOT PRESENT AT DETECTION LIMIT





ANALYTICAL SERVICES  
PRIORITY POLLUTANT ANALYSIS

TABLE 2  
BASE-NEUTRAL FRACTION

CLIENT: GMC-CPC DIVISION  
PROJECT NO.: 25554  
SAMPLE: 85-4

DATE SAMPLED: 12/06/85 TIME: 10:50 AM  
DATE RECEIVED: 120985 TIME: 7:00 AM  
DATE COMPLETED: 12/19/85

SAMPLE NO. 58327

COMPOUND	RESULT	D.L.	COMPOUND	RESULT	D.L.
	(mg/l )			(mg/l )	
ACENAPHTHENE	*	0.002	3,3'-DICHLOROBENZIDINE	*	0.020
ACENAPHTHYLENE	*	0.001	DIETHYL PHTHALATE	*	0.002
ANTHRACENE	*	0.001	DIMETHYL PHTHALATE	*	0.002
BENZIDINE	*	0.050	2,4-DINITROTOLUENE	*	0.010
BENZO (A) ANTHRACENE	*	0.005	2,6-DINITROTOLUENE	*	0.009
BENZO (K) FLUORANTHENE	*	0.005	DI-N-OCTYLPHTHALATE	*	0.002
BENZO (A) PYRENE	*	0.005	1,2-DIPHENYLHYDRAZINE	*	0.001
BENZO (G,H,I) PERYLENE	*	0.010	FLUORANTHENE	0.004	0.001
BIS-(2-CHLOROETHYL) ETHER	*	0.004	FLUORENE	*	0.002
BIS(2-CHLOROETHOXY) METHANE	*	0.004	HEXACHLOROBENZENE	*	0.005
BIS(2-CHLOROISOPROPYL) - ETHER	*	0.001	HEXACHLOROBUTADIENE	*	0.005
BIS-(2-ETHYL HEXYL) - PHTHALATE	0.002	0.002	HEXACHLOROETHANE	*	0.007
4-BROMOPHENYL PHENYL ETHER	*	0.007	HEXACHLOROCYCLOPENTADIENE	*	0.005
BUTYL BENZYL PHTHALATE	*	0.003	INDENO (1,2,3-CD) PYRENE	*	0.010
2-CHLORONAPHTHALENE	*	0.002	ISOPHORONE	*	0.002
4-CHLOROPHENYL PHENYL ETHER	*	0.003	NAPHTHALENE	*	0.001
CHRYSENE	*	0.005	NITROBENZENE	*	0.004
DIBENZO (A,H) ANTHRACENE	*	0.010	N-NITROSODI-N-PROPYLAMINE	*	0.004
DI-N-BUTYL PHTHALATE	0.007	0.001	N-NITROSODIPHENYLAMINE	*	0.003
1,2-DICHLOROBENZENE	*	0.003	PHENANTHRENE	0.010	0.001
1,3-DICHLOROBENZENE	*	0.003	PYRENE	0.003	0.001
1,4-DICHLOROBENZENE	*	0.003	1,2,4-TRICHLOROBENZENE	*	0.003

\*COMPOUND NOT PRESENT AT DETECTION LIMIT



ANALYTICAL SERVICES  
PRIORITY POLLUTANT ANALYSIS

TABLE 2  
BASE-NEUTRAL FRACTION

CLIENT: GMC-CPC DIVISION  
PROJECT NO.: 25554  
SAMPLE: 85-5B

DATE SAMPLED: 12/06/85 TIME: 11:30 AM  
DATE RECEIVED: 12/09/85 TIME: 7:00 AM  
DATE COMPLETED: 12/19/85

SAMPLE NO. 58328

COMPOUND	RESULT	D.L.	COMPOUND	RESULT	D.L.
	( mg/l )			( mg/l )	
ACENAPHTHENE	*	0.002	3,3'-DICHLOROBENZIDINE	*	0.020
ACENAPHTHYLENE	*	0.001	DIETHYL PHTHALATE	*	0.002
ANTHRACENE	*	0.001	DIMETHYL PHTHALATE	*	0.002
BENZIDINE	*	0.050	2,4-DINITROTOLUENE	*	0.010
BENZO (A) ANTHRACENE	*	0.005	2,6-DINITROTOLUENE	*	0.009
BENZO (K) FLUORANTHENE	*	0.005	DI-N-OCTYLPHTHALATE	*	0.002
BENZO (A) PYRENE	*	0.005	1,2-DIPHENYLHYDRAZINE	*	0.001
BENZO (G,H,I) PERYLENE	*	0.010	FLUORANTHENE	*	0.001
BIS-(2-CHLOROETHYL) ETHER	*	0.004	FLUORENE	0.004	0.002
BIS(2-CHLOROETHOXY) METHANE	*	0.004	HEXACHLOROBENZENE	*	0.005
BIS(2-CHLOROISOPROPYL) - ETHER	*	0.001	HEXACHLOROBUTADIENE	*	0.005
BIS-(2-ETHYL HEXYL) - PHTHALATE	*	0.002	HEXACHLOROETHANE	*	0.007
4-BROMOPHENYL PHENYL ETHER	*	0.007	HEXACHLOROCYCLOPENTADIENE	*	0.005
BUTYL BENZYL PHTHALATE	*	0.003	INDENO (1,2,3-CD) PYRENE	*	0.010
2-CHLORONAPHTHALENE	*	0.002	ISOPHORONE	*	0.002
4-CHLOROPHENYL PHENYL ETHER	*	0.003	NAPHTHALENE	*	0.001
CHRYSENE	*	0.005	NITROBENZENE	*	0.004
DIBENZO (A,H) ANTHRACENE	*	0.010	N-NITROSODI-N-PROPYLAMINE	*	0.004
DI-N-BUTYL PHTHALATE	*	0.001	N-NITROSODIPHENYLAMINE	*	0.003
1,2-DICHLOROBENZENE	*	0.003	PHENANTHRENE	0.003	0.001
1,3-DICHLOROBENZENE	*	0.003	PYRENE	0.005	0.001
1,4-DICHLOROBENZENE	*	0.003	1,2,4-TRICHLOROBENZENE	*	0.003

\*COMPOUND NOT PRESENT AT DETECTION LIMIT

\*COMPOUND NOT PRESENT AT DETECTION LIMIT



ANALYTICAL SERVICES  
PRIORITY POLLUTANT ANALYSIS

TABLE 2  
BASE-NEUTRAL FRACTION

CLIENT: GMC-CPC DIVISION  
PROJECT NO.: 25554  
SAMPLE: 85-6

DATE SAMPLED: 12/06/85 TIME: 3:25 PM  
DATE RECEIVED: 12/09/85 TIME: 7:00 AM  
DATE COMPLETED: 12/19/85

SAMPLE NO. 58329

COMPOUND	RESULT	D.L.	COMPOUND	RESULT	D.L.
	(mg/l )			(mg/l )	
ACENAPHTHENE	*	0.002	3,3'-DICHLOROBENZIDINE	*	0.020
ACENAPHTHYLENE	*	0.001	DIETHYL PHTHALATE	*	0.002
ANTHRACENE	*	0.001	DIMETHYL PHTHALATE	*	0.002
BENZIDINE	*	0.050	2,4-DINITROTOLUENE	*	0.010
BENZO (A) ANTHRACENE	*	0.005	2,6-DINITROTOLUENE	*	0.009
BENZO (K) FLUORANTHENE	*	0.005	DI-N-OCTYLPHTHALATE	*	0.002
BENZO (A) PYRENE	*	0.005	1,2-DIPHENYLHYDRAZINE	*	0.001
BENZO (G,H,I) PERYLENE	*	0.010	FLUORANTHENE	*	0.001
BIS-(2-CHLOROETHYL) ETHER	*	0.004	FLUORENE	*	0.002
BIS(2-CHLOROETHOXY) METHANE	*	0.004	HEXACHLOROBENZENE	*	0.005
BIS(2-CHLOROISOPROPYL)- ETHER	*	0.001	HEXACHLOROBUTADIENE	*	0.005
BIS-(2-ETHYL HEXYL)- PHTHALATE	*	0.002	HEXACHLOROETHANE	*	0.007
4-BROMOPHENYL PHENYL ETHER	*	0.007	HEXACHLOROCYCLOPENTADIENE	*	0.005
BUTYL BENZYL PHTHALATE	*	0.003	INDENO (1,2,3-CD) PYRENE	*	0.010
2-CHLORONAPHTHALENE	*	0.002	ISOPHORONE	*	0.002
4-CHLOROPHENYL PHENYL ETHER	*	0.003	NAPHTHALENE	*	0.001
CHRYSENE	*	0.005	NITROBENZENE	*	0.004
DIBENZO (A,H) ANTHRACENE	*	0.010	N-NITROSODI-N-PROPYLAMINE	*	0.004
DI-N-BUTYL PHTHALATE	*	0.001	N-NITROSODIPHENYLAMINE	*	0.003
1,2-DICHLOROBENZENE	*	0.003	PHENANTHRENE	*	0.001
1,3-DICHLOROBENZENE	*	0.003	PYRENE	*	0.001
1,4-DICHLOROBENZENE	*	0.003	1,2,4-TRICHLOROBENZENE	*	0.003

\*COMPOUND NOT PRESENT AT DETECTION LIMIT



ANALYTICAL SERVICES  
PRIORITY POLLUTANT ANALYSIS

TABLE 2  
BASE-NEUTRAL FRACTION

CLIENT: GMC-CPC DIVISION  
PROJECT NO.: 25554  
SAMPLE: 85-7

DATE SAMPLED: 12/06/85 TIME: 3:10 PM  
DATE RECEIVED: 120985 TIME: 7:00 AM  
DATE COMPLETED: 12/19/85

SAMPLE NO. 58330

COMPOUND	RESULT	D.L.	COMPOUND	RESULT	D.L.
	(mg/l )			(mg/l )	
ACENAPHTHENE	*	0.002	3,3'-DICHLOROBENZIDINE	*	0.020
ACENAPHTHYLENE	*	0.001	DIETHYL PHTHALATE	*	0.002
ANTHRACENE	*	0.001	DIMETHYL PHTHALATE	*	0.002
BENZIDINE	*	0.050	2,4-DINITROTOLUENE	*	0.010
BENZO (A) ANTHRACENE	*	0.005	2,6-DINITROTOLUENE	*	0.009
BENZO (K) FLUORANTHENE	*	0.005	DI-N-OCTYLPHTHALATE	*	0.002
BENZO (A) PYRENE	*	0.005	1,2-DIPHENYLHYDRAZINE	*	0.001
BENZO (G,H,I) PERYLENE	*	0.010	FLUORANTHENE	*	0.001
BIS-(2-CHLOROETHYL) ETHER	*	0.004	FLUORENE	*	0.002
BIS(2-CHLOROETHOXY) METHANE	*	0.004	HEXACHLOROBENZENE	*	0.005
BIS(2-CHLOROISOPROPYL) - ETHER	*	0.001	HEXACHLOROBUTADIENE	*	0.005
BIS-(2-ETHYL HEXYL) - PHTHALATE	*	0.002	HEXACHLOROETHANE	*	0.007
4-BROMOPHENYL PHENYL ETHER	*	0.007	HEXACHLOROCYCLOPENTADIENE	*	0.005
BUTYL BENZYL PHTHALATE	*	0.003	INDENO (1,2,3-CD) PYRENE	*	0.010
2-CHLORONAPHTHALENE	*	0.002	ISOPHORONE	*	0.002
4-CHLOROPHENYL PHENYL ETHER	*	0.003	NAPHTHALENE	*	0.001
CHRYSENE	*	0.005	NITROBENZENE	*	0.004
DIBENZO (A,H) ANTHRACENE	*	0.010	N-NITROSODI-N-PROPYLAMINE	*	0.004
DI-N-BUTYL PHTHALATE	*	0.001	N-NITROSODIPHENYLAMINE	*	0.003
1,2-DICHLOROBENZENE	*	0.003	PHENANTHRENE	*	0.001
1,3-DICHLOROBENZENE	*	0.003	PYRENE	*	0.001
1,4-DICHLOROBENZENE	*	0.003	1,2,4-TRICHLOROBENZENE	*	0.003

\*COMPOUND NOT PRESENT AT DETECTION LIMIT

