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GROUNDWATER TECHNOLOGY

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CORRECTIVE RESPONSE SUMMARY/ SITE CHARACTERIZATION REPORT CONSOLIDATED RAIL CORPORATION BOTSFORD YARD KALAMAZOO, MICHIGAN

Project Number: 04005-6001

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1.0 INTRODUCTION

This report is a summary of corrective action and investigation activities conducted since 1973 at the Botsford Yard in Kalamazoo, Michigan, currently owned by Consolidated Rail Corporation (Conrail). These activities were undertaken in response to the periodic historical appearance of separate phase hydrocarbons on the surface of the Kalamazoo River, located at the southern boundary of the site (Figure 1, Site Location Map).

1.1 Historical Chronology: 1973 - 1986

Based upon a file search of the Conrail records, the following chronology summarizes the historical activities conducted at the site from 1973 through 1986.

1973: The Michigan Department of Natural Resources (MDNR) contacted Penn Central Transportation Company (Penn Central) regarding the seepage of oil into the Kalamazoo River. The locomotive refueling area was identified as a potential source of the hydrocarbons. Oil recovery and seepage abatement actions were initiated and maintained by Penn Central.

1974: Penn Central submits, and the MDNR approves, a Pollution Incident and Prevention Plan, including actions for improved oil interception and control, which are conditionally approved by the MDNR. Penn Central also initiated reporting of the oil recovery to the MDNR.

1975: The installation of pollution abatement and recovery equipment was completed, which included a fueling pad, piping, control wells, and an 8000 gallon underground storage tank.

1976: Conrail was created in April 1976 by the Rail Reorganization Act of 1973 and acquired the Botsford Yard from bankrupt Penn Central.

1977. Quarterly inspections initiated by the MDNR.

1984: Conrail ceases fueling operations at the Botsford Yard. More than 150,000 gallons of fuel have been recovered from the subsurface since inception of the oil recovery actions during the 1970s. During that time, a general decrease in the thickness of fuel oil in the monitoring wells was observed.

1986: Two ORS Filter Scavengers are deployed in the large diameter sumps (S-1 through S-5, Figure 2) present on-site. The two units are rotated between the five existing sumps, with the objective of passively recovering any separate phase product that accumulates in the sumps.

In 1988, Groundwater Technology, Inc. (Groundwater Technology) was contracted by Conrail to:

- identify and characterize the nature of the separate phase hydrocarbon impacts to both surface and subsurface waters located beneath and adjacent to the site; and

- evaluate the site characteristics for the development of enhanced product recovery and discharge/seepage abatement.

The current report details the work scope and results of those activities.

2.0 SCOPE OF WORK

2.1 Recovery System Inspection and Discharge/Seepage Abatement

On January 4, 1989, Groundwater Technology personnel inspected the Botsford Yard, during which, the five large-diameter (greater than 5 feet) sumps located on-site were monitored for the presence/absence of separate phase petroleum. In the two northern-most sumps (S-1 and S-2, Figure 2), approximately four feet of separate phase petroleum (as determined with an interface probe) were noted. Additionally, one sump located adjacent to the Kalamazoo River (S-4 or S-5, not specifically noted) contained approximately one foot of petroleum. Sump S-3 contained no separate phase petroleum. During the January 1989 site visit, the filter scavengers deployed in 1986 were, and as of May 1993 continue to be, in service; at present, no separate phase hydrocarbons remain in any of the large diameter sumps.

The preliminary data from the January 1989 site visit indicated that diesel fuel was entering the Kalamazoo River from a bank seep located approximately 350 feet upstream of the Mills Street bridge and via a sanitary sewer outfall located immediately north of the Kalamazoo River on the western side of Mills Street (immediately down from manhole S8, see Figure 2). This line is no longer in service, and will in fact be closed (filled with concrete) during upcoming bridge and road reconstruction, however, it is apparent that it currently acts as a point of accumulation for groundwater and any separate phase petroleum product floating upon it.

In response to the observed discharges/seepages, corrective actions were undertaken, including:

- the placement of an inflatable bladder (plug) in the sanitary sewer line between manhole S8 and the outfall into the river;
- the periodic evacuation of liquids from sewer manhole S8; and
- the placement of sorbent booms in the Kalamazoo River immediately in front of the bank seep and the sewer effluent point.

In addition, the filter scavengers deployed in 1986 continue to be in operation recovering product from the large diameter sumps. Since January 1989 and through the end of April 1993, approximately 2,500 gallons of diesel fuel and 8,700 gallons of water have been recovered from the subsurface via the two ORS filter scavengers (placed in the recovery sumps) and the periodic evacuation of liquids from

manhole S8. As the liquids were stored in above-ground polyethylene tanks and a stationary railcar, the recovery volumes were calculated by measuring the thickness of the water and product in each of the tanks and converting to volume via tank charts.

Regarding the functional performance of the inflatable bladder in the sanitary bypass line, periodic failure of the bladder has resulted in the occasional discharge of liquids contained within the sewer to the Kalamazoo River, typically during a low water stage of the river. Maintenance of bladder integrity by the City of Kalamazoo has been a critical aspect of preventing these undesired releases. It is pertinent to indicate that the sanitary sewer line in question (manhole S8) is scheduled to be closed during the Mills Street bridge reconstruction project currently underway (May 1993). By virtue of this, further uncontrolled discharges to the Kalamazoo River via this entry point will be prevented.

2.2 Site Assessment

2.2.1 Objectives

Groundwater Technology's hydrogeologic evaluation was conducted in two phases, the first was from January 1989 through October 1990, and the second from October 1992 through the compilation of this report. The objectives of the site assessment for enhanced product recovery were to characterize.

- the geology beneath the site;
- the hydrogeologic factors affecting the flow of groundwater beneath the site;
- the distribution of fugitive hydrocarbons detected beneath the site; and
- the physical factors affecting the migration of petroleum into the river via the sewer line and the bank seep.

2.2.2 Soil Boring/Monitoring Well Installation

Monitoring wells MW-1 through MW-9 were constructed from April 18, 1989 to April 20, 1989 and monitoring wells MW-10 through MW-21 were constructed from November 13, 1989 to November 22, 1989. The locations of the monitoring wells were selected primarily to provide information on the subsurface extent of separate phase petroleum.

Hollow stem auger drilling techniques were employed to install all the borings. Split spoon samples were obtained at regular intervals, described by a geologist, and analyzed at the site for the presence of volatile organic compounds (VOCs) using a photoionization device (PID).

Each boring was completed as a monitoring well through the installation of two inch diameter PVC riser and screen (0.010" slot). Schedule 40 PVC riser was installed above the screen sand/gravel pack was placed around the screen up to at least two feet above the screen. A bentonite seal was then placed above the sand pack. The soil characteristics and the construction details of the monitoring wells are presented on the boring logs located in Appendix A.

2.2.3 Monitoring Well Gauging and Surveying

Following the installation of the monitoring wells, each of the wells, along with the large diameter sumps, were surveyed to a relative benchmark at the site. Water levels were calculated to this relative datum until the site was professionally surveyed by Hatfield Engineering in December 1992. Note that the location of MW-2 on the Hatfield map is based on the historically known location; the well was destroyed sometime after the November 13, 1992 site visit and prior to the Hatfield survey in December 1992. Therefore, while the historical elevation data cannot be converted to the Hatfield absolute top-of-casing elevations, the historical product thickness data is valid and has been included on those maps for dates prior to the well's destruction.

Groundwater elevation and product thickness data has been collected periodically using an interface probe since the initial gauging event on April 26, 1989 to January 1993. The pre-Hatfield relative-datum gauging data has been recalculated to the absolute datum as measured during the professional survey. Other than for MW-2, it has been assumed that no physical changes to the well casings (settling, repairs necessitating cutting the riser, etc..) have occurred since collection of the initial data on April 21, 1989.

2.2.4 Groundwater Sample Collection and Analysis

The initial round of groundwater sampling was conducted on December 6, 1989. Water samples were collected from the following monitoring wells:

- MW-01;
- MW-04;
- MW-05;
- MW-15;
- MW-17;
- MW-19;
- MW-20; and
- MW-21.

The samples were analyzed for total petroleum hydrocarbons (TPH) via a modified EPA Method 8015. The resultant gas chromatographs (GC) were also compared to GC standards to confirm the product type (i.e., diesel).

The next round of groundwater sampling was conducted on January 31, 1990, during an aquifer pumping test. These samples were analyzed for TPH via a modified EPA Method 8015 and volatile organics via EPA Method 8010 and 8020.

The third (and most recent) round of groundwater sampling was conducted on October 21, 1992. Samples were collected from those monitoring wells not exhibiting a measurable thickness of separate phase petroleum. Those wells were:

- MW-01;
- MW-04;
- MW-05;
- MW-06;
- MW-09;
- MW-15;
- MW-17;
- MW-19;
- MW-20; and
- MW-21.

The samples were analyzed for benzene, ethylbenzene, toluene, and xylenes (BTEX) via a modified EPA Method 602 and polynuclear aromatic hydrocarbons (PNAs) via EPA Method 610.

2.2.5 Product Sample Collection and Analysis

To characterize the product detected in the monitoring wells, on April 26, 1989, samples of the separate phase petroleum contained in MW-3, MW-6, and MW-7 were collected and analyzed for total PCBs, purgeable halocarbons via EPA Method 5030/8010, and hydrocarbon fingerprinting via a simulated product distillation.

To characterize the nature of the product noted in the sanitary sewer line, product samples were collected from the manhole designated as S8 (see Figure 2). The first sampling of the sewer liquids was conducted on October 17, 1990. The sample was analyzed for TCLP volatile and semi-volatile organics,

TCLP metals, TCLP pesticides, TCLP herbicides, and PCBs in oil.

The second round of product sampling from the sanitary sewer was conducted on October 7, 1993 to obtain waste characterization and disposal approval at Environmental Waste Control. These samples were analyzed for the full TCLP scan (as above), PCBs, total cyanide, total sulfide, flashpoint, and pH.

2.3 Slug Testing

Slug tests were performed on monitoring wells MW-3, MW-4, MW-7, MW-9, MW-11, MW-12, MW-15, MW-17, MW-18, and MW-19. However, only the data from monitoring wells MW-3, MW-7, MW-12, MW-15, and MW-17 were analyzable. Useable data from the other monitoring wells were not obtained as the water level in those wells either recovered too quickly for manual measurement or interference from free product prevented the collection of accurate information.

2.4 Pump Testing

Two pump tests were performed at the Botsford Yard to obtain information regarding aquifer properties (hydraulic conductivity and transmissivity), as well as an estimated flow rate from the subsurface. The first test was conducted on January 30, 1990, and the second on January 31, 1990.

The first test (1/30/90), conducted on sump S2, operated for 4.5 hours at a pumping rate of approximately 2 gallons per minute (gpm) Water level drawdown was monitored in S2 and monitoring well MW-8. The second test (1/31/90) operated for approximately 14 hours at a flow rate of 9 gpm. Again, the pumping well was sump S2. Water level drawdown was observed in monitoring wells MW-7, MW-8, MW-9, MW-12, MW-13, and MW-16.

3.0 SITE CHARACTERIZATION RESULTS

3.1 Site Geology

Split spoon samples obtained during the installation of the 21 monitoring wells indicate that the subsurface geology beneath the Botsford Yard consists of medium to fine grained sand with silt and gravel. Each of the monitoring wells intersected sand and gravel fill ranging in thickness from 2 to 9 feet prior to entering the native material. The subsurface geology is uniform within the intersected depth; Figure 3 is an interpretive cross section of the subsurface geology of the site.

3.2 Site Hydrogeology

Groundwater at the site ranges in depth from 3.04 ft. (MW-01 on 12/21/92) to 15.86 ft. (MW-14 on 01/30/90), as measured from the top of the monitoring well casing. The depth to water varies depending on the monitoring well location and the time/season of water level gauging. The chronological gauging data are placed in Appendix B. Based on the gauging data it is observed that groundwater flows towards the south, draining into the Kalamazoo River. There is also a westward component to the gradient, possibly related to the groundwater mound associated with the surface runoff into sump S-2. Based on the groundwater gradient maps (Figures 4 through 7) the average hydraulic gradient has been estimated to be 0.003 ft/ft towards the south-southwest.

A mounding of the groundwater elevation can be observed surrounding large diameter sump S-2, as evidenced on Figures 4 through 7. A physical inspection of the sump revealed that surface runoff may be entering the sump, thus causing the mounding.

3.2.1 Slug Test Results

The data from each slug test was analyzed with the Bouwer and Rice 1989 method. The slug test results are listed in Table 1. Hydraulic conductivity (K) values ranged from 1.67 to 12.52 ft/day. Transmissivity (T) values ranged from 25.05 to 187.80 ft^2/day. The values are within the range of fine sands and silts.

3.2.2 Pump Test Results

The drawdown data was analyzed using the computer program Graphical Well Analysis Package

(GWAP), as developed by Dansby and Price (1987). The pump test data and the GWAP output are placed in Appendix C. The average hydraulic conductivity estimated by the analysis is 58.31 gpd/ft^2. which falls at the lower limit of clean sand and median value of silty sand.

A summary of the pump test results is provided in Table 2. The results from the first test (1/30/90) indicate that the K of the water bearing zone ranged from 57 to 2421 gallons per day/ft^2 (gpd/ft^2) (7.6 - 324 ft/day). The transmissivity ranged from 851-36,320 gpd/ft (114-4856 ft^2/day). The results from the second test (1/31/90) indicated that the K ranged from 60 to 886 gpd/ft^2 (8-118 ft./day), and the T ranged from 898-13,280 gdp/ft (120- 1775 ft^2/day).

There are several issues of concern regarding the validity of the pumping test data; which were that:

- no construction details are available for sump S-2;
- the large diameter of the sump creates a significant storage in the pumping well (S2) that must be affected before drawdown begins in the water bearing zone;
- the pumping tests were of fairly short duration (4.5 hours and 14 hours); and
- analysis of the GWAP results (Appendix C) showed only three good matches of the drawdown data to the type curves (1/31/90 data of S2 and MW-16 and 1/30/90 data of S2).

3.3 Subsurface Hydrocarbon Distribution

3.3.1 Separate Phase Hydrocarbon Distribution and Chemistry

The periodic gauging of petroleum and water levels (Appendix B) has indicated the presence of separate phase petroleum product in 13 monitoring wells, generally located in the central and southern areas of the site. Separate phase hydrocarbons were not detected in upgradient monitoring wells MW-1 and MW-17, or in the easterly cross-gradient monitoring wells MW-15 and MW-21.

The maximum apparent product thickness is found in the central part of the site, as represented by monitoring wells MW-2, MW-11, MW-3, MW-18, MW-7, MW-12, MW-13, MW-14, and MW-10. In this area, the apparent product thickness ranges from 0.32 feet (MW-14, 12/21/92) to 5.02 feet (MW-10, 10/17/90).

The monitoring wells located along the Kalamazoo River (MW-4, MW-19, S-3, MW-5, and MW-20) generally do not exhibit a measureable thickness of separate phase petroleum product. MW-6 has periodically exhibited a measureable thickness of product, ranging from 0.00 feet (1/31/90, 10/20/92,

11/13/92, and 12/21/92) to a maximum of 0.11 feet (1/7/93).

During a site visit conducted on June 16, 1993, representatives of Groundwater Technology, Conrail, and the MDNR observed an open pit excavation located on the former Auto Ion property. The pit, located along the Kalamazoo river immediately west of manhole S8 (see Figure 2), was several hundred square feet in size, with groundwater exposed at the bottom. No petroleum product was observed floating on the surface of the water at the bottom of the excavation.

Generally, the apparent thickness of product as measured in the monitoring wells will be higher than the true thickness by an approximate ratio of 4:1 (Hughes, Sullivan and Zinner, 1988). Hence the actual product thickness within the aquifer can be expected to be smaller than observed in the monitoring wells. As such, no estimates have been made regarding the actual volume of recoverable product at the site.

The laboratory results from the product samples collected from MW-3, MW-6, and MW-7 on April 26, 1989 showed no detectable concentrations of purgeable halocarbons and PCBs. The simulated distillation results indicated that the three samples were in similar in composition and consisted primarily of hydrocarbons in fuel oil #2 (diesel) boiling range. The analytical reports may be found in Appendix D.

3.3.2 Dissolved Phase Hydrocarbon Distribution

The TPH results for those water samples collected on December 6, 1989 are shown on Table 3; the laboratory analytical reports are located in Appendix D. For those samples exhibiting detectable results, the TPH concentration ranged from 3,400 μg/L (MW-4) to 15,000 μg/L (MW-20); both wells are located in the southern areas of the site along the Kalamazoo River. Furthermore, the GC analysis indicates that the profile is consistent with diesel fuel as a source. Note that upgradient monitoring wells MW-1 and MW-17, and easterly cross gradient wells MW-15 and MW-21 exhibited no detectable TPH concentration.

The analysis of the water samples collected on 1/31/90 during the pumping test indicated the presence of biodegraded diesel fuel (3800 μg/L TPH). The analysis also indicated the presence of benzene (17 μg/L), toluene (3.5 μg/L), ethylbenzene (8.8 μg/L), xylenes (22 μg/L), 1,1-dichloroethane (3.2 μg/L), and trans-1,2-dichloroethene (48 μg/L). The laboratory results may be found in Appendix D.

Table 4 shows the PNA results from the groundwater samples collected on October 21, 1992. Dissolved phase PNAs were detected in MW-4, MW-19, MW-5, MW-20, and MW-6. Although PNA's were detected in MW-9, the concentrations measured were in exceedance of the maximum expected analyte solubility

in water; this was likely due to the introduction of product into the gas chromatograph.

PNAs were not detected in monitoring wells MW-17 and MW-1, both located upgradient to the site. MW-21 and MW-15 were also free of PNAs, both located in the easterly cross gradient direction near the Kalamazoo river.

BTEX compounds were not detected in any of the analyzed monitoring wells except for MW-5, which exhibited 3.2 parts per billion (ppb) benzene. Table 5 summarizes the BTEX results.

The complete laboratory reports may be found in Appendix D.

3.4 Sewer Line Investigation

The City of Kalamazoo (Mr. Bruce Merchant) was contacted to determine the configuration of the subsurface utilities between the intersection of Mills and O'Neill streets and the Kalamazoo river. The existing configuration is shown on Figure 2; the only line currently known to be impacted with petroleum is the sanitary bypass line associated with sewer manhole S8.

During the early summer of 1993, the City of Kalamazoo will undertake an effort to close this, and all other existing subsurface lines between the intersection of Mills and O'Neill streets and the Kalamazoo river. A new storm sewer line will be installed along this section of Mills street; the construction details will be obtained from the City of Kalamazoo. Upon completion of the road, bridge, and subsurface utilities construction, Figure 2 will be amended to reflect the changes.

The summary of the laboratory analyses from both sets of samples collected from the sewer line (manhole S8) are shown on Tables 6 through 10. Minor concentrations of barium, chromium, lead, and total cyanide were indicated from the sample collected on October 17, 1990; all other analytes were below detection/quantitation limits. However, all the analytes in the sample collected in January 1993 were below the detection/quantitation limits.

4.0 CONCLUSIONS

Based upon this investigation, it may be concluded that:

- separate phase hydrocarbon impacts at the site are confined to the bank seep, the sanitary sewer outfall associated with manhole S8, and the central portion of the facility as defined by monitoring wells MW-2, MW-11, MW-3, MW-18, MW-7, MW-12, MW-13, MW-14, and MW-10;
- as the refueling area was formerly located in the area surrounded by monitoring wells MW-2, MW-10, and MW-14, the fugitive diesel fuel found in the central area of facility is most likely related to this operation;
- the lack of separate phase diesel fuel in those monitoring wells along the Kalamazoo River (other than small amounts in MW-6) indicates that there is not a site-wide, general migration of a continous product layer into the river; rather, the observed bank seep is likely related to either a narrow band (20 to 30 feet wide) of product periodically migrating downgradient from the refueling area of the facility or a very localized spill directly adjacent to the river; further investigation is warranted prior to proposing additional corrective action other than the ongoing maintenance of the sorbent booms;
- closure of the sanitary sewer line beneath Mills Street will prevent the periodic discharge of diesel fuel from the sewer line into the Kalamazoo River;
- the upcoming excavation beneath Mills Street, necessary for installing the new sewer line, should provide information regarding the nature of the migration of petroleum from the Botsford Yard into the sanitary sewer; recommendations regarding additional corrective action in this area will depend on the results of this work; and
- enhanced product recovery in the refueling area of the facility should be focussed in the area of MW-2, MW-10, and MW-14.

5.0 REFERENCES

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FIGURES

Figure 1	Site Location Map
Figure 2	Site Map
Figure 3	Geologic Cross Sections
Figure 4	Groundwater Gradient Map (12/05/89)
Figure 5	Groundwater Gradient Map (10/17/90)
Figure 6	Groundwater Gradient Map (11/13/92)
Figure 7	Groundwater Gradient Map (12/21/92)

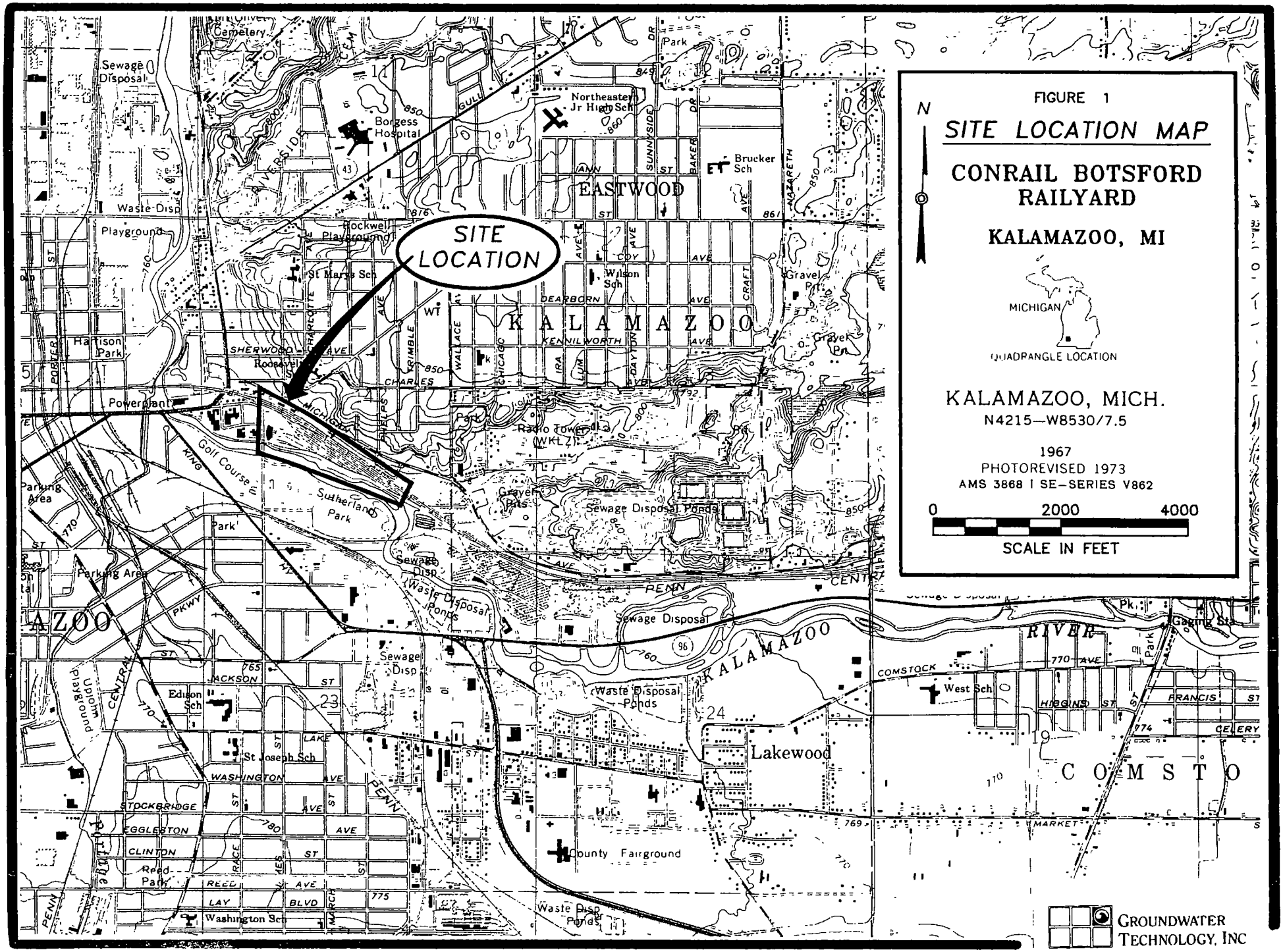
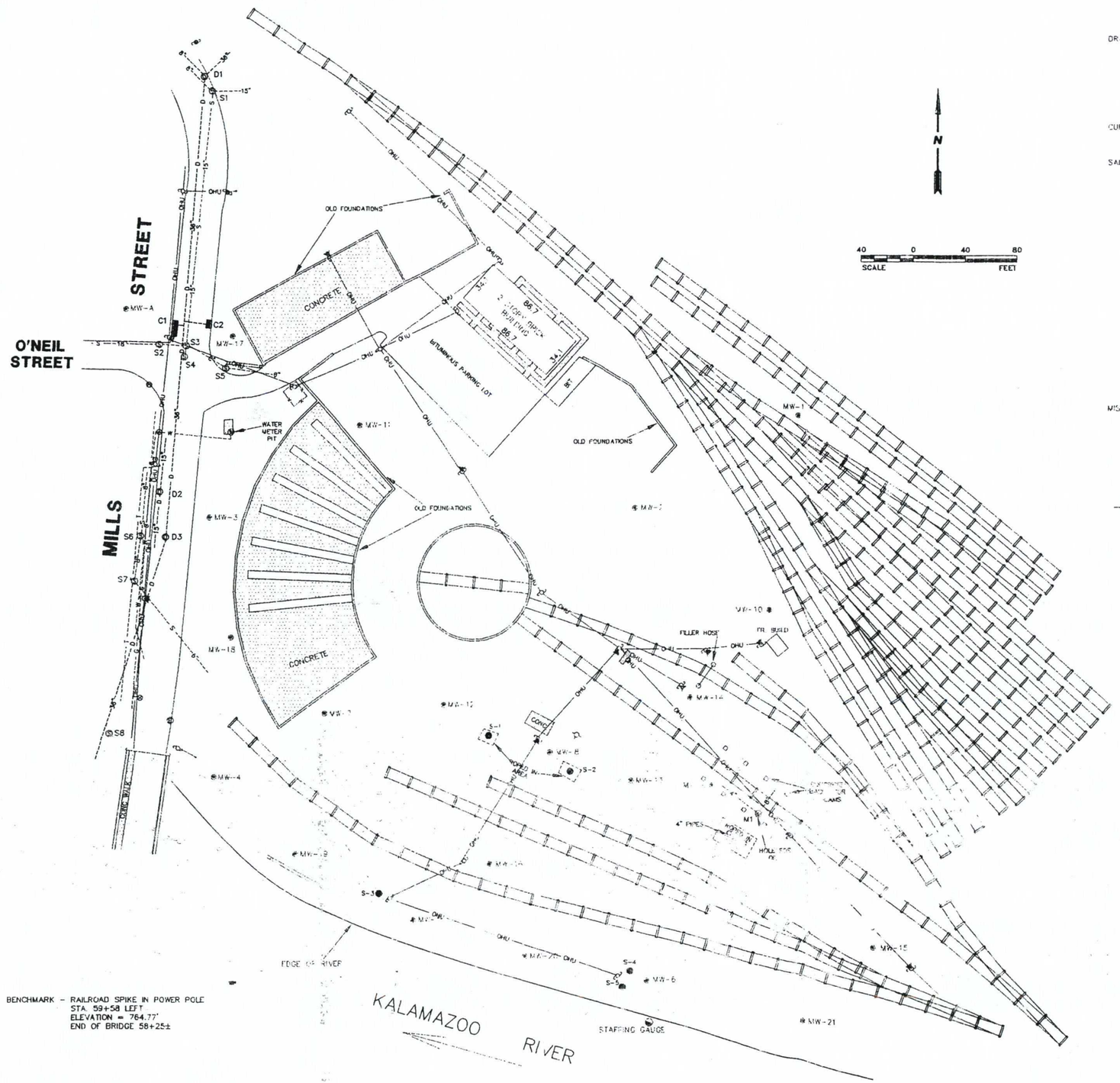


FIGURE 1
SITE LOCATION MAP
CONRAIL BOTSFORD RAILYARD
KALAMAZOO, MI
MICHIGAN
QUADRANGLE LOCATION
KALAMAZOO, MICH.
N4215—W8530/7.5
1967
PHOTOREVISED 1973
AMS 3868 I SE—SERIES V862
0
2000
4000
SCALE IN FEET
N
SITE LOCATION
EASTWOOD
KALAMAZOO
Lakewood
COMSTO
Sewage Disposal
Waste Disp
Playground
Borgess Hospital
Northeastern Jr High Sch
Brucker Sch
Rockwell Playground
St Marys Sch
Wilson Sch
Gravel Pit
Harrison Park
Powerplant
Golf Course
Sutherland Park
Radio Tower (WKLZ)
Sewage Disposal Ponds
Parking Area
Waste Disposal Ponds
Sewage Disposal
KALAMAZOO RIVER
Gaging Sta
West Sch
Edison Sch
St Joseph Sch
Upjohn Playground
County Fairground
Washington Sch
Reed Park
Cemetery
GROUNDWATER TECHNOLOGY, INC



BENCHMARK – RAILROAD SPIKE IN POWER POLE
STA. 59+58 LEFT
ELEVATION = 764.77'
END OF BRIDGE 58+25±

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STRUCTURE INVENTORY

	#	RIM ELEVATION	SIZE	DIRECTION	INVERT ELEVATION
DRAINAGE	D1	762.46	36"	SOUTH	756.36
			36"	SOUTH	756.39
			15"	NORTHWEST	756.39
	D2	763.36	15"	NORTH	754.31
			15"	SOUTH	754.31
	D3	763.72	36"	NORTH	755.75
			36"	SOUTH	755.75
CURB INLETS	C1	762.43	12"	EAST	757.75
	C2	762.72	12"	WEST	757.42
SANITARY	S1	762.51	15"	SOUTH	755.61
			15"	EAST	755.61
			8"	NORTHWEST	755.61
	S2	762.70	18"	EAST	753.90
			18"	WEST	753.90
	S3	763.06	12"	SOUTH	757.71
			15"	SOUTH	755.06
			8"	EAST	756.96
			18"	WEST	754.26
			15"	NORTH	754.81
	S4	763.20	12"	NORTH	757.90
	S5	764.42	8"	WEST	758.57
			6"	EAST	758.74
	S6	763.77	8"	NORTH	755.95
			8"	SOUTH	755.95
	S7	764.12	8"	NORTH	756.12
			6"	SOUTHEAST	757.97
	S8	765.04	TOP OF OILY WATER		755.04
			TO BOTTOM		754.04
			NO PIPES VISIBLE		
MISC.	M1	769.14	4"	NORTHWEST	765.89
			8"	NORTHEAST	765.39

WELL ELEVATIONS

WELL #	ELEVATION TOP OF GROUND	ELEVATION TOP OF RIM	ELEVATION TOP OF PVC	COORDINATES NORTH	COORDINATES EAST
1	766.2	768.28	767.93	1943.1	2411.9
3	765.2	767.57	767.27	1864.9	1955.1
4	762.1	764.34	764.16	1667.0	1960.0
5	761.7	764.41	764.06	1558.7	2115.7
6	762.4	764.85	764.59	1511.6	2296.6
7	766.5	769.45	769.13	1715.4	2044.8
8	766.9	769.34	769.07	1685.6	2221.5
9	767.1	769.41	769.26	1651.0	2346.7
10	764.1	766.55	766.11	1794.1	2390.3
11	768.1	770.16	769.98	1935.6	2071.2
12	766.9	769.03	768.85	1721.6	2138.3
13	767.2	769.14	768.83	1664.2	2283.6
14	766.0	765.97	765.79	1727.3	2329.1
15	765.1	767.32	767.06	1537.5	2471.8
16	764.9	766.98	766.76	1601.5	2175.6
17	764.3	766.46	766.31	2003.6	1972.2
18	765.6	768.04	767.85	1773.3	1972.4
19	762.0	764.08	763.80	1608.9	2023.5
20	761.4	763.73	763.44	1530.2	2203.5
21	762.5	764.62	764.34	1479.7	2417.8
A	761.7	765.03	------	2024.6	1889.5

PASSIVE RECOVERY SYSTEMS

#	RIM ELEVATION
S-1	[illegible]
S-2	[illegible]
S-3	[illegible]
S-4	[illegible]
S-5	[illegible]

LEGEND

- RAILROAD TRACK
- BURIED GAS LINES – MARKED BY UTILITY COMPANY
- BURIED WATER LINES AS MARKED BY UTILITY COMPANY
- BURIED ELECTRIC LINES AS MARKED BY UTILITY COMPANY
- BURIED DRAINAGE LINES
- BURIED SANITARY LINES
- OVERHEAD UTILITY LINES
- MONITOR WELL
- CURB INLET
- SANITARY MANHOLE
- DRAINAGE MANHOLE
- MANHOLE
- WATER VALVE
- HYDRANT
- UTILITY POLE
- UTILITY POLE WITH LIGHT
- FENCE LINE
- BILLBOARD
- CONCRETE AREA
- X000.0 SPOT ELEVATION
- TELEPHONE PEDESTAL
- ELECTRIC MANHOLE
- WATER METER PIT

Hatfield Engineering, Inc
Surveyors & Engineers
10 [illegible] Street
BATTLE CREEK, MI [illegible]
616-962-5127

NO.	DATE	BY	REVISION

SIGNATURE	DATE
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PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

GROUNDWATER TECHNOLOGY
23555 RESEARCH DRIVE
FARMINGTON HILLS, MI 48335 (313) 473-0720

CONRAIL BOTSFORD YARD

76 MILL STREET
KALAMAZOO, MICHIGAN 49[illegible]

SITE MAP

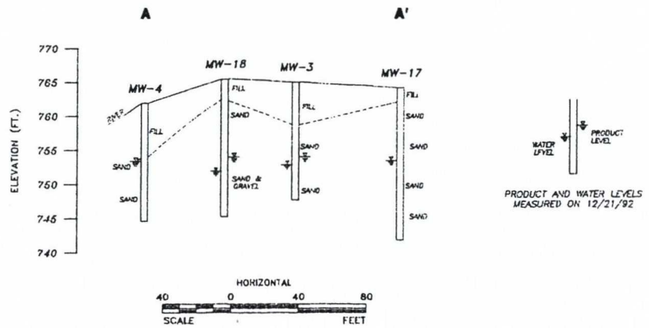
DESIGNED BY:	DETAILED BY:	CHECKED BY:
BB	NLW	

DRAWING DATE:	ACAD FILE:
6-23-93	6001-Y1

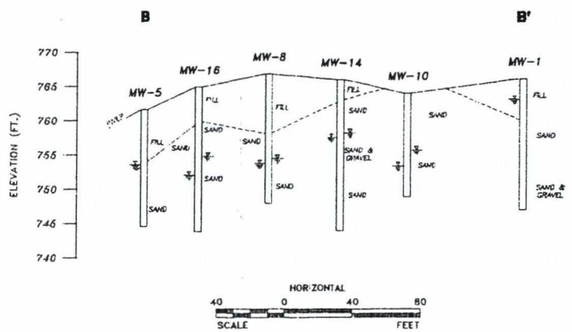
PROJECT NO.:	CONTRACT:
04301 0122	

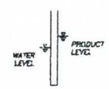
DRAWING: REVISION:

FIGURE 2

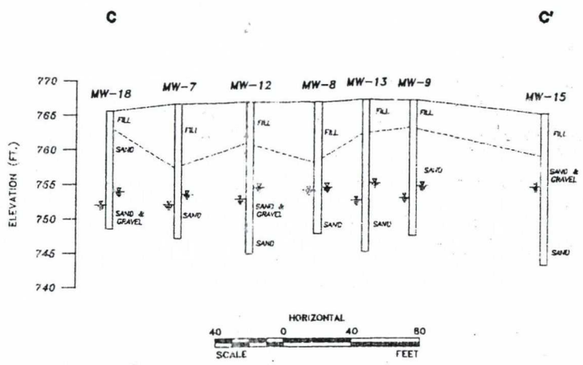


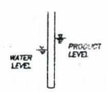
PRODUCT AND WATER LEVELS MEASURED ON 12/21/92



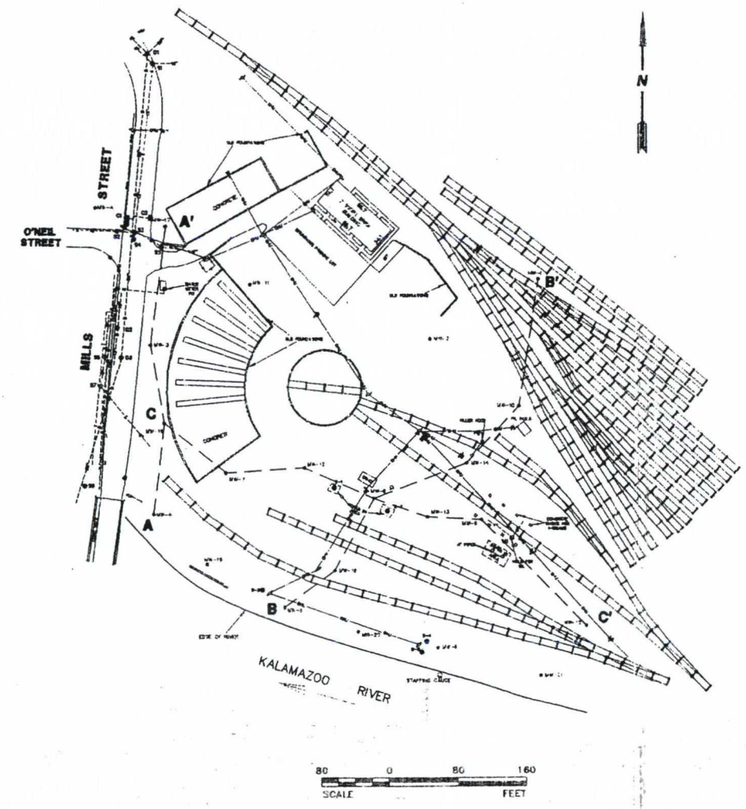


PRODUCT AND WATER LEVELS MEASURED ON 12/21/92





PRODUCT AND WATER LEVELS MEASURED ON 12/21/92



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NO.	DATE	BY	REVISION

SIGNATURE	DATE
REVIEW ENGR:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

GROUNDWATER TECHNOLOGY
23933 RESEARCH DRIVE
FARMINGTON HILLS, MI 48335 (313) 476-6...

CONRAIL BOTSFORD YARD

75 MILL STREET
KALAMAZOO, MICHIGAN 49007

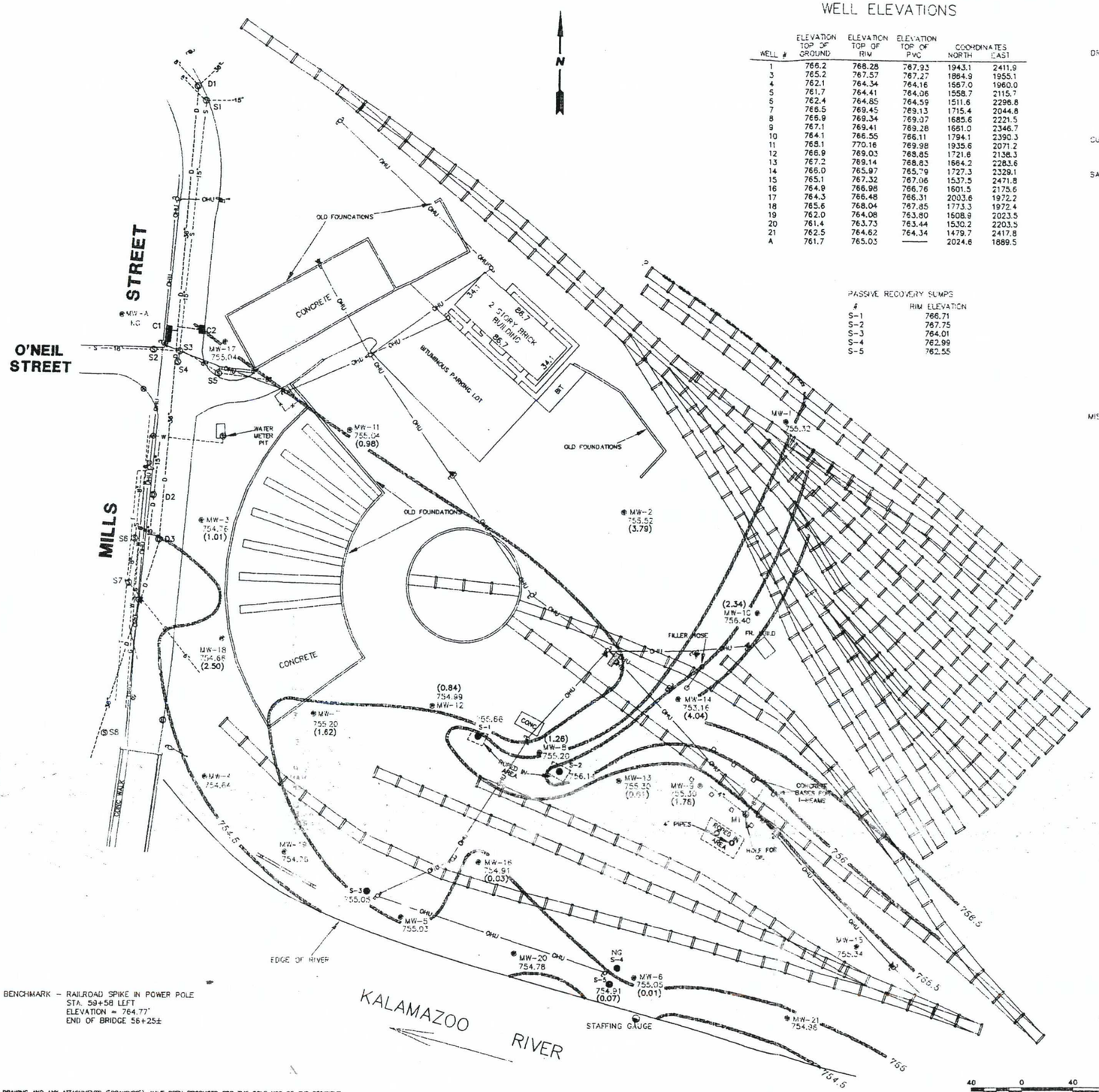
GEOLOGIC CROSS SECTIONS
A - A', B - B', C - C'

DESIGNED BY:	DETAILED BY:	CHECKED BY:
LNS	NLW	

DRAWING DATE:	ACAD FILE:
6-23-93	6001-XS
PROJECT NO.:	CONTRACT:
04301 0122	

DRAWING: REVISION:

FIGURE 3



BENCHMARK – RAILROAD SPIKE IN POWER POLE
STA. 59+58 LEFT
ELEVATION = 764.77'
END OF BRIDGE 56+25±

WELL ELEVATIONS

WELL #	ELEVATION TOP OF GROUND	ELEVATION TOP OF RIM	ELEVATION TOP OF PVC	COORDINATES NORTH	COORDINATES EAST
1	766.2	768.28	767.93	1943.1	2411.9
3	765.2	767.57	767.27	1864.9	1955.1
4	762.1	764.34	764.16	1667.0	1960.0
5	761.7	764.41	764.06	1558.7	2115.7
6	762.4	764.85	764.59	1511.6	2296.8
7	766.5	769.45	769.13	1715.4	2044.8
8	766.9	769.34	769.07	1685.6	2221.5
9	767.1	769.41	769.28	1661.0	2346.7
10	764.1	766.55	766.11	1794.1	2390.3
11	768.1	770.16	769.98	1935.6	2071.2
12	766.9	769.03	768.85	1721.6	2138.3
13	767.2	769.14	768.83	1664.2	2283.6
14	766.0	765.97	765.79	1727.3	2329.1
15	765.1	767.32	767.06	1537.5	2471.8
16	764.9	766.98	766.76	1601.5	2175.6
17	764.3	766.48	766.31	2003.6	1972.2
18	765.6	768.04	767.85	1773.3	1972.4
19	762.0	764.08	763.80	1508.9	2023.5
20	761.4	763.73	763.44	1530.2	2203.5
21	762.5	764.62	764.34	1479.7	2417.8
A	761.7	765.03	——	2024.6	1889.5

PASSIVE RECOVERY SUMPS

#	RIM ELEVATION
S-1	766.71
S-2	767.75
S-3	764.01
S-4	762.99
S-5	762.55

STRUCTURE INVENTORY

	#	RIM ELEVATION	SIZE	DIRECTION	INVERT ELEVATION
DRAINAGE	D1	762.46	36"	SOUTH	756.36
			36"	SOUTH	756.39
			15"	NORTHWEST	756.39
	D2	763.36	15"	NORTH	754.31
			15"	SOUTH	754.31
	D3	763.72	36"	NORTH	755.75
			36"	SOUTH	755.75
CURB INLETS	C1	762.43	12"	EAST	757.75
	C2	762.72	12"	WEST	757.42
SANITARY	S1	762.51	15"	SOUTH	755.61
			15"	EAST	755.61
			8"	NORTHWEST	755.61
	S2	762.70	18"	EAST	753.90
			18"	WEST	753.90
	S3	763.06	12"	SOUTH	757.71
			15"	SOUTH	755.06
			8"	EAST	756.96
			18"	WEST	754.26
			15"	NORTH	754.81
	S4	763.20	12"	NORTH	757.90
	S5	764.42	8"	WEST	758.57
			6"	EAST	758.74
	S6	763.77	8"	NORTH	755.95
			8"	SOUTH	755.95
	S7	764.12	8"	NORTH	756.12
			6"	SOUTHEAST	757.97
	S8	765.04	TOP OF OILY WATER		755.04
			TO BOTTOM		754.04
			NO PIPES VISIBLE		
MISC.	M1	769.14	4"	NORTHWEST	765.89
			8"	NORTHEAST	765.39

LEGEND

- RAILROAD TRACKS
- G – BURIED GAS LINES AS MARKED BY UTILITY COMPANY
- W – BURIED WATER LINES AS MARKED BY UTILITY COMPANY
- T – BURIED TELEPHONE LINES AS MARKED BY UTILITY COMPANY
- D – BURIED DRAINAGE LINES
- S – BURIED SANITARY LINES
- OHU – OVERHEAD UTILITY LINES
- MONITOR WELL
- CURB INLET
- SANITARY MANHOLE
- DRAINAGE MANHOLE
- MANHOLE
- WATER VALVE
- HYDRANT
- UTILITY POLE
- UTILITY POLE WITH LIGHT
- FENCE LINE
- BILLBOARD
- TELEPHONE PEDESTAL
- ELECTRIC MANHOLE
- WATER METER
- 755.30 – GROUNDWATER CONTOUR LINE – DASHED WHERE INFERRED
- 755.30 – GROUNDWATER ELEVATION IN FEET
- NG – NOT GAUGED
- (1.78) – APPARENT PRODUCT THICKNESS IN FEET

40 0 40 80
SCALE FEET

Hatfield Engineering, Inc.
Surveyors & Engineers
530 Main Street
BATTLE CREEK, MI 49017
616-962-5127

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	SIGNATURE	DATE
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PROJECT ENGR:		
PROJECT MGR:		
CLIENT:		

GROUNDWATER TECHNOLOGY
23933 RESEARCH DRIVE
FARMINGTON HILLS, MI 48335 (313) 473-

CONRAIL BOTSFORD YARD

78 MILL STREET
KALAMAZOO, MICHIGAN 49007

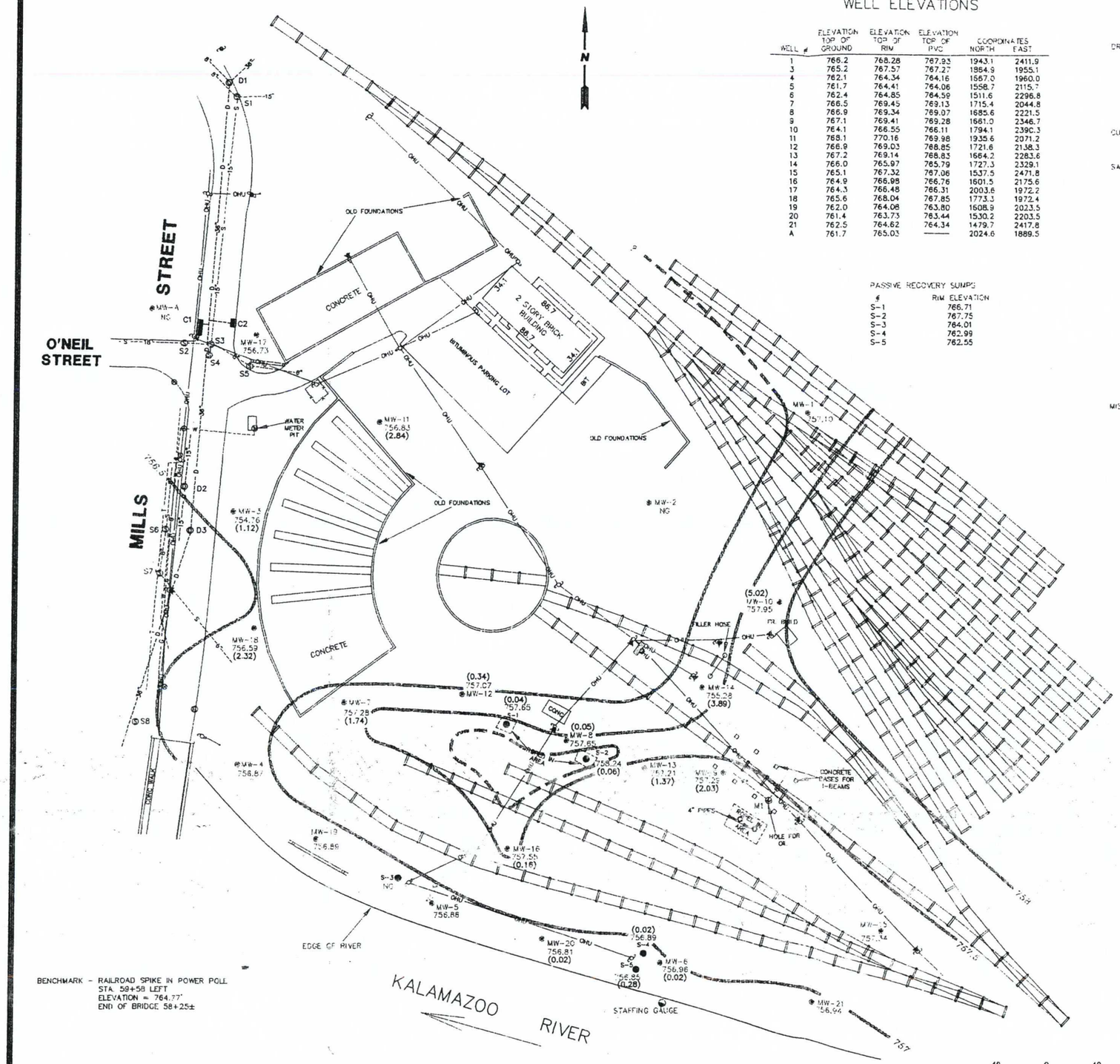
GROUNDWATER GRADIENT MAP
DECEMBER 5, 1989

DESIGNED BY:	DETAILED BY:	CHECKED BY:
BB	NLW	

DRAWING DATE:	ACAD FILE:
6-23-93	6001-GWG
PROJECT NO.: 04301 0122	CONTRACT:

DRAWING: REVISION:

FIGURE 4



WELL ELEVATIONS

WELL #	ELEVATION TOP OF GROUND	ELEVATION TOP OF RIM	ELEVATION TOP OF PVC	COORDINATES NORTH	COORDINATES EAST
1	766.2	768.28	767.93	1943.1	2411.9
3	765.2	767.57	767.27	1864.9	1955.1
4	762.1	764.34	764.16	1567.0	1960.0
5	761.7	764.41	764.06	1558.7	2115.7
6	762.4	764.85	764.59	1511.6	2296.8
7	766.5	769.45	769.13	1715.4	2044.8
8	766.9	769.34	769.07	1685.6	2221.5
9	767.1	769.41	769.28	1681.0	2346.7
10	764.1	766.55	766.11	1794.1	2390.3
11	768.1	770.16	769.98	1935.6	2071.2
12	766.9	769.03	768.85	1721.6	2138.3
13	767.2	769.14	768.83	1664.2	2283.6
14	766.0	765.97	765.79	1727.3	2329.1
15	765.1	767.32	767.06	1537.5	2471.8
16	764.9	766.98	766.76	1601.5	2175.6
17	764.3	766.48	766.31	2003.6	1972.2
18	765.6	768.04	767.85	1773.3	1972.4
19	762.0	764.08	763.80	1508.9	2023.5
20	761.4	763.73	763.44	1530.2	2203.5
21	762.5	764.62	764.34	1479.7	2417.8
A	761.7	765.03	——	2024.6	1889.5

PASSIVE RECOVERY SUMPS

#	RIM ELEVATION
S-1	766.71
S-2	767.75
S-3	764.01
S-4	762.99
S-5	762.55

STRUCTURE INVENTORY

	#	RIM ELEVATION	SIZE	DIRECTION	INVERT ELEVATION
DRAINAGE	D1	762.46	36"	SOUTH	756.36
			36"	SOUTH	756.39
			15"	NORTHWEST	756.39
	D2	763.36	15"	NORTH	754.31
			15"	SOUTH	754.31
	D3	763.72	36"	NORTH	755.75
			36"	SOUTH	755.75
CURB INLETS	C1	762.43	12"	EAST	757.75
	C2	762.72	12"	WEST	757.42
SANITARY	S1	762.51	15"	SOUTH	755.61
			15"	EAST	755.61
			8"	NORTHWEST	755.61
	S2	762.70	18"	EAST	753.90
			18"	WEST	753.90
	S3	763.06	12"	SOUTH	757.71
			15"	SOUTH	755.06
			8"	EAST	756.96
			18"	WEST	754.26
			15"	NORTH	754.81
	S4	763.20	12"	NORTH	757.90
	S5	764.42	8"	WEST	758.57
			6"	EAST	758.74
	S6	763.77	8"	NORTH	755.95
			8"	SOUTH	755.95
	S7	764.12	8"	NORTH	756.12
			6"	SOUTHEAST	757.97
	S8	765.04	TOP OF OILY WATER TO BOTTOM NO PIPES VISIBLE		755.04 754.04
MISC.	M1	769.14	4"	NORTHWEST	765.89
			8"	NORTHEAST	765.39

LEGEND

- RAILROAD TRACKS
- G — BURIED GAS LINES AS MARKED BY UTILITY COMPANY
- W — BURIED WATER LINES AS MARKED BY UTILITY COMPANY
- T — BURIED TELEPHONE LINES AS MARKED BY UTILITY COMPANY
- D — BURIED DRAINAGE LINES
- S — BURIED SANITARY LINES
- OHU — OVERHEAD UTILITY LINES
- MONITOR WELL
- CURB INLET
- SANITARY MANHOLE
- DRAINAGE MANHOLE
- MANHOLE
- WATER VALVE
- HYDRANT
- UTILITY POLE
- UTILITY POLE WITH LIGHT
- X — FENCE LINE
- BILLBOARD
- TELEPHONE PEDESTAL
- ELECTRIC MANHOLE
- WATER METER PIT
- GROUNDWATER CONTOUR LINE - DASHED WHERE INFERRED
- 757.21 — GROUNDWATER ELEVATION IN FEET
- NG — NOT GAUGED
- (1.37) — APPARENT PRODUCT THICKNESS IN FEET

BENCHMARK - RAILROAD SPIKE IN POWER POLE
STA. 59+58 LEFT
ELEVATION = 764.77'
END OF BRIDGE 58+25±

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Surveyors & Engineers
530 Main Street
HASTLE CREEK, MI 49017
616-962-5127

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PROJECT MGR:	
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GROUNDWATER TECHNOLOGY
23933 RESEARCH DRIVE
FARMINGTON HILLS, MI 48335 (313) 473-0770

CONRAIL BOTSFORD YARD

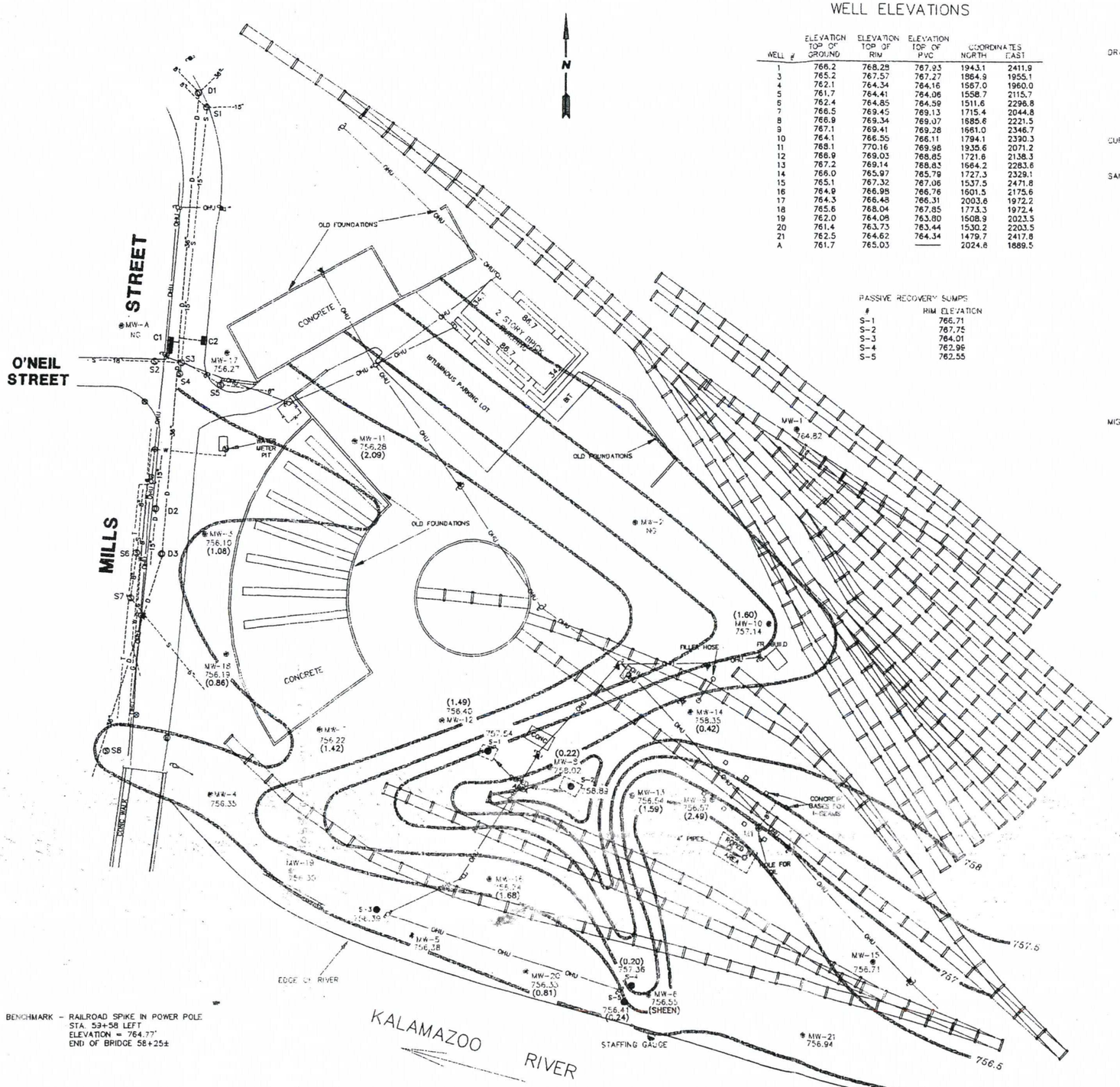
75 MILL STREET
KALAMAZOO, MICHIGAN 49007

GROUNDWATER GRADIENT MAP
OCTOBER 17, 1990

DESIGNED BY:	DETAILED BY:	CHECKED BY:
BB	NLW	

DRAWING DATE:	ACAD FILE:
6-23-93	6001-GWG
PROJECT NO.: 04301 0122	CONTRACT:
DRAWING:	REVISION:

FIGURE 5



WELL ELEVATIONS

WELL #	ELEVATION TOP OF GROUND	ELEVATION TOP OF RIM	ELEVATION TOP OF PVC	COORDINATES NORTH	COORDINATES EAST
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4	762.1	764.34	764.16	1567.0	1960.0
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6	762.4	764.85	764.59	1511.6	2296.8
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9	767.1	769.41	769.28	1661.0	2346.7
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11	768.1	770.16	769.98	1935.6	2071.2
12	766.9	769.03	768.85	1721.6	2138.3
13	767.2	769.14	768.83	1664.2	2283.6
14	766.0	765.97	765.79	1727.3	2329.1
15	765.1	767.32	767.06	1537.5	2471.8
16	764.9	766.98	766.76	1601.5	2175.6
17	764.3	766.48	766.31	2003.6	1972.2
18	765.6	768.04	767.85	1773.3	1972.4
19	762.0	764.08	763.80	1508.9	2023.5
20	761.4	763.73	763.44	1530.2	2203.5
21	762.5	764.62	764.34	1479.7	2417.8
A	761.7	765.03	—	2024.8	1889.5

PASSIVE RECOVERY SUMPS

#	RIM ELEVATION
S-1	766.71
S-2	767.75
S-3	764.01
S-4	762.96
S-5	762.55

STRUCTURE INVENTORY

	#	RIM ELEVATION	SIZE	DIRECTION	INVERT ELEVATION
DRAINAGE	D1	762.46	36"	SOUTH	756.36
			36"	SOUTH	756.39
			15"	NORTHWEST	756.39
	D2	763.36	15"	NORTH	754.31
			15"	SOUTH	754.31
	D3	763.72	36"	NORTH	755.75
			36"	SOUTH	755.75
CURB INLETS	C1	762.43	12"	EAST	757.75
	C2	762.72	12"	WEST	757.42
SANITARY	S1	762.51	15"	SOUTH	755.61
			15"	EAST	755.61
			8"	NORTHWEST	755.61
	S2	762.70	18"	EAST	753.90
			18"	WEST	753.90
	S3	763.06	12"	SOUTH	757.71
			15"	SOUTH	755.06
			8"	EAST	756.96
			18"	WEST	754.26
			15"	NORTH	754.81
	S4	763.20	12"	NORTH	757.90
	S5	764.42	8"	WEST	758.57
			6"	EAST	758.74
	S6	763.77	8"	NORTH	755.95
			8"	SOUTH	755.95
	S7	764.12	8"	NORTH	756.12
			6"	SOUTHEAST	757.97
	S8	765.04	TOP OF OILY WATER		755.04
			TO BOTTOM		754.04
			NO PIPES VISIBLE		
MISC.	M1	769.14	4"	NORTHWEST	765.89
			8"	NORTHEAST	765.39

LEGEND

- RAILROAD TRACKS
- G — BURIED GAS LINES AS MARKED BY UTILITY COMPANY
- W — BURIED WATER LINES AS MARKED BY UTILITY COMPANY
- T — BURIED TELEPHONE LINES AS MARKED BY UTILITY COMPANY
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- CURB INLET
- SANITARY MANHOLE
- DRAINAGE MANHOLE
- MANHOLE
- WATER VALVE
- HYDRANT
- UTILITY POLE
- UTILITY POLE WITH LIGHT
- FENCE LINE
- BILLBOARD
- TELEPHONE PEDESTAL
- ELECTRIC MANHOLE
- WATER METER PIT
- GROUNDWATER CONTOUR LINE - DASHED WHEN INFERRED
- 756.54 - GROUNDWATER ELEVATION IN FEET
- NG - NOT GAUGED
- (1.59) - APPARENT PRODUCT THICKNESS IN FEET

Hatfield Engineering, Inc.
Surveyors & Engineers
530 Main Street
BATTLE CREEK, MI 49017
616-962-5127

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	SIGNATURE	DATE
REVIEW ENGR:		
PROJECT ENGR:		
PROJECT MGR:		
CLIENT:		

GROUNDWATER TECHNOLOGY
23935 RESEARCH DRIVE
FARMINGTON HILLS, MI 48335 (313) 473-0220

CONRAIL BOTSFORD YARD

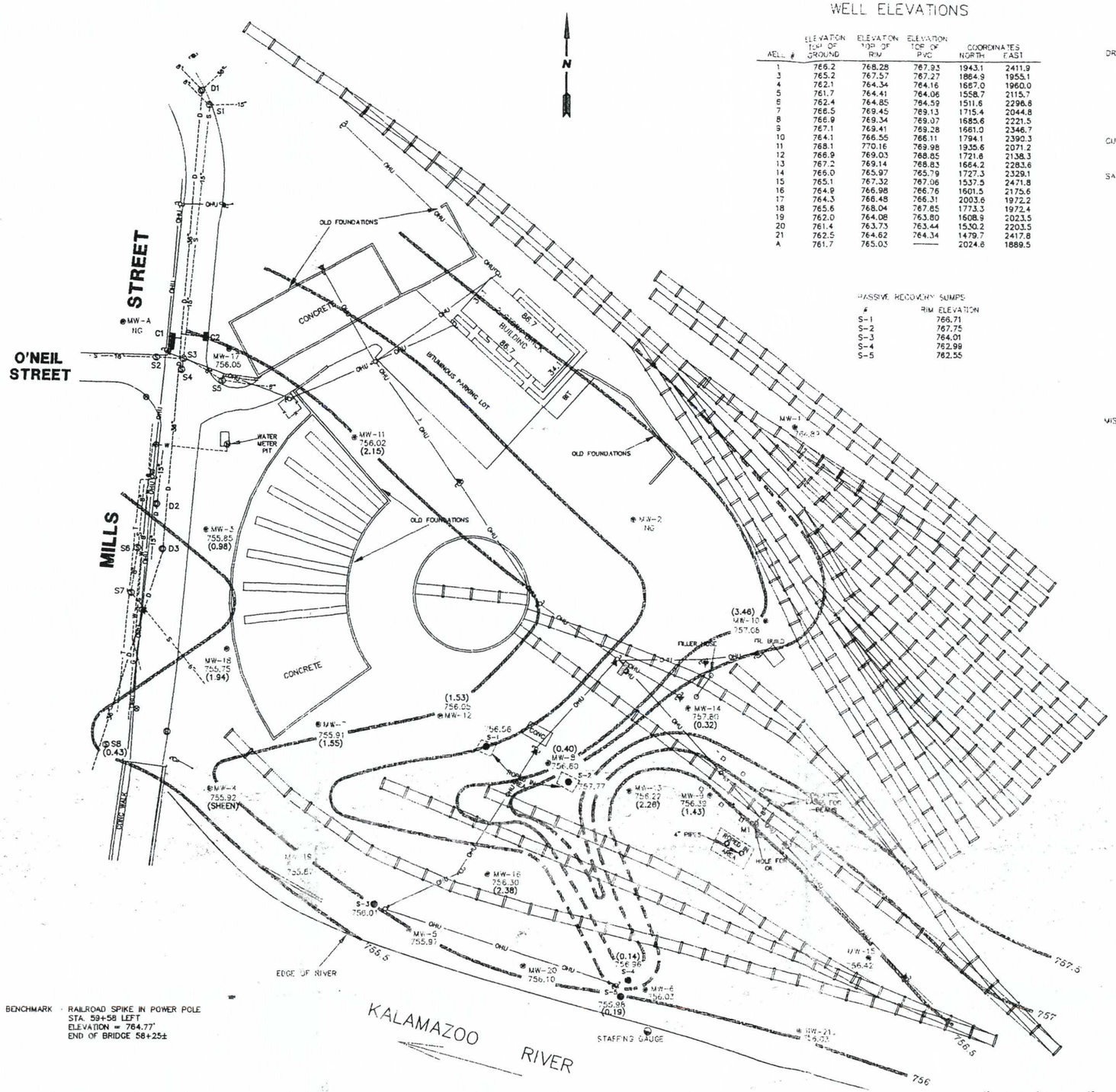
75 MILL STREET
KALAMAZOO, MICHIGAN 49001

GROUNDWATER GRADIENT MAP
NOVEMBER 13, 1992

DESIGNED BY:	DETAILED BY:	CHECKED
BB	NLW	

DRAWING DATE:	ACAD FILE:
6-23-93	6001-GWG
PROJECT NO.: 04301 0122	CONTRACT:
DRAWING:	REVISION:

FIGURE 6



WELL ELEVATIONS

WELL #	ELEVATION TOP OF GROUND	ELEVATION TOP OF RIM	ELEVATION TOP OF PVC	COORDINATES NORTH	COORDINATES EAST
1	766.2	768.28	767.93	1943.1	2411.9
3	765.2	767.57	767.27	1864.9	1955.1
4	762.1	764.34	764.16	1667.0	1960.0
5	761.7	764.41	764.06	1558.7	2115.7
6	762.4	764.85	764.59	1511.6	2296.8
7	766.5	769.45	769.13	1715.4	2044.8
8	766.9	769.34	769.07	1685.6	2221.5
9	767.1	769.41	769.28	1661.0	2346.7
10	764.1	766.55	766.11	1794.1	2390.3
11	768.1	770.16	769.98	1935.6	2071.2
12	766.9	769.03	768.85	1721.6	2138.3
13	767.2	769.14	768.83	1664.2	2283.6
14	766.0	765.97	765.79	1727.3	2329.1
15	765.1	767.32	767.06	1537.5	2471.8
16	764.9	766.98	766.76	1601.5	2175.6
17	764.3	766.48	766.31	2003.6	1972.2
18	765.6	768.04	767.85	1773.3	1972.4
19	762.0	764.08	763.80	1608.9	2023.5
20	761.4	763.73	763.44	1530.2	2203.5
21	762.5	764.62	764.34	1479.7	2417.8
A	761.7	765.03	——	2024.8	1889.5

PASSIVE RECOVERY SUMPS

#	RIM ELEVATION
S-1	766.71
S-2	767.75
S-3	764.01
S-4	762.99
S-5	762.55

STRUCTURE INVENTORY

	#	RIM ELEVATION	SIZE	DIRECTION	INVERT ELEVATION
DRAINAGE	D1	762.46	36"	SOUTH	756.36
			36"	SOUTH	756.39
			15"	NORTHWEST	756.39
	D2	763.36	15"	NORTH	754.31
			15"	SOUTH	754.31
	D3	763.72	36"	NORTH	755.75
			36"	SOUTH	755.75
CURB INLETS	C1	762.43	12"	EAST	757.75
	C2	762.72	12"	WEST	757.42
SANITARY	S1	762.51	15"	SOUTH	755.61
			15"	EAST	755.61
			8"	NORTHWEST	755.61
	S2	762.70	18"	EAST	753.90
			18"	WEST	753.90
	S3	763.06	12"	SOUTH	757.71
			15"	SOUTH	755.06
			8"	EAST	756.96
			18"	WEST	754.26
			15"	NORTH	754.81
	S4	763.20	12"	NORTH	757.90
	S5	764.42	8"	WEST	758.57
			6"	EAST	758.74
	S6	763.77	8"	NORTH	755.95
			8"	SOUTH	755.95
	S7	764.12	8"	NORTH	756.12
			6"	SOUTHEAST	757.97
	S8	765.04	TOP OF OILY WATER TO BOTTOM NO PIPES VISIBLE		755.04 / 754.04
MISC.	M1	769.14	4"	NORTHWEST	765.89
			8"	NORTHEAST	765.39

LEGEND

- RAILROAD TRACKS
- G — BURIED GAS LINES AS MARKED BY UTILITY COMPANY
- W — BURIED WATER LINES AS MARKED BY UTILITY COMPANY
- T — BURIED TELEPHONE LINES AS MARKED BY UTILITY COMPANY
- D — BURIED DRAINAGE LINES
- S — BURIED SANITARY LINES
- OHU — OVERHEAD UTILITY LINES
- MONITOR WELL
- CURB INLET
- SANITARY MANHOLE
- DRAINAGE MANHOLE
- MANHOLE
- WATER VALVE
- HYDRANT
- UTILITY POLE
- UTILITY POLE WITH LIGHT
- FENCE LINE
- BILLBOARD
- TELEPHONE PEDESTAL
- ELECTRIC MANHOLE
- WATER METER PIT
- GROUNDWATER CONTOUR LINE - DASHED WHERE INFERRED
- 756.22 - GROUNDWATER ELEVATION IN FEET
- NOT GAUGED
- (.43) - APPARENT PRODUCT THICKNESS IN FEET

BENCHMARK - RAILROAD SPIKE IN POWER POLE
STA. 59+58 LEFT
ELEVATION = 764.77'
END OF BRIDGE 58+25±

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Hatfield Engineering, Inc.
Surveyors & Engineers
530 Main Street
BATTLE CREEK, MI 49017
616-962-5127

NO.	DATE	BY	REVISION

SIGNATURE	DATE
REVIEW ENGR:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

GROUNDWATER TECHNOLOGY
23933 RESEARCH DRIVE
FARMINGTON HILLS, MI 48335 (313) 4[illegible]

CONRAIL BOTSFORD YARD

75 MILL STREET
KALAMAZOO, MICHIGAN 49007

GROUNDWATER GRADIENT MAP
DECEMBER 21, 1992

DESIGNED BY:	DETAILED BY:	CHECKED BY:
BB	NLW	

DRAWING DATE:	ACAD FILE:
6-23-93	6001-GWG
PROJECT NO.: 04301 0122	CONTRACT:
DRAWING:	REVISION:

FIGURE 7

Table 1
Results of Slug Tests
Consolidated Rail Corporation
Botsford Yard, Kalamazoo, Michigan

Date of Test	Well #	Hydraulic Conductivity		Transmissivity	
		(ft./d)	(gpd/ft^2)	(ft^2/d)	(gpd/ft.)
Jan. 1992	MW-3	1.81	13.54	27.15	203.10
Jan. 1992	MW-7	3.49	26.09	52.35	391.35
Jan. 1992	MW-12	10.81	80.89	162.15	1213.35
Jan. 1992	MW-15	1.67	12.49	25.05	187.35
Jan. 1992	MW-17	12.52	93.67	187.80	1405.05

Table 2
Results of Pump Test
Consolidated Rail Corporation
Botsford Yard, Kalamazoo, Michigan

Date of Test	Well #	Hydraulic Conductivity		Transmissivity	
		(ft./d)	(gpd/ft^2)	(ft^2/d)	(gpd/ft.)
01/30/90	S-2	7.59	56.76	113.82	851.30
01/30/90	MW-8	323.66	2421.00	4855.98	36320.00
01/31/90	S-2	8.00	59.87	120.08	898.10
01/31/90	MW-7	118.41	885.60	1775.54	13280.00
01/31/90	MW-8	23.09	172.70	346.28	2590.00
01/31/90	MW-9	60.73	454.20	910.90	6813.00
01/31/90	MW-12	115.70	865.40	1735.43	12980.00
01/31/90	MW-13	107.98	807.60	1619.11	12110.00
01/31/90	MW-16	65.07	486.70	976.01	7300.00

Table 3
Total Petroleum Hydrocarbons in Groundwater
Consolidated Rail Corporation
Botsford Yard, Kalamazoo, Michigan

Sample ID	Date Sampled	Date Analyzed	Gasoline	Diesel	Mineral Spirits	Kerosene	Fuel Oil	Lube Oil
			Concentration (μg/L)					
MW-1	12/06/89	12/14/89	<10	<10	<10	<10	<10	<10
MW-17	12/06/89	12/14/89	<10	<10	<10	<10	<10	<10
MW-19	12/06/89	12/14/89	<10	4900	<10	<10	<10	<10
MW-15	12/06/89	12/14/89	<10	<10	<10	<10	<10	<10
MW-20	12/06/89	12/14/89	<10	15000	<10	<10	<10	<10
MW-4	12/06/89	12/14/89	<10	3400	<10	<10	<10	<10
MW-5	12/06/89	12/15/89	<10	6500	<10	<10	<10	<10
MW-21	12/06/89	12/14/89	<10	<10	<10	<10	<10	<10

Analytical Method – Modified EPA Method 8015
Method detection limit = 10 μg/L ; analyte below this level would not be detected.

GROUNDWATER TECHNOLOGY

Table 4
Polynuclear Aromatic Hydrocarbons[a] in Groundwater
Consolidated Rail Corporation
Botsford Yard: Kalamazoo, Michigan

Sample Identification Sample Date	MW-1 10/21/92	MW-4 10/21/92	MW-5 10/21/92	MW-6 10/21/92	MW-9[b] 10/21/92	MW-15 10/21/92	MW-17 10/21/92	MW-19 10/21/92	MW-20 10/21/92	MW-21 10/21/92
Analyte	Concentration (μg/L)									
Naphthalene	BRL	BRL	BRL	57	<3600	BRL	BRL	BRL	50	BRL
Acenaphthylene	BRL	BRL	BRL	BRL	<4600	BRL	BRL	BRL	<12	BRL
Acenaphthene	BRL	13	BRL	61	<3600	BRL	BRL	7.8	23	BRL
Fluorene	BRL	32	5.0	150	2500	BRL	BRL	19	67	BRL
Phenanthrene	BRL	84	7.4	780	13000	BRL	BRL	58	350	BRL
Anthracene	BRL	16	BRL	170	2000	BRL	BRL	9.2	30	BRL
Fluoranthene	BRL	14	BRL	45	580	BRL	BRL	7.1	15	BRL
Pyrene	BRL	BRL	BRL	BRL	<540	BRL	BRL	BRL	BRL	BRL
Benzo(a)anthracene	BRL	BRL	BRL	BRL	<26	BRL	BRL	BRL	BRL	BRL
Chrysene	BRL	BRL	BRL	BRL	<300	BRL	BRL	BRL	BRL	BRL
Benzo(b)fluoranthen	BRL	BRL	BRL	BRL	<36	BRL	BRL	BRL	BRL	BRL
Benzo(k)fluoranthen	BRL	BRL	BRL	BRL	<34	BRL	BRL	BRL	BRL	BRL
Benzo(a)pyrene	BRL	BRL	BRL	BRL	<46	BRL	BRL	BRL	BRL	BRL
Dibenzo(a,h)anthrac	BRL	BRL	BRL	BRL	<60	BRL	BRL	BRL	BRL	BRL
Benzo(g,h,i)perylene	BRL	BRL	BRL	BRL	<150	BRL	BRL	BRL	BRL	BRL
Indeno(1,2,3-cd)pyr	BRL	BRL	BRL	BRL	<86	BRL	BRL	BRL	BRL	BRL

PNAs in groundwater analyzed using EPA Method 610.
Concentrations significantly exceed expected maximum solubilities; results likely indicate that product was introduced to Gas Chromatograph.
BRL = Below Reporting Limits.

GROUNDWATER TECHNOLOGY

Table 5
BTEX[a] in Groundwater
Consolidated Rail Corporation
Botsford Yard: Kalamazoo, Michigan

Sample Identification Sample Date	MW-1 10/21/92	MW-5 10/21/92	MW-15 10/21/92	MW-17 10/21/92	MW-21 10/21/92
Analyte	Concentration (μg/L)				
Benzene	BRL	3.2	BRL	BRL	BRL
Toluene	BRL	BRL	BRL	BRL	BRL
Ethylbenzene	BRL	BRL	BRL	BRL	BRL
Xylenes	BRL	BRL	BRL	BRL	BRL

[a] BTEX analyzed using EPA Method 602.
NA = Not Analyzed
BRL = Below Reporting Limits

Table 6
TCLP Metals in Sewer Sample
Consolidated Rail Corporation
Botsford Yard, Kalamazoo, Michigan

Analyte	Sample of 10/17/1990		Sample of 1/07/1993**		Sample of 1/07/1993***	
	Concentration mg/L	Detection Limit mg/L	Concentration mg/L	Quantitation Limit mg/L	Concentration mg/L	Quantitation Limit mg/L
Arsenic	<0.05	0.05	<0.46	0.50	<0.50	0.50
Barium	**0.06**	0.03	<18	20	<1.0	1.0
Cadmium	<0.05	0.05	<0.45	0.50	<0.050	0.050
Chromium	**0.05**	0.05	<0.90	1.0	<0.050	0.050
Lead	**0.1**	0.1	<9.1	10	<0.50	0.50
Mercury	<0.001	0.001	<0.091	0.10	<0.002	0.002
Selenium	<0.05	0.05	<0.18	0.20	<0.20	0.20
Silver	<0 05	0.05	<0.91	1.0	<0.050	0.050
Quantitation Limit Multiplier			0.910		1	

** Non-Aqeous Phase, *** Aqeous Phase

GROUNDWATER TECHNOLOGY

Table 7
Volatile Organics in TCLP Leachate of Sewer Sample
Consolidated Rail Corporation
Botsford Yard: Kalamazoo, Michigan

Analyte	Sample of 10/17/1990		Sample of 1/07/1993	
	Concentration mg/L	Quantitation Limit mg/L	Concentration mg/L	Quantitation Limit mg/L
Benzene	<0.050	0.050	<0.050	0.005
Carbon tetrachloride	<0.050	0.050	<0.050	0.005
Chlorobenzene	<0.050	0.050	<0.050	0.005
Chloroform	<0.050	0.050	<0.050	0.005
1,4-Dichlorobenzene	<0.050	0.050	NA	
1,2-Dichloroethane	<0.050	0.050	<0.050	0.005
1,1-Dichloroethylene	<0.050	0.050	<0.050	0.005
Methyl ethyl ketone	<1.0	1.0	<1.0	0.010
Tetrachloroethylene	<0.050	0.050	<0.050	0.005
Trichloroethylene	NA		<0.050	0.005
Vinyl chloride	<0.10	0.10	<0.10	0.010
Quantitation Limit Multiplier	1		10	

Table 8
Semivolatile Organics in TCLP Leachate of Sewer Sample
Consolidated Rail Corporation
Botsford Yard: Kalamazoo, Michigan

(NON-AQEOUS PHASE)

Analyte	Sample of 10/17/1990		Sample of 1/07/1993	
	Concentration mg/L	Quantitation Limit mg/L	Concentration mg/L	Quantitation Limit mg/L
o-Cresol	<1000	0.033	<190	0.010
m-Cresol + p-Cresol	<1000	0.033	<190	0.010
1,4-Dichlorobenzene	<1000	0.033	<190	0.010
2,4-Dinitrotoluene	<1000	0.033	<190	0.010
Hexachloro-1,3-butadiene	<1000	0.033	<190	0.010
Hexachlorobenzene	<1000	0.033	<190	0.010
Hexachloroethane	<1000	0.033	<190	0.010
Nitrobenzene	<1000	0.033	<190	0.010
Pentachlorophenol	<5000	0.17	<950	0.050
Pyridine	<1000	0.033	<950	0.050
2,4,5-Trichlorophenol	<1000	0.033	<190	0.010
2,4,6-Trichlorophenol	<1000	0.033	<190	0.010
Quantitation Limit Multiplier	100,000		19000	

(AQEOUS PHASE)

Analyte	Sample of 10/17/1990		Sample of 1/07/1993	
	Concentration mg/L	Quantitation Limit mg/L	Concentration mg/L	Quantitation Limit mg/L
o-Cresol	<0.66	0.033	<0.40	0.010
m-Cresol + p-Cresol	<0.66	0.033	<0.40	0.010
1,4-Dichlorobenzene	<0.66	0.033	<0.40	0.010
2,4-Dinitrotoluene	<0.66	0.033	<0.40	0.010
Hexachloro-1,3-butadiene	<0.66	0.033	<0.40	0.010
Hexachlorobenzene	<0.66	0.033	<0.40	0.010
Hexachloroethane	<0.66	0.033	<0.40	0.010
Nitrobenzene	<0.66	0.033	<0.40	0.010
Pentachlorophenol	<3.4	0.17	<2.0	0.050
Pyridine	<0.66	0.033	<2.0	0.050
2,4,5-Trichlorophenol	<0.66	0.033	<0.40	0.010
2,4,6-Trichlorophenol	<0.66	0.033	<0.40	0.010
Quantitation Limit Multiplier	20		40	

Table 9
Consolidated Rail Corporation
Botsford Yard, Kalamazoo, Michigan

Pesticides in TCLP Leachate of Sewer Sample

Analyte	Sample of 10/17/1990		Sample of 1/07/1993	
	Concentration mg/L	Quantitation Limit mg/L	Concentration mg/L	Quantitation Limit mg/L
Lindane (gamma-BHC)	<0.01	0.0001	<0.0029	0.00004
Heptachlor	<0.01	0.0001	<0.0022	0.00003
Heptachlor Epoxide	<0.01	0.0001	<0.060	0.00083
Endrin	<0.01	0.0001	<0.0044	0.00006
Methoxychlor	<0.01	0.0001	<0.13	0.0018
Chlordane	<0.1	0.001	<0.010	0.00014
Toxaphene	<0.4	0.004	<0.17	0.0024
Quantitation Limit Multiplier			72.7	

Herbicides in TCLP Leachate of Sewer Sample

Analyte	Sample of 10/17/1990		Sample of 1/07/1993	
	Concentration mg/L	Quantitation Limit mg/L	Concentration mg/L	Quantitation Limit mg/L
2,4-D	NA		<0.40	0.0012
Silvex (2,4,5-TP)	NA		<0.057	0.00017
Quantitation Limit Multiplier			333	

Polychlorinated Biphenyls in Oil of Sewer Sample

Analyte	Sample of 10/17/1990		Sample of 1/07/1993	
	Concentration mg/kg	Quantitation Limit mg/kg	Concentration mg/kg	Quantitation Limit mg/kg
Aroclor-1221	NA		<5.0	1.0
Aroclor-1232	NA		<5.0	1.0
Aroclor-1242(1016)	NA		<5.0	1.0
Aroclor-1248	NA		<5.0	1.0
Aroclor-1254	NA		<5.0	1.0
Aroclor-1260	NA		<5.0	1.0
Detection Limit Multplier			5.0	

NA - Not analyzed

Table 10
Inorganics in Water in Sewer Sample
Consolidated Rail Corporation
Botsford Yard: Kalamazoo, Michigan

Analyte	Sample of 10/17/1990		Sample of 1/07/1993	
	Concentration	Practical Quantitation Limit	Concentration	Detection Limit
Total Cyanide	0.074	0.02 mg/L	<5.0	5.0 mg/L
Total Sulfide	20 *	1.0 mg/L	<200	200 mg/L
Flashpoint	>200	°F	>200	°F
pH	7.1	NA	6.9	NA

* Sample was not properly preserved

APPENDIX A

WELL LOGS

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-1**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *4/18/89*
Surface Elev *766.2 ft* Total Hole Depth *19.0 ft.* Diameter *8.0 ft.*
Top of Casing *767.93 ft.* Water Level Initial *11.0 ft.* Static *11.97 ft.*
Screen: Dia *2.0 in* Length *15.0 ft.* Type/Size *0.010 in.*
Casing. Dia *2.0 in* Length *6.0 ft* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type *CME 850*
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Craig Rupnow*
Checked By *Constance Livchak* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0		0.0	1			GW	
2							
4		0.0	2	2 2 6 18			Brown or black, poorly sorted, sand and gravel FILL
6							
8						SM	Brown/gray, mottled, moist, fine SAND AND SILT with clay
10		0.0	3	2 2 3 18			
12							
14		0.0	4	6 11 14 18		SW	Brown, wet, medium dense, poorly sorted, silty SAND AND GRAVEL
16							
18							
20							End of Boring at 19 Feet
22							

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-2**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No *040056002* Date drilled *4/18/89*
Surface Elev. _____ Total Hole Depth *18.0 ft.* Diameter *8 0 ft.*
Top of Casing _____ Water Level Initial *7.0 ft.* Static _____
Screen: Dia *2.0 in.* Length *15.0 ft* Type/Size *0.010 in.*
Casing. Dia *2.0 in* Length *6.0 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type *CME 850*
Drilling Company *Fox* Method *HSA* Permit # _____
Driller *Jerry Hamman* Log By *Craig Rupnow*
Checked By *Constance Livchak* License No. _____

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							
2		2.7	1				
4				4 2 2 18		GW	
6		1.4	2				Brown or black, poorly sorted, sand and gravel FILL
8							∇ Water @ 7.0 ft (heavy petroleum sheen)
10		24.2	3	? 2			
12							
14				18		SM	
16		34.2	4	?			Black, wet, medium dense, medium to fine silty SAND
18							
20							End of Boring at 18 Feet
22							

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-3**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *4/18/89*
Surface Elev *765.2 ft.* Total Hole Depth *17.5 ft.* Diameter *8.0 ft.*
Top of Casing *767.27 ft.* Water Level Initial *10.0 ft.* Static *12.88 ft.*
Screen. Dia *2.0 in* Length *15.0 ft.* Type/Size *0.010 in.*
Casing Dia *2.0 in* Length *5.5 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Craig Rupnow*
Checked By *Constance Livchak* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							
2		0.2	1			GW	Black, damp, loose, poorly sorted, sand, gravel and cinder FILL
4				3 2 2 18			
6		3.7	2				
8							
10		18.2	3	3 6 5 18		SW	Black/brown, moist, medium dense, poorly sorted SAND AND GRAVEL Heavy product sheen
12							
14				11 14 19 18			
16		18.3	4			SM	Brown, wet, medium dense, coarse to fine, silty SAND
18							End of Boring at 17.5 Feet
20							
22							

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-4**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *4/18/89*
Surface Elev. *762.1 ft.* Total Hole Depth *17.5 ft* Diameter *8.0 ft.*
Top of Casing *764.16 ft.* Water Level Initial *7.0 ft* Static *9.41 ft.*
Screen: Dia *2.0 in.* Length *15.0 ft.* Type/Size *0.010 in.*
Casing: Dia *2.0 in.* Length *5.5 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Craig Rupnow*
Checked By *Constance Livchak* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							
2		0.7	1				
4				2 1 1 18		GW	Black, damp, loose, poorly sorted, sand, gravel, and cinder FILL
6		0.2	2				
8							
10		18.0	3	1 1 1 18		SM	Gray/black, moist, loose, very fine SAND AND SILT Water at 7.0 with a heavy product sheen
12							
14		1.7	4	3 7 8 18		SW	Gray, wet, loose, coarse to medium SAND with some gravel and shells
16							
18							End of Boring at 17.5 Feet
20							
22							

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-5**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *4/18/89*
Surface Elev. *761.7 ft.* Total Hole Depth *17.0 ft.* Diameter *8.0 ft.*
Top of Casing *764.06 ft* Water Level Initial *7.0 ft.* Static *8.94 ft.*
Screen: Dia *2.0 in.* Length *15.0 ft* Type/Size *0.010 in*
Casing: Dia *2.0 in.* Length *5.0 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type *CME 850*
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Craig Rupnow*
Checked By *Constance Livchak* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0		0.0	1			GW	Black, damp, loose, poorly sorted, sand, gravel and cinder FILL
2							
4		1.8	2	7 8 4 (18)			
6							
8						SM	Gray/black, wet, loose, very fine SAND AND SILT Water at 7.0 ft with a heavy product sheen
10		1.8	3	3 2 3 (18)			
12						SP	Gray, wet, loose, medium to fine SAND with some gravel and shells
14		9.1	4	2 8 8 (18)			
16							
18							End of Boring at 17 Feet
20							
22							
24							

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-6**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *4/18/89*
Surface Elev. *762.4 ft* Total Hole Depth *17.0 ft.* Diameter *8.0 ft*
Top of Casing *764.59 ft.* Water Level Initial *7.0 ft* Static *9.14 ft*
Screen: Dia *2.0 in.* Length *15.0 ft.* Type/Size *0.010 in.*
Casing. Dia *2.0 in.* Length *5.5 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type *CME 850*
Drilling Company *Fox* Method *HSA* Permit # _____
Driller *Jerry Hamman* Log By *Craig Rupnow*
Checked By *Constance Livchak* License No. _____

See Site Map For Boring Location

COMMENTS:

Depth (ft)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0		0.0	1				
2							
4				3 2 2 / 18		GW	
6		0.7	2				Black, damp, loose, poorly sorted, sand, gravel and cinder FILL
8							
10		34 4	3	3 3 7 / 18		SW	Black, wet, loose, coarse SAND AND GRAVEL Water at 7 0 ft with a heavy product sheen
12							
14		19.6	4	18		SP	Brown, wet, loose, coarse to medium SAND with some gravel
16							
18							End of Boring at 17 Feet
20							
22							

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-7**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi* Project No. *040056002* Date drilled *4/19/89*
Surface Elev. *766.5 ft* Total Hole Depth *19.5 ft.* Diameter *8.0 ft.*
Top of Casing *769.13 ft* Water Level Initial *11.0 ft* Static *15.09 ft*
Screen: Dia *2.0 in* Length *15.0 ft* Type/Size *0.010 in*
Casing: Dia *2.0 in.* Length *7.5 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Craig Rupnow*
Checked By *Constance Livchak* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0		0.1	1				
2							
4		0.2	2	1 1 1 18		GW	Black, damp, loose, poorly sorted, sand, gravel and cinder FILL
6							
8							
10		87.2	3	1 2 6 18		SM	Gray, wet, loose, very fine SAND AND SILT with product odor
12							
14		37.2	4	7 12 14 18		SP	Gray, wet, medium dense, coarse SAND with some gravel Water at 11 ft with product odor
16							
18							
20							End of Boring at 19.5 Feet
22							

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-8**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *4/20/89*
Surface Elev. *766.9 ft.* Total Hole Depth *19.0 ft.* Diameter *8.0 ft.*
Top of Casing *769.07 ft.* Water Level Initial *11.0 ft.* Static *13.92 ft.*
Screen. Dia *2.0 in.* Length *15.0 ft.* Type/Size *0.010 in*
Casing: Dia *2.0 in.* Length *7.0 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Craig Rupnow*
Checked By *Constance Livchak* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							
2		0.0	1				
4		0.4	2	3 1 1 / 18		GW	Black, damp, loose, poorly sorted, sand, gravel and cinder FILL
6							
8							
10		22.2	3	1 2 1 / 18		SM	Black, moist, loose, very fine SAND AND SILT Water at 11 ft with a heavy product sheen
12							
14		37.2	4	8 17 31 / 18		SW	Brown, wet, medium dense, medium to fine SAND
16							
18							
20							End of Boring at 19.0 Feet
22							

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-9**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi* Project No. *040056002* Date drilled *4/20/89*
Surface Elev. *767.1 ft.* Total Hole Depth *19.5 ft.* Diameter *8.0 ft*
Top of Casing *769.28 ft.* Water Level Initial *11.0 ft.* Static *13.36 ft*
Screen: Dia *2.0 in.* Length *15.0 ft* Type/Size *0.010 in*
Casing: Dia *2.0 in.* Length *7.5 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Craig Rupnow*
Checked By *Constance Livchak* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							
2		1.1	1			GW	Black, damp, loose, poorly sorted, sand, gravel and cinder FILL
4				2 2 1 18			
6		37.2	2				
8							
10		37.2	3	2 2 3 18		SP	Brown, moist, loose, fine SAND trace gravel Water at 11 ft with a heavy product sheen
12							
14				3 4 2 18			
16		104.1	4				
18							
20							End of Boring at 19.5 Feet
22							

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-10**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi* Project No. *040056002* Date drilled *11/13/89*
Surface Elev. *764.1 ft* Total Hole Depth *15.0 ft.* Diameter *8.0 ft.*
Top of Casing *766.11 ft.* Water Level Initial *9.0 ft.* Static *11.58 ft.*
Screen: Dia *2.0 in.* Length *10.0 ft* Type/Size *0.010 in.*
Casing: Dia *2.0 in.* Length *7.5 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Sam Kitchin*
Checked By *Constance Livchak* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							
2		5.0	1			SM	Black to gray, damp, loose, fine SAND AND SILT
4				8 4 3 18			
6		5.0	2				
8							
10		0.0	3	3 4 4 18		SP	Brown, wet, loose, fine SAND trace silt
12							Brown, wet, medium dense, fine SAND
14				5 8 11 18			
16		3.0	4				End of Boring at 15.0 Feet
18							
20							
22							
24							

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-11**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *11/14/89*
Surface Elev. *768.1 ft.* Total Hole Depth *23.0 ft.* Diameter *8.0 ft.*
Top of Casing *769.98 ft.* Water Level Initial *12.0 ft.* Static *15.72 ft*
Screen: Dia *2.0 in.* Length *15.0 ft* Type/Size *0.010 in*
Casing: Dia *2.0 in.* Length *9.25 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type *CME 850*
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Sam Kitchin*
Checked By *Constance Livchak* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							Concrete
2		20.0	1			GW	Dark brown, wet, loose, sand, gravel and cinder FILL
4				1 1 6			Concrete
6		20.0	2	5		GW	Dark brown, damp, loose sand, gravel, silt, and cinder FILL
8							
10		20.0	3	51 16 9 18			Brown, damp, loose, fine SAND
12							
14		20.0	4	7 18		SP	Brown, wet, medium dense, SAND
16							
18							Brown, wet, fine SAND trace silt
20							
22							

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-12**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *11/14/89*
Surface Elev. *766.9 ft.* Total Hole Depth *22.0 ft.* Diameter *8.0 ft.*
Top of Casing *768.85 ft.* Water Level Initial *12.0 ft* Static *14.53 ft.*
Screen: Dia *2.0 in.* Length *15.0 ft.* Type/Size *0.010 in.*
Casing: Dia *2.0 in.* Length *10.0 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type *CME 850*
Drilling Company *Fox* Method *HSA* Permit # _____
Driller *Jerry Hamman* Log By *Sam Kitichin*
Checked By *Constance Livchak* License No. _____

See Site Map For Boring Location

COMMENTS:

Depth (ft)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							
2		30.0	1			GW	Black, damp, gravel, sand, silt, and crushed basalt FILL
4				2 3 18 2			
6		28.0	2				
8						ML	Dark brown, damp, loose SILT
10		50.0	3	2 2 18 2			
12						GP	Brown, wet, dense, GRAVEL and coarse SAND trace silt
14		42.0	4	18 ?			
16							
18							
20						SP	Brown, wet, medium SAND
22							End of Boring at 22.0 Feet

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-13**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *11/15/89*
Surface Elev. *767.2 ft.* Total Hole Depth *22.0 ft.* Diameter *8.0 ft.*
Top of Casing *768.83 ft.* Water Level Initial *12.0 ft.* Static *13.52 ft.*
Screen: Dia *2.0 in.* Length *15.0 ft* Type/Size *0.010 in.*
Casing. Dia *2.0 in.* Length *9.0 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type *CME 850*
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Sam Kitchin*
Checked By *Constance Livchak* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							
2		0.0	1			GW	Black, damp, gravel, sand and silt FILL
4		1.0	2	3 2 1 18		SM	Black, damp, very loose, CINDERS, little fine sand
6							
8							Brownish/black, damp, loose fine SAND AND SILT
10		30.0	3	1 - 4 18		SM	
12							
14		25.0	4	10 9 11 18		SP	Brown, wet, medium dense, fine SAND trace silt
16							
18							
20							
22							End of Boring at 22.0 Feet

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-14**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *11/15/89*
Surface Elev. *766.0 ft.* Total Hole Depth *22.0 ft.* Diameter *8.0 ft.*
Top of Casing *765.79 ft.* Water Level Initial *12.0 ft.* Static *15.50 ft.*
Screen: Dia *2.0 in.* Length *15.0 ft.* Type/Size *0.010 in*
Casing: Dia *2.0 in.* Length *7.5 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type *CME 850*
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Sam Kitchin*
Checked By *Constance Livchak* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0		0.0	1		GW	Black, damp, gravel, sand and silt FILL
2						
4		0.0	2 ?		SP	Light brown, damp, fine SAND, trace silt
6						
8						
10		10.0	3 ?		GW	Dark brown, damp, medium dense fine GRAVEL and medium SAND, some silt
12						
14		35.0	4 ?			
16						
18					SP	Light brown, wet, loose, fine SAND
20						
22						End of Boring at 22.0 Feet

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-15**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi* Project No. *040056002* Date drilled *11/15/89*
Surface Elev. *765.1 ft.* Total Hole Depth *22.0 ft.* Diameter *8.0 ft*
Top of Casing *767.06 ft.* Water Level Initial *12.0 ft.* Static *10.94 ft.*
Screen: Dia *2.0 in.* Length *15.0 ft.* Type/Size *0.010 in*
Casing: Dia *2.0 in.* Length *9.0 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type *CME 850*
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Sam Kitchin*
Checked By *Constance Livchak* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							
2		0.0	1	18		GM	Black, damp, gravel, sand and silt FILL
4				7 5 3 18			Concrete
6		0.0	2			GM	Black, damp, loose, gravel, sand and silt FILL
8						GW	Light brown, damp, loose GRAVEL and medium to fine SAND, some silt
10		0.0	3	2 4 5 18			
12							
14		0.0	4	4 8 12 18		SM	Light brown, wet, medium to fine SAND AND SILT
16							
18							
20						SP	Light brown, wet, medium dense, medium to fine SAND
22							End of Boring at 22.0 Feet

GROUNDWATER TECHNOLOGY

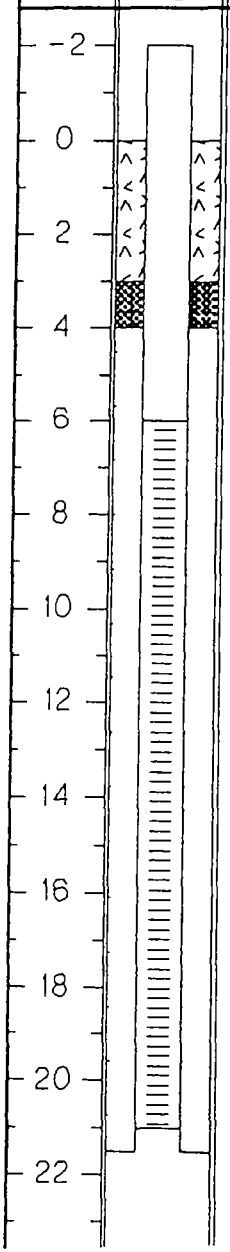
Drilling Log

Monitoring Well MW-16

Project Conrail - Botsford Owner Consolidated Rail Corp
Location Kalamazoo, Mi Project No 040056002 Date drilled 11/16/89
Surface Elev. 764.9 ft. Total Hole Depth 21.0 ft Diameter 8.0 ft.
Top of Casing 766 76 ft. Water Level Initial 14 0 ft. Static 10.83 ft.
Screen: Dia 2.0 in Length 15 0 ft. Type/Size 0.010 in
Casing: Dia 2.0 in. Length 8.0 ft. Type PVC
Filter Pack Material Sand Rig/Core Type CME 850
Drilling Company Fox Method HSA Permit #
Driller Jerry Hamman Log By Sam Kitchin
Checked By Sam Kitchin License No.

See Site Map For Boring Location

COMMENTS:



Depth (ft.)	PID (ppm)	Sample ID Blow Count/ % Recovery	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2				
0	20.0	1	GM	Black, damp, gravel, sand and silt FILL
2				
4	0.0	2 (4 5 6)	SM/ML	Black, damp, medium dense, CINDERS and coarse SAND
6			SM	Dark brown, damp, fine SAND, some silt
8				
10	40 0	3 (1 1 1)	ML	Black, damp, soft plastic SILT, some clay
12				
14	0 0	4 (1 2 2)	SM	Dark brown, wet, loose, fine SAND, some silt
16				
18			ML	Dark brown, wet, SILT
20				
22				End of Boring at 21.0 Feet

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-17**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *11/16/89*
Surface Elev. *764.3 ft.* Total Hole Depth *22.5 ft* Diameter *8.0 ft.*
Top of Casing *766.31 ft* Water Level Initial *12.0 ft.* Static *10.56 ft*
Screen: Dia *2.0 in.* Length *15.0 ft.* Type/Size *0.010 in.*
Casing: Dia *2.0 in.* Length *9.0 ft* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type *CME 850*
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Sam Kitchin*
Checked By *Sam Kitchin* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0		0.0	1	18		GM	Black, damp, gravel, sand and silt FILL
2							
4		0.0	2	1 1 1 / 18		SP	Light brown, damp, very loose, fine SAND
6							
8						SM	Brown, damp, loose fine SAND AND SILT, some clay
10		0.0	3	2 2 3 / 18			
12							
14		0.0	4	5 10 12 / 18		SP	Light brown, wet, medium dense, fine SAND
16							
18						SM	Brown, wet, fine SAND AND SILT
20							
22							

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-18**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *11/16/89*
Surface Elev. *765.6 ft.* Total Hole Depth *20.5 ft* Diameter *8.0 ft.*
Top of Casing *767.85 ft.* Water Level Initial *12.0 ft.* Static *13.68 ft*
Screen. Dia *2.0 in* Length *15.0 ft.* Type/Size *0.010 in.*
Casing: Dia *2.0 in* Length *7.0 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type *CME 850*
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Sam Kitchin*
Checked By *Sam Kitchin* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0		0.0	1	18		GM	Black, damp, gravel, sand and silt FILL
2							
4		0.0	2	2 3 3 18		SM	Light brown, damp, very loose, fine SAND, some silt, little clay
6							
8							
10		55.0	3	3 4 10 18		GW	Dark brown, wet, medium dense fine GRAVEL and coarse to medium SAND, little silt
12							
14		35.0	4	2 9 13 18		GW	Light brown, wet, medium dense, fine GRAVEL and medium to fine SAND, little silt
16							
18							
20							Hard rock (?)
22							End of Boring at 20.5 Feet

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-19**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *11/22/89*
Surface Elev. *762.0 ft.* Total Hole Depth *15.0 ft.* Diameter *8.0 ft.*
Top of Casing *763.80 ft.* Water Level Initial *7.0 ft.* Static *8.24 ft.*
Screen: Dia *2.0 in* Length *10.0 ft.* Type/Size *0.010 in.*
Casing: Dia *2.0 in.* Length *6.5 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Sam Kitchin*
Checked By *Sam Kitchin* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0		n/a	1		GM	Black, damp, gravel, cinders, sand, and silt FILL
2						
4		n/a	2 (1 3 2 18)		GM	Black, damp, loose, fine SAND AND CINDERS
6						
8						
10		n/a	3 (1 1 1 18)		SM	Gray, wet, very loose, fine SAND, some silt
12						
14						
16						End of Boring at 15.0 Feet
18						
20						
22						

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-20**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *11/22/89*
Surface Elev. *761.4 ft.* Total Hole Depth *15.5 ft.* Diameter *8.0 ft.*
Top of Casing *763.44 ft.* Water Level Initial *8.0 ft* Static *7.71 ft.*
Screen: Dia *2.0 in.* Length *10.5 ft.* Type/Size *0.010 in.*
Casing: Dia *2.0 in.* Length *7.5 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type
Drilling Company *Fox* Method *HSA* Permit #
Driller *Jerry Hamman* Log By *Sam Kitchin*
Checked By *Sam Kitchin* License No.

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							
2		n/a	1			GM	Black, damp, gravel, cinders, sand, and silt FILL
4				3 2 1 18			Dark brown, damp, very loose, fine SAND AND SILT
6		n/a	2				
8							Dark brown, wet, very loose, fine SAND AND SILT
10		n/a	3	1 1 1 18		SM	
12							Dark brown, wet, fine SAND AND SILT
14							
16							End of Boring at 15.5 Feet
18							
20							
22							

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-21**

Project *Conrail - Botsford* Owner *Consolidated Rail Corp*
Location *Kalamazoo, Mi.* Project No. *040056002* Date drilled *11/22/89*
Surface Elev. *762.5 ft* Total Hole Depth *20.0 ft.* Diameter *8.0 ft.*
Top of Casing *764.34 ft.* Water Level Initial *9.0 ft.* Static *8.53 ft.*
Screen: Dia *2.0 in.* Length *15.5 ft.* Type/Size *0.010 in.*
Casing: Dia *2.0 in* Length *7.0 ft.* Type *PVC*
Filter Pack Material *Sand* Rig/Core Type *CME 850*
Drilling Company *Fox* Method *HSA* Permit # _____
Driller *Jerry Hamman* Log By *Sam Kitchin*
Checked By *Sam Kitchin* License No. _____

See Site Map For Boring Location

COMMENTS:

Depth (ft)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0		0.0	1		GM	Black, damp, gravel, cinders, sand and silt FILL
2						
4		n/a	2 (2 1 2)			
6						
8					SM	Dark brown, wet, loose, fine SAND AND SILT
10		n/a	3 (4 6)		SW	Brown, wet, loose medium to fine SAND, trace silt
12					SM	Brown wet, medium to fine SAND AND SILT
14						
16					SW	Brown, wet, medium to fine SAND
18						
20						
22						End of Boring at 20.0 Feet

APPENDIX B

CHRONOLOGICAL GAUGING DATA

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail/Botsford Yard
Location Kalamazoo, Michigan
Job #: 04005-6001

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
MW-01	04/21/89	767 93	11.96		0.00	NA	NA	11.96	755.97
MW-01	04/26/89	767 93	12 19		0.00	NA	NA	12.19	755.74
MW-01	12/05/89	767.93	12 61		0.00	NA	NA	12.61	755.32
MW-01	01/31/90	767.93	12 15		0.00	NA	NA	12.15	755.78
MW-01	10/17/90	767 93	10 83		0.00	NA	NA	10.83	757.10
MW-01	10/20/92	767.93	11.73		0.00	NA	NA	11.73	756.20
MW-01	11/13/92	767 93	3 11		0 00	NA	NA	3.11	764.82
MW-01	12/21/92	767.93	3.04		0.00	NA	NA	3.04	764.89
MW-01	04/05/93	767 93	2 51	Casing cracked about 2.5 feet from the top					
MW-02	12/21/92	100.10	Well gauged in November; damaged (cause unknown) prior to survey in December 1992.						
MW-03	04/21/89	767.27	12 88	11 90	0 98	0 80	0.78	12.10	755.17
MW-03	04/26/89	767 27	13 18	12.09	1 09	0.80	0.87	12.31	754.96
MW-03	12/05/89	767 27	13 32	12 31	1.01	0.80	0 81	12.51	754.76
MW-03	10/17/90	767.27	11.52	10 40	1 12	0 80	0 90	10.62	756.65
MW-03	10/20/92	767 27	12 05	11 32	0 73	0.80	0.58	11.47	755.80
MW-03	11/13/92	767.27	12 03	10 95	1.08	0.80	0.86	11.17	756.10
MW-03	12/21/92	767.27	12.20	11 22	0.98	0 80	0.78	11.42	755.85
MW-03	04/05/93	767 27	11 63	9.62	2.01	0.80	1 61	10 02	757.25
MW-04	04/21/89	764 16	9 41	9 35	0.06	0 80	0 05	9 36	754.80
MW-04	04/26/89	764 16	9.73	9 56	0.17	0.80	0 14	9.59	754.57
MW-04	12/05/89	764 16	9 52		0 00	NA	NA	9.52	754 64
MW-04	01/31/90	764 16	8 90		0 00	NA	NA	8.90	755.26
MW-04	10/17/90	764 16	7 29		0.00	NA	NA	7.29	756.87
MW-04	10/20/92	764 16	8 17	SHEEN	0 00	NA	NA	8.17	755.99
MW-04	11/13/92	764 16	7.81		0.00	NA	NA	7.81	756.35
MW-04	12/21/92	764 16	8.24		0.00	NA	NA	8.24	755.92
MW-04	01/07/93	764 16	5.45		0.00	NA	NA	5.45	758.71
MW-04	04/05/93	764 16	6 46		0.00	NA	NA	6.46	757.70
MW-05	04/21/89	764 04	8.94		0.00	NA	NA	8.94	755.10
MW-05	04/26/89	764.04	9 08		0 00	NA	NA	9.08	754.96
MW-05	12/05/89	764.04	9 01		0.00	NA	NA	9.01	755.03
MW-05	01/31/90	764.04	8.41		0 00	NA	NA	8.41	755.63
MW-05	10/17/90	764.04	7 16		0.00	NA	NA	7.16	756.88
MW-05	10/20/92	764.04	8 02		0.00	NA	NA	8.02	756.02

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail/Botsford Yard
Location. Kalamazoo, Michigan
Job #: 04005-6001

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
MW-05	12/21/92	764.04	8.07		0.00	NA	NA	8.07	755.97
MW-05	01/07/93	764 04	5.30		0.00	NA	NA	5.30	758.74
MW-05	04/05/93	764 04	6 35	SHEEN	0.00	NA	NA	6.35	757.69
MW-06	04/21/89	764 59	9.14	9.12	0 02	0 80	0.02	9.12	755.47
MW-06	04/26/89	764.59	9.35	9.33	0.02	0.80	0.02	9.33	755.26
MW-06	12/05/89	764.59	9.55	9.54	0.01	0.80	0 01	9 54	755.05
MW-06	01/31/90	764.59	8.95		0.00	NA	NA	8.95	755.64
MW-06	10/17/90	764 59	7.65	7.63	0.02	0.80	0.02	7.63	756.96
MW-06	10/20/92	764.59	8.46		0.00	NA	NA	8 46	756.13
MW-06	11/13/92	764 59	8.04	SHEEN	0.00	NA	NA	8.04	756 55
MW-06	12/21/92	764.59	8.56		0.00	NA	NA	8 56	756.03
MW-06	01/07/93	764.59	5.93	5.82	0.11	0.80	0 09	5.84	758 75
MW-06	04/05/93	764.59	6.91	6.82	0.09	0.80	0 07	6.84	757.75
MW-07	04/21/89	769.13	15.09	13 15	1 94	0.80	1.55	13 54	755.59
MW-07	04/26/89	769.13	15.23	13 36	1.87	0.80	1 50	13.73	755.40
MW-07	12/05/89	769.13	15.23	13 61	1.62	0.80	1.30	13.93	755.20
MW-07	01/30/90	769 13	14.32	12.78	1 54	0.80	1.23	13.09	756 04
MW-07	10/17/90	769 13	13.24	11 50	1.74	0.80	1.39	11.85	757.28
MW-07	10/20/92	769 13	14.06	12 95	1 11	0 80	0.89	13 17	755.96
MW-07	11/13/92	769 13	14.05	12.63	1 42	0.80	1.14	12.91	756.22
MW-07	12/21/92	769.13	14 46	12 91	1 55	0.80	1 24	13.22	755 91
MW-07	04/05/93	769.13	13.26	11 15	2.11	0.80	1.69	11 57	757.56
MW-08	04/21/89	769.07	13 92	13 21	0 71	0.80	0 57	13 35	755 72
MW-08	04/26/89	769 07	15.37	13.33	2 04	0.80	1.63	13.74	755.33
MW-08	12/05/89	769 07	14.80	13.54	1.26	0 80	1 01	13.79	755 28
MW-08	01/30/90	769 07	14.10	12.77	1 33	0 80	1.06	13.04	756 03
MW-08	10/17/90	769.07	11.46	11.41	0 05	0 80	0.04	11.42	757.65
MW-08	10/20/92	769 07	11 73	11 60	0 13	0 80	0.10	11.63	757.44
MW-08	11/13/92	769.07	11.23	11.01	0 22	0 80	0 18	11.05	758 02
MW-08	12/21/92	769.07	12.79	12.39	0.40	0.80	0 32	12 47	756.60
MW-08	04/05/93	769.07	10.71	10.59	0.12	0.80	0 10	10.61	758.46
MW-09	04/21/89	769 28	13.36		0.00	NA	NA	13.36	755.92
MW-09	04/26/89	769.28	13.58		0.00	NA	NA	13.58	755 70
MW-09	12/05/89	769.28	15.40	13.62	1 78	0.80	1.42	13.98	755 30
MW-09	01/30/90	769 28	13.22	13.00	[illegible]	[illegible]			

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail/Botsford Yard
Location: Kalamazoo, Michigan
Job #: 04005-6001

Depths and Thicknesses reported in feet
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
MW-09	10/17/90	769.28	13.61	11.58	2.03	0.80	1.62	11.99	757.29
MW-09	10/20/92	769.28	12.81		0.00	NA	NA	12.81	756 47
MW-09	11/13/92	769.28	14.70	12.21	2.49	0.80	1 99	12.71	756 57
MW-09	12/21/92	769.28	14.03	12 60	1.43	0.80	1 14	12.89	756 39
MW-09	04/05/93	769.28	11.09	SHEEN	0.00	NA	NA	11.09	758 19
MW-10	12/05/89	766.11	11.58	9 24	2.34	0.80	1 87	9 71	756.40
MW-10	01/31/90	766.11	11 92	8 73	3 19	0 80	2 55	9.37	756 74
MW-10	10/17/90	766.11	12.18	7.16	5.02	0.80	4.02	8 16	757 95
MW-10	10/20/92	766.11	10.04	8.95	1.09	0.80	0.87	9.17	756.94
MW-10	11/13/92	766.11	9.98	8 38	1.60	0.80	1.28	8.70	757.41
MW-10	12/21/92	766.11	11.80	8.34	3 46	0 80	2.77	9 03	757 08
MW-10	04/05/93	766.11	9 87	6.90	2.97	0 80	2 38	7 49	758 62
MW-11	12/05/89	769 98	15 72	14 74	0.98	0 80	0 78	14 94	755 04
MW-11	10/17/90	769 98	15 42	12.58	2 84	0.80	2 27	13 15	756.83
MW-11	10/20/92	769.98	15.59	13.69	1.90	0 80	1 52	14.07	755.91
MW-11	11/13/92	769 98	15.37	13 28	2 09	0 80	1 67	13.70	756 28
MW-11	12/21/92	769.98	15 68	13 53	2 15	0.80	1.72	13 96	756 02
MW-11	04/05/93	769.98	14.96	11 95	3 01	0 80	2 41	12.55	757 43
MW-12	12/05/89	768.85	14 53	13.69	0 84	0 80	0 67	13 86	754 99
MW-12	01/30/90	768 85	13 92	12 84	1 08	0.80	0.86	13 06	755.79
MW-12	10/17/90	768.85	12.05	11 71	0 34	0 80	0.27	11.78	757.07
MW-12	10/20/92	768.85	13 54	12 07	1 47	0 80	1 18	12.36	756.49
MW-12	11/13/92	768.85	13 64	12.15	1 49	0.80	1 19	12 45	756 40
MW-12	12/21/92	768.85	14 02	12.49	1 53	0 80	1.22	12 80	756 05
MW-12	04/05/93	768.85	11 30	10 99	0 31	0.80	0 25	11 05	757 80
MW-13	12/05/89	768.83	14.02	13.41	0.61	0 80	0.49	13 53	755 30
MW-13	01/30/90	768.83	13.11	12 72	0.39	0 80	0 31	12 80	756 03
MW-13	10/17/90	768 83	12 72	11.35	1 37	0 80	1 10	11.62	757.21
MW-13	10/20/92	768.83	13 30	12.30	1.00	0.80	0.80	12.50	756.33
MW-13	11/13/92	768.83	13.56	11.97	1.59	0.80	1 27	12 29	756.54
MW-13	12/21/92	768.83	14.42	12.16	2.26	0.80	1.81	12.61	756 22
MW-13	04/05/93	768.83	10.91	10.73	0 18	0 80	0.14	10.77	758.06
MW-14	12/05/89	765 79	15.86	11.82	4 04	0.80	3 23	12 63	753 16
MW-14	01/30/90	765 79	15.86	[illegible]	[illegible]				

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail/Botsford Yard
Location: Kalamazoo, Michigan
Job #: 04005-6001

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
MW-14	10/17/90	765 79	13 62	9.73	3 89	0 80	3 11	10.51	755.28
MW-14	10/20/92	765 79	CASING BROKEN		NA	NA	NA	NA	NA
MW-14	11/13/92	765.79	7.78	7 36	0 42	0 80	0.34	7.44	758.35
MW-14	12/21/92	765.79	8 25	7 93	0 32	0 80	0.26	7.99	757.80
MW-14	04/05/93	765.79	7 09	6 82	0.27	0.80	0.22	6.87	758.92
MW-15	12/05/89	767.06	11.72		0 00	NA	NA	11.72	755.34
MW-15	01/30/90	767.06	11 12		0 00	NA	NA	11 12	755.94
MW-15	10/17/90	767.06	9.72		0 00	NA	NA	9.72	757.34
MW-15	10/20/92	767 06	10 69		0.00	NA	NA	10.69	756.37
MW-15	11/13/92	767 06	10.35		0 00	NA	NA	10.35	756.71
MW-15	12/21/92	767.06	10 64		0 00	NA	NA	10.64	756.42
MW-15	04/05/93	767.06	9.05		0 00	NA	NA	9 05	758.01
MW-16	12/05/89	766 76	11 87	11 84	0 03	0 80	0.02	11 85	754.91
MW-16	01/30/90	766 76	10 83		0 00	NA	NA	10.83	755.93
MW-16	10/17/90	766 76	9 34	9 18	0 16	0 80	0.13	9.21	757.55
MW-16	10/21/92	766.76	12 54	9.03	3 51	0 80	2.81	9.73	757.03
MW-16	11/13/92	766 76	11.36	9.68	1 68	0 80	1 34	10 02	756.74
MW-16	12/21/92	766 76	12 36	9 98	2 38	0 80	1 90	10 46	756.30
MW-16	04/05/93	766 76	8 70	8 57	0 13	0 80	0.10	8 60	758.16
MW-17	12/05/89	766 31	11 27		0 00	NA	NA	11 27	755.04
MW-17	01/31/90	766 31	10 69		0 00	NA	NA	10 69	755.62
MW-17	10/17/90	766 31	9 58		0 00	NA	NA	9.58	756.73
MW- 17	10/20/92	766 31	10 40		0 00	NA	NA	10.40	755.91
MW -17	11/13/92	766.31	10 04		0 00	NA	NA	10.04	756.27
MW- 17	12/21/92	766 31	10 26		0 00	NA	NA	10.26	756.05
MW-17	04/05/93	766 31	9 12		0 00	NA	NA	9.12	757.19
MW-18	12/05/89	767 85	15 19	12.69	2 50	0 80	2.00	13.19	754.66
MW--18	10/17/90	767 85	13 12	10 80	2 32	0 80	1 86	11.26	756.59
MW-18	10/20/92	767 85	12 34	11.76	0 58	0 80	0 46	11 88	755.97
MW--18	11/13/92	767.85	12 35	11 49	0 86	0 80	0 69	11 66	756.19
MW-18	12/21/92	767 85	13 65	11 71	1.94	0 80	1 55	12.10	755.75
MW-18	04/05/93	767.85	12 38	10 04	2 34	0 80	1.87	10.51	757.34
MW-19	12/05/89	763.80	9 04		0 00	NA	NA	9.04	754.76
MW-19	01/31/90	763 80	8 42		0 00	NA	NA	[illegible]	[illegible]

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail/Botsford Yard
Location: Kalamazoo, Michigan
Job #. 04005-6001

Depths and Thicknesses reported in feet.
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
MW-19	10/17/90	763 80	6 91		0.00	NA	NA	6.91	756.89
MW-19	10/20/92	763 80	7 75	SHEEN	0 00	NA	NA	7.75	756.05
MW-19	11/13/92	763.80	7.50		0.00	NA	NA	7.50	756.30
MW-19	12/21/92	763 80	7 93		0.00	NA	NA	7.93	755.87
MW-19	01/07/93	763 80	5 10		0.00	NA	NA	5.10	758.70
MW-19	04/05/93	763 80	6.17		0.00	NA	NA	6.17	757.63
MW-20	12/05/89	763 44	8 66		0.00	NA	NA	8.66	754.78
MW-20	01/31/90	763 44	8.30	8 04	0.26	0.80	0.21	8.09	755.35
MW-20	10/17/90	763 44	6 65	6.63	0 02	0 80	0.02	6.63	756.81
MW-20	10/20/92	763 44	7 23	7.21	0 02	0 80	0.02	7.21	756.23
MW-20	11/13/92	763 44	7.76	6 95	0 81	0 80	0.65	7.11	756.33
MW-20	12/21/92	763 44	7 34		0 00	NA	NA	7.34	756.10
MW-20	01/07/93	763 44	5 85	4 67	1 18	0 80	0.94	4.91	758.53
MW-20	04/05/93	763.44	6 03	5 70	0 33	0.80	0.26	5.77	757.67
MW-21	12/05/89	764 34	9 36		0 00	NA	NA	9.36	754.98
MW-21	01/31/90	764 34	8.81		0.00	NA	NA	8.81	755.53
MW-21	10/17/90	764 34	7 40		0.00	NA	NA	7.40	756.94
MW-21	10/20/92	764 34	8 03		0 00	NA	NA	8.03	756.31
MW-21	11/13/92	764 34	7 89		0 00	NA	NA	7.89	756.45
MW-21	12/21/92	764 34	8 31		0 00	NA	NA	8.31	756.03
MW-21	01/07/93	764 34	5 54		0 00	NA	NA	5.54	758.80
MW-21	04/05/93	764 34	6 56		0.00	NA	NA	6.56	757.78
S-01	04/26/89	766 71	10 97	10 95	0 02	0 80	0.02	10.95	755.76
S-01	12/05/89	766 71	11 05		0 00	NA	NA	11.05	755.66
S-01	01/30/90	766 71	10 96		0 00	NA	NA	10.96	755.75
S-01	10/17/90	766 71	9 09	9 05	0 04	0 80	0.03	9 06	757.65
S-01	10/20/92	766 71	10 45		0.00	NA	NA	10.45	756.26
S-01	11/13/92	766.71	9 17		0 00	NA	NA	9.17	757.54
S-01	12/21/92	766 71	10 15		0.00	NA	NA	10.15	756.56
S-01	04/05/93	766 71	8 25		0 00	NA	NA	8.25	758.46
S-02	04/26/89	767 75	11 43	11 42	0.01	0.80	0.01	11.42	756.33
S-02	12/05/89	767.75	11.63	11 61	0 02	0 80	0.02	11.61	756.14
S-02	01/30/90	767.75	11 45	11 41	0.04	0.80	0.03	11.42	756.33
S-02	10/17/90	767.75	9 56	9.50	0 06	0.80	0.05	9.51	758.24
S-02	10/20/92	767 75	10 07	10 04	0.03	0 80	0.02	[illegible]	[illegible]

GROUNDWATER TECHNOLOGY, INC.
CHRONOLOGICAL GAUGING DATA

Site: Conrail/Botsford Yard
Location: Kalamazoo, Michigan
Job #. 04005-6001

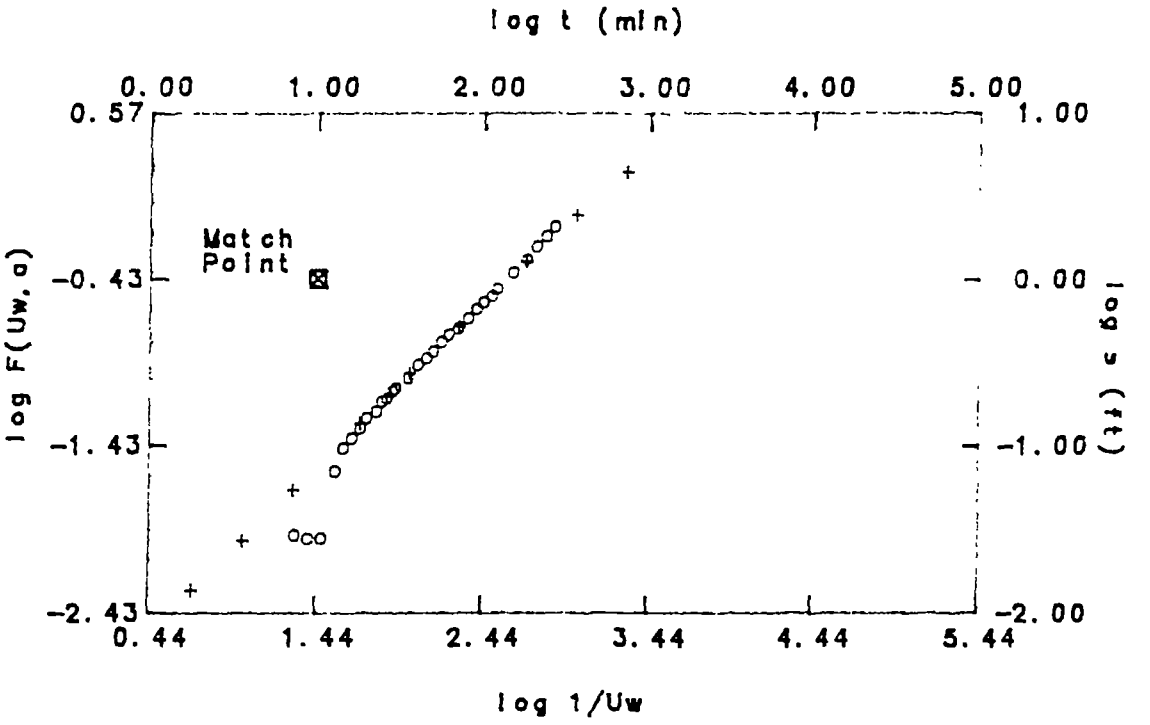
Depths and Thicknesses reported in feet
NM = Not Measured

Well ID	DATE GAUGED M /D /Y	T.O.C. ELEV.	DEPTH to WATER	DEPTH to PETRO	PETRO. THICK	PETRO GRAV	WATER EQUIV	CORR. DTW	CORR. WATER ELEV.
S-02	11/13/92	767.75	8.86	SHEEN	0.00	NA	NA	8 86	758 89
S-02	12/21/92	767.75	9.98	SHEEN	0.00	NA	NA	9.98	757.77
S-02	04/05/93	767.75	6.02		0.00	NA	NA	6.02	761.73

APPENDIX C

PUMP TEST ANALYSIS (GWAP OUTPUT)

CONRAIL, BOTSFORD YARD



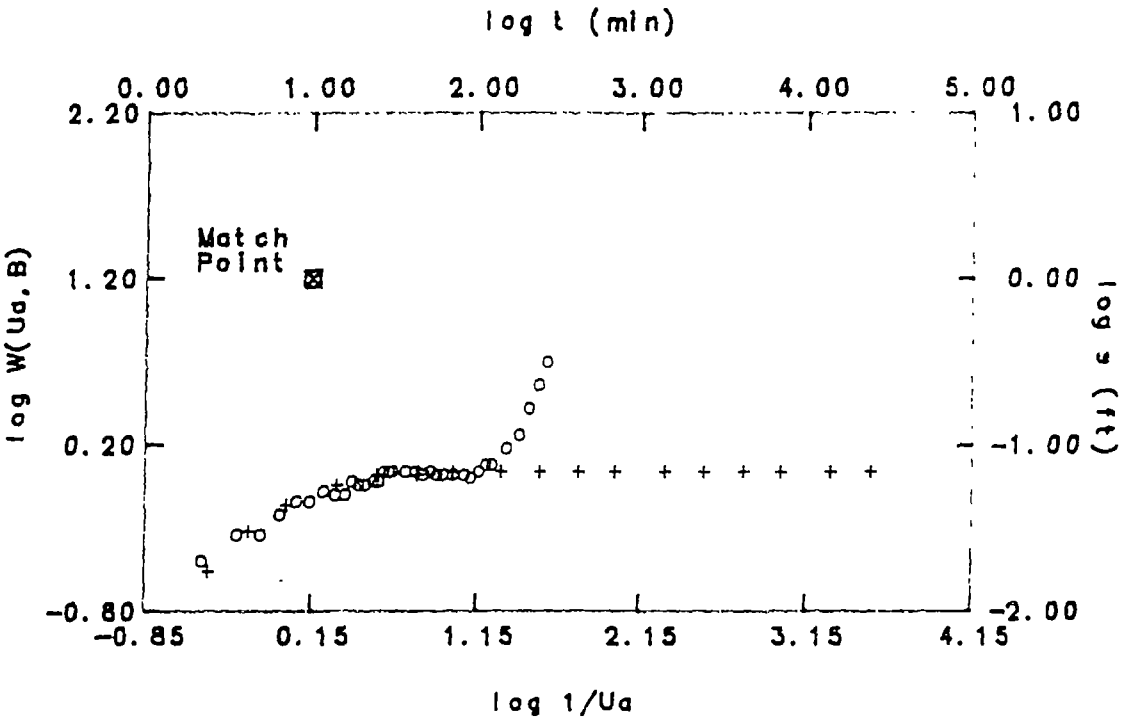
o – Data
+ – Type Curve
Large Dia.: alpha = -3.0

MATCH POINT			SOLUTION		
t	=	1.000E+0001	Transmissivity	=	8.513E+0002 gpd/ft
s	=	1.000E+0000	Hydraulic. Cond.	=	5.676E+0001 gpd/sq ft
1/Uw	=	2.754E+0001	Storativity	=	2.777E-0006
F(Uw, a)	=	3.715E-0002			

WELL INFORMATION		
WELL IDENTIFICATION	:	S-2
DATE OF AQUIFER TEST	:	1/30/90
AQUIFER THICKNESS (b)	:	1.500E+0001 ft
DISCHARGE RATE (Q)	:	2.000E+0001 gpm
EFFECTIVE RADIUS	:	5.000E+0001 cu ft
WELL RADIUS AT MEASURED WATER LEVELS (rc)	:	2.635E+0000 ft

GROUNDWATER

CONRAIL, BOTSFORD YARD

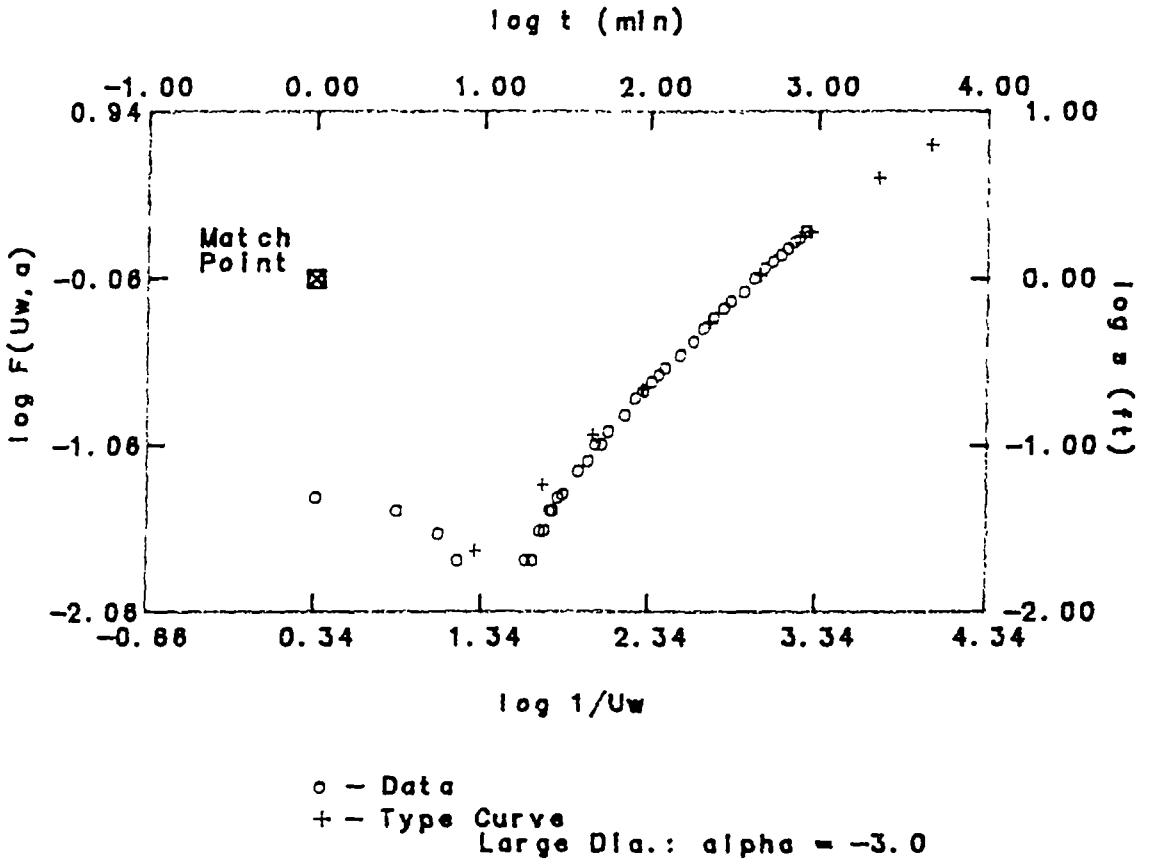


MATCH POINT		SOLUTION	
t	= 1.000E+0001	Transmissivity	= 3.632E+0004 gpd/ft
s	= 1.000E+0000	Hydraulic. Cond.	= 2.421E+0003 gpd/sq ft
1/Ua	= 1.413E+0000	Storativity	= 5.988E-0002
W(Ua, B)	= 1.585E+0000		

WELL INFORMATION	
WELL IDENTIFICATION	: MW-8
DATE OF AQUIFER TEST	: 1/30/90
AQUIFER THICKNESS (b)	: 1.500E+0001 ft
DISCHARGE RATE (Q)	: 2.000E+0001 gpm
PUMPING WELL RADIUS (r)	: 2.635E+0000 ft
DISTANCE OF OBS. WELL FROM PUMPING WELL (d)	: 2.000E+0001 ft

GROUNDWATER

CONRAIL, BOTSFORD YARD

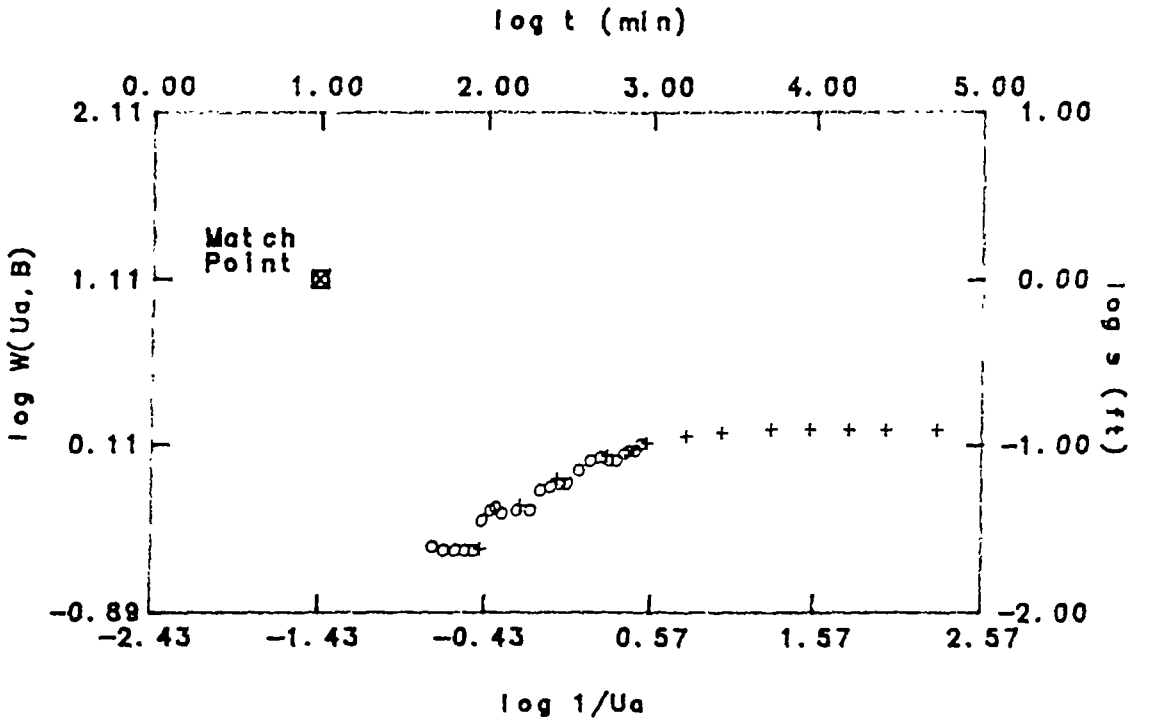


MATCH POINT		SOLUTION	
t	= 1.000E+0000	Transmissivity	= 8.981E+0002 gpd/ft
a	= 1.000E+0000	Hydraulic. Cond.	= 5.987E+0001 gpd/sq ft
1/Uw	= 2.188E+0000	Storativity	= 2.777E-0004
F(Uw, a)	= 8.710E-0002		

WELL INFORMATION	
WELL IDENTIFICATION	: S-2
DATE OF AQUIFER TEST	: 1/31/90
AQUIFER THICKNESS (b)	: 1.500E+0001 ft
DISCHARGE RATE (Q)	: 9.000E+0000 gpm
EFFECTIVE RADIUS	: 5.000E+0000 cu ft
WELL RADIUS AT MEASURED WATER LEVELS (rc)	: 2.635E+0000 ft

GROUNDWATER

CONRAIL, BOTSFORD YARD



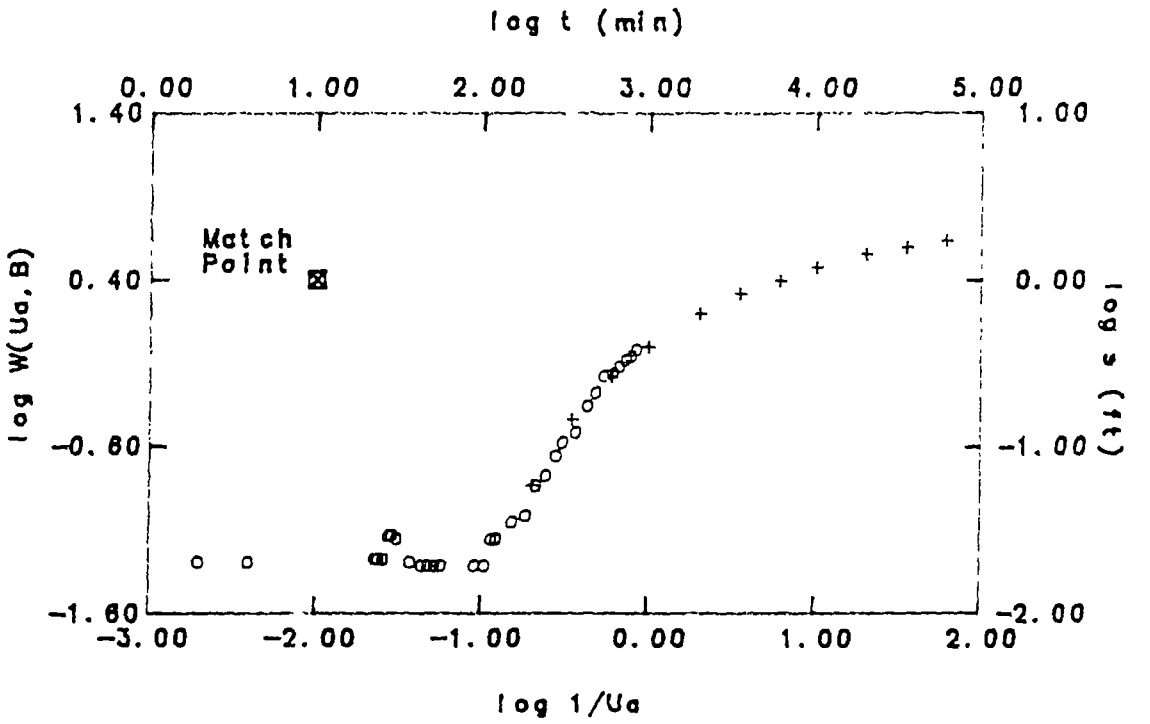
o – Data
+ – Type Curve
Unconf. Elastic: beta = 0.10

MATCH POINT			SOLUTION		
t	=	1.000E+0001	Transmissivity	=	1.328E+0004 gpd/ft
s	=	1.000E+0000	Hydraulic. Cond.	=	8.856E+0002 gpd/sq ft
1/Ua	=	3.715E-0002	Storativity	=	8.641E-0003
W(Ua,B)	=	1.288E+0000			

WELL INFORMATION		
WELL IDENTIFICATION	:	MW-7
DATE OF AQUIFER TEST	:	1/31/90
AQUIFER THICKNESS (b)	:	1.500E+0001 ft
DISCHARGE RATE (Q)	:	9.000E+0000 gpm
PUMPING WELL RADIUS (r)	:	2.635E+0000 ft
DISTANCE OF OBS. WELL FROM PUMPING WELL (d)	:	1.960E+0002 ft

GROUNDWATER

CONRAIL, BOTSFORD YARD



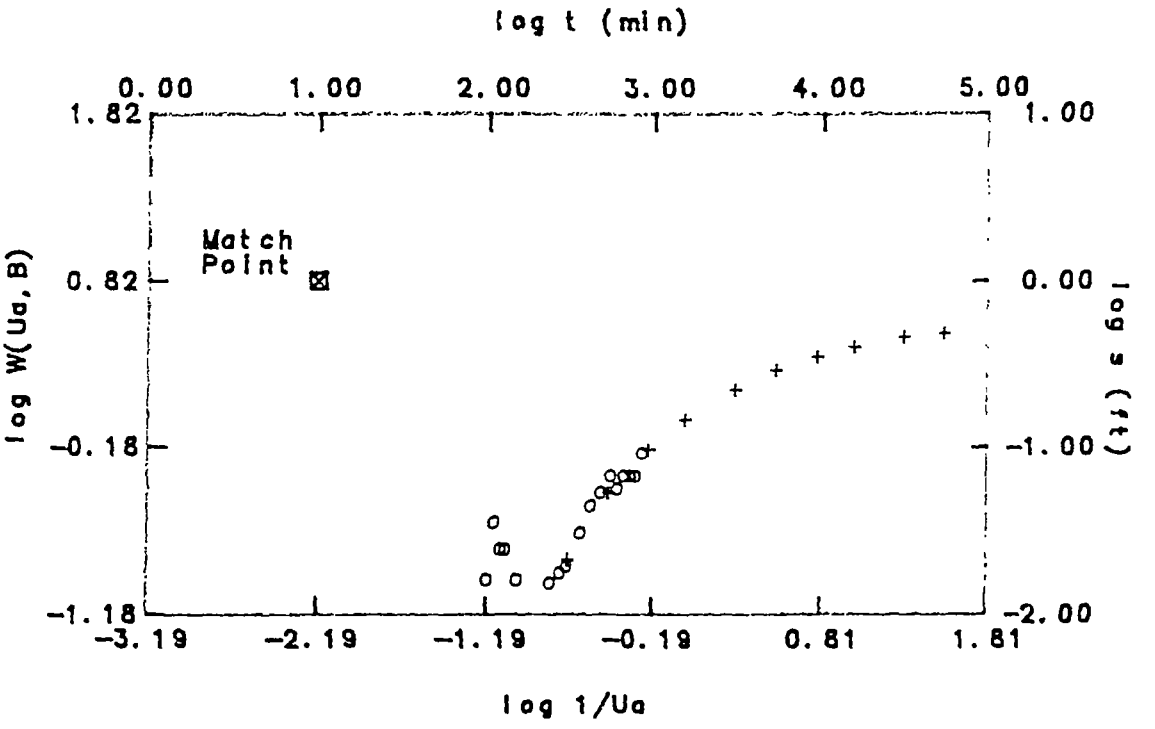
o – Data
+ – Type Curve
Unconf. Elastic: beta = 0.001

MATCH POINT		SOLUTION	
t	= 1.000E+0001	Transmissivity	= 2.590E+0003 gpd/ft
s	= 1.000E+0000	Hydraulic. Cond.	= 1.727E+0002 gpd/sq ft
1/Ua	= 1.000E-0002	Storativity	= 8.012E-0001
W(Ua,B)	= 2.512E-0001		

WELL INFORMATION	
WELL IDENTIFICATION	: MW-8
DATE OF AQUIFER TEST	: 1/31/90
AQUIFER THICKNESS (b)	: 1.500E+0001 ft
DISCHARGE RATE (Q)	: 9.000E+0000 gpm
PUMPING WELL RADIUS (r)	: 2.835E+0000 ft
DISTANCE OF OBS. WELL FROM PUMPING WELL (d)	: 2.000E+0001 ft

GROUNDWATER

CONRAIL, BOTSFORD YARD



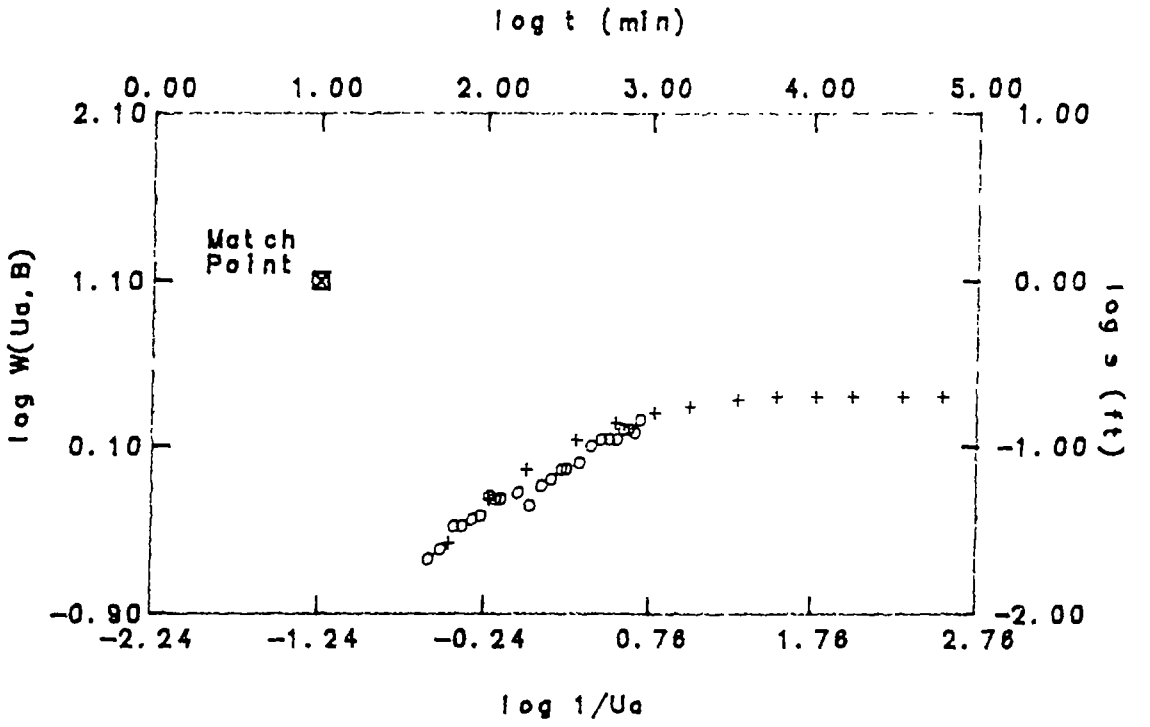
o – Data
+ – Type Curve
Unconf. Elastic: beta = 0.01

MATCH POINT			SOLUTION		
t	=	1.000E+0001	Transmissivity	=	6.813E+0003 gpd/ft
s	=	1.000E+0000	Hydraulic. Cond.	=	4.542E+0002 gpd/sq ft
1/Ua	=	6.457E-0003	Storativity	=	8.097E-0002
W(Ua,B)	=	6.607E-0001			

WELL INFORMATION		
WELL IDENTIFICATION	:	MW-9
DATE OF AQUIFER TEST	:	1/31/90
AQUIFER THICKNESS (b)	:	1.500E+0001 ft
DISCHARGE RATE (Q)	:	9.000E+0000 gpm
PUMPING WELL RADIUS (r)	:	2.635E+0000 ft
DISTANCE OF OBS. WELL FROM PUMPING WELL (d)	:	1.100E+0002 ft

GROUNDWATER

CONRAIL, BOTSFORD YARD



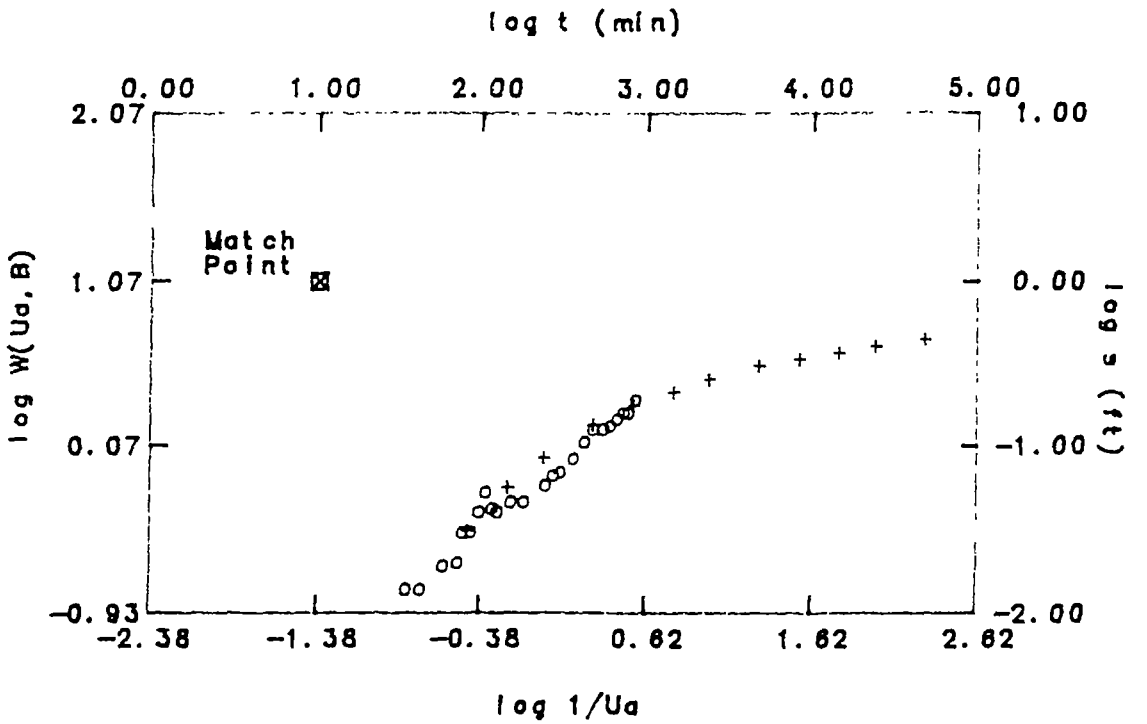
o – Data
+ – Type Curve
Unconf. Elastic: beta = 0.03

MATCH POINT			SOLUTION		
t	=	1.000E+0001	Transmissivity	=	1.298E+0004 gpd/ft
s	=	1.000E+0000	Hydraulic. Cond.	=	8.654E+0002 gpd/sq ft
1/Ua	=	5.754E-0002	Storativity	=	1.731E-0002
W(Ua, B)	=	1.259E+0000			

WELL INFORMATION		
WELL IDENTIFICATION	:	MW-12
DATE OF AQUIFER TEST	:	1/31/90
AQUIFER THICKNESS (b)	:	1.500E+0001 ft
DISCHARGE RATE (Q)	:	9.000E+0000 gpm
PUMPING WELL RADIUS (r)	:	2.635E+0000 ft
DISTANCE OF OBS. WELL FROM PUMPING WELL (d)	:	1.100E+0002 ft

GROUNDWATER TECHNOLOGY, INC.

CONRAIL, BOTSFORD YARD



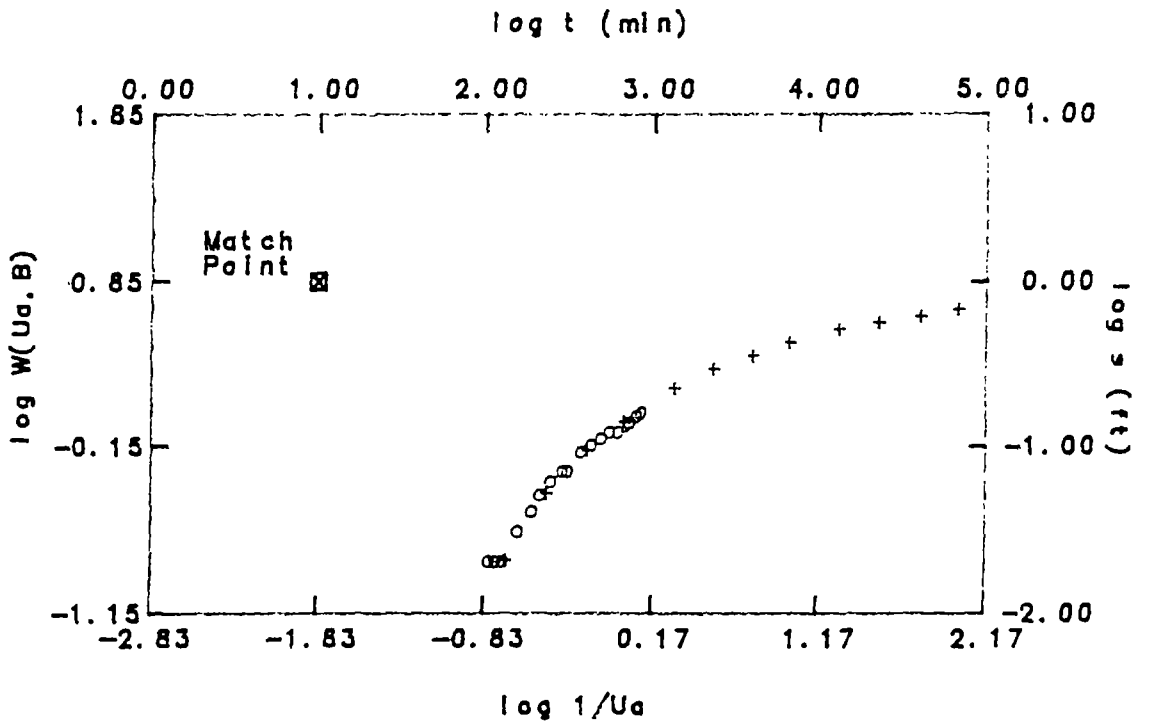
o – Data
+ – Type Curve
Unconf. Elastic: beta = 0.001

MATCH POINT			SOLUTION		
t	=	1.000E+0001	Transmissivity	=	1.211E+0004 gpd/ft
s	=	1.000E+0000	Hydraulic. Cond.	=	8.076E+0002 gpd/sq ft
1/Ua	=	4.169E-0002	Storativity	=	2.076E-0002
W(Ua, B)	=	1.175E+0000			

WELL INFORMATION		
WELL IDENTIFICATION	:	MW-13
DATE OF AQUIFER TEST	:	1/31/90
AQUIFER THICKNESS (b)	:	1.500E+0001 ft
DISCHARGE RATE (Q)	:	9.000E+0000 gpm
PUMPING WELL RADIUS (r)	:	2.635E+0000 ft
DISTANCE OF OBS. WELL FROM PUMPING WELL (d)	:	1.140E+0002 ft

GROUNDWATER TECHNOLOGY, INC.

CONRAIL, BOTSFORD YARD



o – Data
+ – Type Curve
Unconf. Elastic: beta = 0.001

MATCH POINT		SOLUTION	
t	= 1.000E+0001	Transmissivity	= 7.300E+0003 gpd/ft
s	= 1.000E+0000	Hydraulic. Cond.	= 4.867E+0002 gpd/sq ft
1/Ua	= 1.479E-0002	Storativity	= 5.298E-0002
W(Ua, B)	= 7.079E-0001		

WELL INFORMATION	
WELL IDENTIFICATION	: MW-16
DATE OF AQUIFER TEST	: 1/31/90
AQUIFER THICKNESS (b)	: 1.500E+0001 ft
DISCHARGE RATE (Q)	: 9.000E+0000 gpm
PUMPING WELL RADIUS (r)	: 2.635E+0000 ft
DISTANCE OF OBS. WELL FROM PUMPING WELL (d)	: 9.300E+0001 ft

GROUNDWATER TECHNOLOGY, INC.

APPENDIX D

LABORATORY RESULTS

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
400-142-9307

Work Order No.
M9-04-696

6/05/89
Submitted to:

Craig Rupnow
Groundwater Technology
24168 Haggerty Road
Farmington Hills, MI 48024

Sample Identification:

The enclosed data reports the analysis of product samples taken on 4/26/89 at site # 400-142-9307, Kalamazoo, Michigan. The samples were extracted on 5/25/89 by B.W..

Method:

The analytical method was EPA Method 5030/8010 using purge and trap gas chromatography with Hall Electrolytic Conductivity Detection.

Respectfully submitted,

Bob Edwards

Bob Edwards
Gas Chromatography Manager

Sampler: C.R.

Analyst: B.W.

Report No.
400-142-9307

Work Order No.
M9-04-696

Purgeable Halocarbons
Analytical Results
mg/kg

Sample No.	01	02
I.D.	MW-3	MW-6
Date Sampled:	4/26/89	4/26/89
Date Run:	5/25/89	5/25/89

Compound	Analytical Result, mg/kg		Method Detection Limit mg/kg
Methylene Chloride	ND	ND	0.05
1,1-Dichloroethylene	ND	ND	0.05
1,1-Dichloroethane	ND	ND	0.05
Trans-1,2-Dichloroethylene	ND	ND	0.05
Chloroform	ND	ND	0.05
1,2-Dichloroethane	ND	ND	0.05
1,1,1-Trichloroethane	ND	ND	0.05
Carbon Tetrachloride	ND	ND	0.05
Bromodichloromethane	ND	ND	0.05
1,2-Dichloropropane	ND	ND	0.05
Bromomethane	ND	ND	0.05
Chloroethane	ND	ND	0.05
Dichlorodifluoromethane	ND	ND	0.05
Trichloroethylene	ND	ND	0.05
Trans-1,3-Dichloropropene	ND	ND	0.05
1,1,2-Trichloroethane	ND	ND	0.05
Dibromochloromethane	ND	ND	0.05
Cis-1,3-Dichloropropene	ND	ND	0.05
2-Chloroethylvinylether	ND	ND	0.05
Bromoform	ND	ND	0.05
1,1,2,2-Tetrachloroethane	ND	ND	0.05
Tetrachloroethylene	ND	ND	0.05
Chlorobenzene	ND	ND	0.05
Vinyl Chloride	ND	ND	0.05
1,2-Dichlorobenzene	ND	ND	0.05
1,3-Dichlorobenzene	ND	ND	0.05
1,4-Dichlorobenzene	ND	ND	0.05
Chloromethane	ND	ND	0.05
Trichlorofluoromethane	ND	ND	0.05
	*1	*1	

Notes:

ND = None Detected

GTEL

Report No.
400-142-9307

Work Order No.
M9-04-696

Purgeable Halocarbons
Analytical Results
mg/kg

Sample No.	03
I.D.	MW-7
Date Sampled:	4/26/89
Date Run:	5/25/89

Compound	Analytical Result, mg/kg	Method Detection Limit mg/kg
Methylene Chloride	ND	0.05
1,1-Dichloroethylene	ND	0.05
1,1-Dichloroethane	ND	0.05
Trans-1,2-Dichloroethylene	ND	0.05
Chloroform	ND	0.05
1,2-Dichloroethane	ND	0.05
1,1,1-Trichloroethane	ND	0.05
Carbon Tetrachloride	ND	0.05
Bromodichloromethane	ND	0.05
1,2-Dichloropropane	ND	0.05
Bromomethane	ND	0.05
Chloroethane	ND	0.05
Dichlorodifluoromethane	ND	0.05
Trichloroethylene	ND	0.05
Trans-1,3-Dichloropropene	ND	0.05
1,1,2-Trichloroethane	ND	0.05
Dibromochloromethane	ND	0.05
Cis-1,3-Dichloropropene	ND	0.05
2-Chloroethylvinylether	ND	0.05
Bromoform	ND	0.05
1,1,2,2-Tetrachloroethane	ND	0.05
Tetrachloroethylene	ND	0.05
Chlorobenzene	ND	0.05
Vinyl Chloride	ND	0.05
1,2-Dichlorobenzene	ND	0.05
1,3-Dichlorobenzene	ND	0.05
1,4-Dichlorobenzene	ND	0.05
Chloromethane	ND	0.05
Trichlorofluoromethane	ND	0.05
	*1	

Where were samples taken and how is it possible to have MDL at 0.05 mg/kg while dilution.

Notes:

ND = None Detected

*1 = Free product; samples were diluted 1:1,000,000.

GTEL

OTEL ENVIRONMENTAL LABORATORIES INC
Concord CA 94520
415-685-7852
800-544-3422 (In CA)
800-423-7143 (Outside CA)

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Craig Rupnow
Phone #: 313-471-2031
Address: 24168 Haggerty Rd. Farmington Hills, MI
FAX #:
Project Number: 400-142-9307
Project Name: Corail-Botsford Yrd.
Project Location: Kalamazoo, MI
Sampler Signature: Craig Rupnow

Sample ID	Lab # (Lab use only)	# CONTAINERS	Volume/Amount	Matrix: WATER	Matrix: SOIL	Matrix: AIR	Matrix: SLUDGE	Matrix: OTHER	Method Preserved: HCl	Method Preserved: HNO3	Method Preserved: ICE	Method Preserved: NONE	Method Preserved: OTHER	Sampling: DATE	Sampling: TIME	BTEX (602/8020)	BTEX/TPH as Gasoline (602/8020/8015)	TPH as Diesel (8015 or 8270)	TPH as Jetfuel (8015 or 8270)	Total Oil & Grease (413.1)	Total Oil & Grease (413.2)	Total Petroleum Hydrocarbons (418.1)	EPA 601/8010 Chlorinated Comp.	EPA 602/8020	EPA 608/8080	EPA 608/8080-PCBs Only	EPA 624/8240	EPA 625/8270	CAM - 17 Metals	EPTOX - 8 Metals	EPA - Priority Pollutant Metals	LEAD(7420/7421/239.2)	ORGANIC LEAD	Finger Print by Sim. Dis.					PRIORITY ONE SERVICE (24 hr)	EXPEDITED SERVICE (2-4 days)	VERBALS/FAX	SPECIAL DETECTION LIMITS (SPECIFY)	SPECIAL REPORTING REQUIREMENTS
MW-3	-01	1	40ml					X				X		4-26	3:30								X											X									
MW-6	-02	1	40ml					X				X		4-26	3:40								X											X									
MW-7	-03	1	40ml					X				X		4-26	3:50								X											X									

Relinquished by:	Date	Time	Received by:
Craig Rupnow	4-26-89	4:15	
Relinquished by	Date	Time	Received by:
Relinquished by	Date	Time	Received by Laboratory:
	4/27/89	12:26	Tracy Townsend

Remarks:

9.3°

Lot# 3957

GC-8010

2535055115

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
400-142-9307

Work Order No.
M9-05-261

5/19/89
Submitted to: Craig Rupnow
Groundwater Technology
24168 Haggerty Rd.
Farmington Hills, MI 48024

Sample Identification:
The attached report covers free product samples taken on 4/26/89 at site 400-142-9307, Kalamazoo, Michigan.

Method:
Analysis was performed for PCB's by GC/ECD as per EPA Method 8080. Detection limits are listed on the report. Samples that are diluted in order to maintain the calibrated range are indicated by a footnote by which the MDL is raised.

Sampling and sample handling, preservation and extraction are specified by this laboratory to be as per EPA Method 8080.

Results:
Results are reported in ug/L (ppb).

Respectfully submitted,

Dave Reese
Extractable Organics Manager
DRR/sj

Report No.
400-142-9307

Work Order No.
M9-05-261

Semi-Volatile Organics Analysis

Sample No.	01
Sample ID.	MW-3
Date Sampled	4/26/89
Date Analyzed	5/15/89

Parameter	Concentration ug/L	Detection Limit
PCB-1221	ND	1.0
PCB-1232	ND	1.0
PCB-1242 (1016)	ND	0.65
PCB-1248	ND	1.0
PCB-1254	ND	1.0
PCB-1260	ND	1.0
	*1	

Notes: ND = Not Detected

*1 = Sample diluted by a factor of 25.

Dilution !
25X

GTEL

Report No.
400-142-9307

Work Order No.
M9-05-261

Semi-Volatile Organics Analysis

Sample No.	02
Sample ID.	MW-6
Date Sampled	4/26/89
Date Analyzed	5/15/89

Parameter	Concentration ug/L	Detection Limit
PCB-1221	ND	1.0
PCB-1232	ND	1.0
PCB-1242 (1016)	ND	0.65
PCB-1248	ND	1.0
PCB-1254	ND	1.0
PCB-1260	ND	1.0
	*1	

Notes: ND = Not Detected

*1 = Sample diluted by a factor of 25.

GTEL

Report No.
400-142-9307

Work Order No.
M9-05-261

Semi-Volatile Organics Analysis

Sample No.	03
Sample ID.	MW-7
Date Sampled	4/26/89
Date Analyzed	5/15/89

Parameter	Concentration ug/L	Detection Limit
PCB-1221	ND	1.0
PCB-1232	ND	1.0
PCB-1242 (1016)	ND	0.65
PCB-1248	ND	1.0
PCB-1254	ND	1.0
PCB-1260	ND	1.0
	*1	

Notes: ND = Not Detected

*1 = Sample diluted by a factor of 25.

GTEL

Manager: Craig Rupnow	Phone #: 313-471-2031
Address: 24168 Haggerty Rd. Farmington Hills, MI	FAX #:
Project Number: 400-142-9307	Project Name: Conrail-Botsford Yrd.
Project Location: Kalamazoo, MI	Sampler Signature: Craig Rupnow

Sample ID	Lab # (Lab use only)	# CONTAINERS	Volume/Amount	Matrix: WATER	SOIL	AIR	SLUDGE	OTHER	Method Preserved: HCl	HNO_3	ICE	NONE	OTHER	Sampling: DATE	TIME	BTEX (602/8020)	BTEX/TPH as Gasoline (602/8020/8015)	TPH as Diesel (8015 or 8270)	TPH as Jetfuel (8015 or 8270)	Total Oil & Grease (413.1)	Total Oil & Grease (413.2)	Total Petroleum Hydrocarbons (418.1)	EPA 601/8010 Chlorinated Comp.	EPA 602/8020	EPA 608/8080	EPA 608/8080-PCBs Only	EPA 624/8240	EPA 625/8270	CAM - 17 Metals	EPTOX - 8 Metals	EPA - Priority Pollutant Metals	LEAD(7420/7421/239.2)	ORGANIC LEAD	Finger Print by Sim. Dis					PRIORITY ONE SERVICE (24 hr)	EXPEDITED SERVICE (2-4 days)	VERBALS/FAX	SPECIAL DETECTION LIMITS (SPECIFY)	SPECIAL REPORTING REQUIREMENTS
W-3	-01	1	40ml					X				X		4-26	3:30								X											X									
-6	-02	1	40ml					X				X		4-26	3:40								X											X									
-7	-03	1	40ml					X				X		4-26	3:50								X											X									

Relinquished by:	Date	Time	Received by:
Craig Rupnow	4-26-89	4:15	
Relinquished by	Date	Time	Received by:
Relinquished by	Date	Time	Received by Laboratory:
	4/27/89	12:06	Tracy Townsend

Remarks:

9.3°

Lot# 3957

USA

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
400-142-9307

Work Order No.
M9-04-695

5/19/89
Submitted to:

Craig Rupnow
Groundwater Technology
24168 Haggerty Rd.
Farmington Hills, MI 48024

Sampling Date: 4/26/89
Site Location: Kalamazoo, MI

This reports the analysis of product samples 69501-69503 (MW-3, MW-6, MW-7) for a hydrocarbon fingerprint. This is a customized analysis which provides an identification of petroleum hydrocarbon contaminants in the sample on the basis of the boiling point range. A comparison of the composition vs boiling point range for samples and fuel standards provides the basis for identification. Samples are analyzed by gas chromatography with flame ionization detection.

Samples 69501-69503 were similar in composition and consisted primarily of hydrocarbons in the Fuel Oil #2 boiling range. However each sample contained residual material (data points at 600 degrees C for display purposes) with a boiling point above 540 degrees C.

Respectfully submitted,

Bob Edwards

Bob Edwards
Gas Chromatography Manager

Analyst: B.E.

SIMULATED DISTILLATION
ANALYTICAL DATA

REPORT 400 142 9307

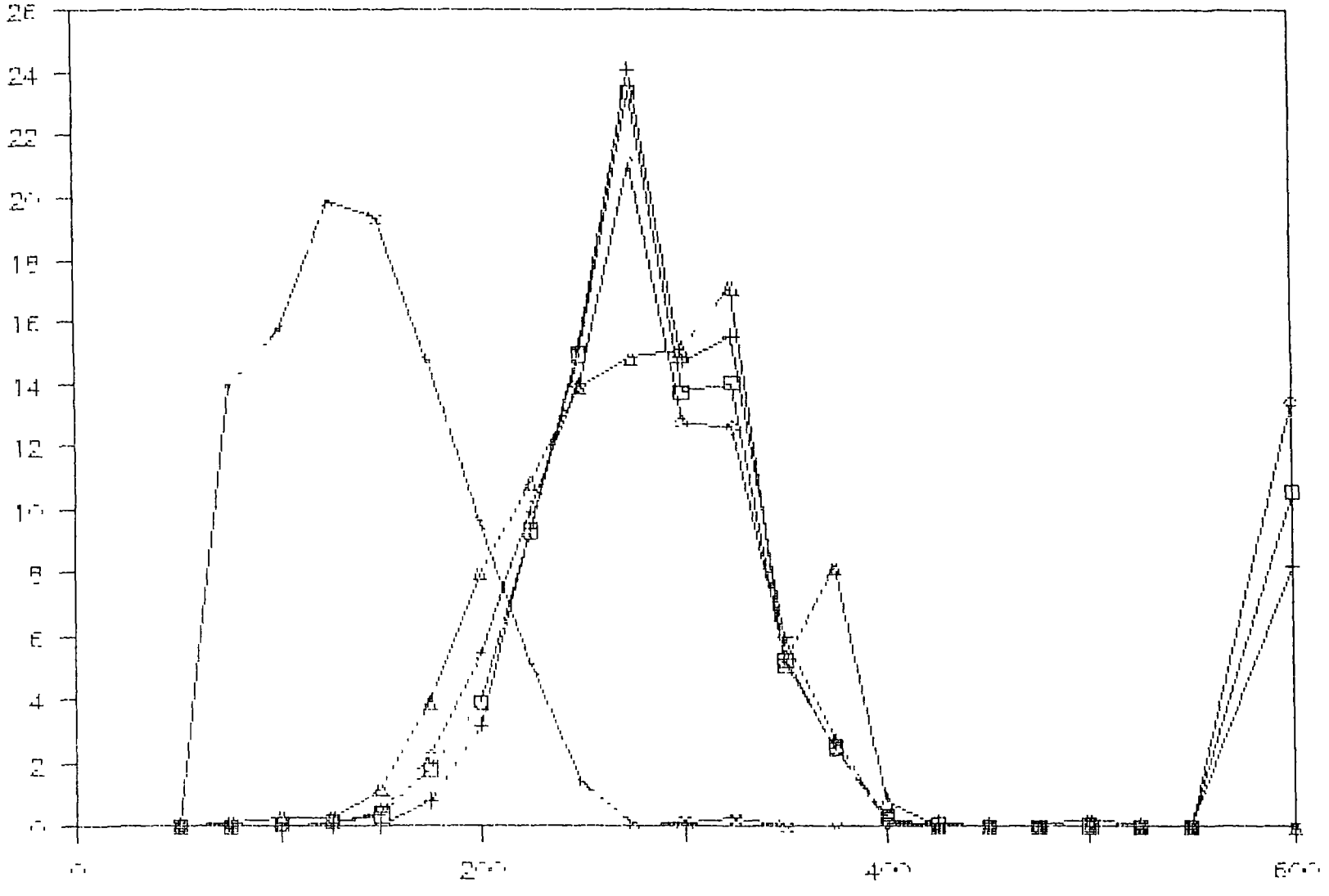
PERCENTAGE COMPOSITION

BP RANGE END POINT	SAMPLE # 69501	SAMPLE # 69502	SAMPLE # 69503	#2 FUEL OIL	GASOLINE
50	0.00	0.00	0.00	0.00	0.00
75	0.00	0.00	0.00	0.15	13.90
100	0.04	0.00	0.00	0.32	15.70
125	0.15	0.00	0.16	0.30	19.90
150	0.38	0.00	0.48	1.17	19.30
175	1.78	0.80	2.22	3.91	14.70
200	3.91	3.22	5.37	7.97	9.56
225	9.31	9.36	10.00	10.79	5.05
250	14.90	15.20	13.90	13.85	1.38
275	23.40	24.10	21.10	14.78	0.07
300	13.70	14.70	12.70	15.07	0.16
325	14.00	15.50	12.60	17.12	0.28
350	5.24	5.96	5.37	5.14	0.00
375	2.44	2.75	2.42	8.18	0.00
400	0.26	0.22	0.09	0.81	0.00
425	0.05	0.11	0.00	0.01	0.00
450	0.00	0.00	0.00	0.08	0.00
475	0.02	0.00	0.00	0.00	0.00
500	0.00	0.00	0.00	0.26	0.00
525	0.00	0.00	0.00	0.08	0.00
550	0.00	0.00	0.00	0.00	0.00
600	10.5	8.19	13.4	0.00	0.00
TOTAL	100	100	99.8	99.99	100

GTEL ENVIRONMENTAL

SIMULATED DISTILLATION

REPORT 400 142 9300



+ 69502 — 69503 △ FUEL OIL #2 ◇ GASOLINE

□ 69501

GTEL ENVIRONMENTAL

GTEL ENVIRONMENTAL LABORATORIES INC

4080 C Pike Lane
Concord, CA 94520
415-685-7852

800-544-3422 (In CA)
800-423-7143 (Outside CA)

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Craig Rupnow
Phone #: 313-471-2031
Address: 24168 Haggerty Rd. Farmington Hills, MI
FAX #:
Project Number: 400-142-9307
Project Name: Conrail-Botsford Yrd.
Project Location: Kalamazoo, MI
Sampler Signature: Craig Rupnow

Sample ID	Lab # (Lab use only)	# CONTAINERS	Volume/Amount	Matrix: WATER	Matrix: SOIL	Matrix: AIR	Matrix: SLUDGE	Matrix: OTHER	Method Preserved: HCl	Method Preserved: HNO3	Method Preserved: ICE	Method Preserved: NONE	Method Preserved: OTHER	Sampling: DATE	Sampling: TIME	BTEX (602/8020)	BTEX/TPH as Gasoline (602/8020/8015)	TPH as Diesel (8015 or 8270)	TPH as Jetfuel (8015 or 8270)	Total Oil & Grease (413 1)	Total Oil & Grease (413 2)	Total Petroleum Hydrocarbons (418.1)	EPA 601/8010 Chlorinated Comp.	EPA 602/8020	EPA 608/8080	EPA 608/8080-PCBs Only	EPA 624/8240	EPA 625/8270	CAM - 17 Metals	EPTOX - 8 Metals	EPA - Priority Pollutant Metals	LEAD(7420/7421/239 2)	ORGANIC LEAD	Finger Print by Sim. Dis.	PRIORITY ONE SERVICE (24 hr)	EXPEDITED SERVICE (2-4 days)	VERBALS/FAX	SPECIAL DETECTION LIMITS (SPECIFY)	SPECIAL REPORTING REQUIREMENTS
W-3	-01	1	40ml					X				X		4-26	3:30								X											X					
W-6	-02	1	40ml					X				X		4-26	3:40								X											X					
W-7	-03	1	40ml					X				X		4-26	3:50								X											X					

Relinquished by:	Date	Time	Received by:
Craig Rupnow	4-26-89	4:15	
Relinquished by	Date	Time	Received by:
Relinquished by	Date	Time	Received by Laboratory:
	4/27/89	12:05	Tracy Townsend

Remarks:

9.3°

Lot# 3957

[illegible] SMDISP 2535055165

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Project Number: 400-142-9307
Work Order Number: M9-12-147

December 18, 1989

Craig Rupnow
Groundwater Technology, Inc.
23933 Research Drive
Farmington Hills, MI 48024

Dear Mr. Rupnow:

Attached please find the analytical results for the samples received by GTEL on 12/06/89. The samples were received and analyzed as indicated on chain of custody number 21251, which is attached.

GTEL maintains a formal quality assurance program to ensure the integrity of the analytical results. All quality assurance criteria were achieved during the analysis unless otherwise noted in the footnotes to the analytical report.

The specific analytical methods used and cited in this report are approved by state and federal regulatory agencies

If you have any questions regarding this analysis, or if we may service any additional analytical needs, please give us a call.

Sincerely,

GTEL Environmental Laboratories, Inc

Bob Edwards
Gas Chromatography Manager

Project Number 400-142-9307
Work Order Number M9-12-147

Table 1

ANALYTICAL RESULTS

Total Petroleum Hydrocarbons as Diesel in Soil
Modified EPA Method 8015[a]

Sample Identification		Date Extracted	Date Analyzed	Concentration, mg/kg	Percent Solids (%)	Detection Limit mg/kg
GTEL No.	Client ID					
01	MW-11	12/07/89	12/12/89	2100	85 1	10

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986, Methylene chloride sonication by EPA Method 3550, modification as per California State Water Resources Control Board LUFT Manual protocols, May 1988 revision Concentration calculated on a dry weight basis

GTEL ENVIRONMENTAL LABORATORIES INC

Meadow Industrial Park
Milford New Hampshire 03055
(603) 672-4835

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

No. 21251

CUSTODY RECORD

Project Manager: Craig Rupnow
Phone #: 313-473-0720
Address (Office): 23933 Research Dr. Farmington Hills, MI 48024
Site Location: Kalamazoo, MI
Project Number: 400-142-9307 / 4000-9307-01
Project Name: Conrail-Botsford Yard
I attest that the proper field sampling procedures were used during the collection of these samples
Sampler Name (Print): Craig Rupnow

ANALYSIS REQUEST

Field Sample ID	Source of Sample	GTEL Lab # (Lab use only)	# CONTAINERS	Matrix: WATER	Matrix: SOIL	Matrix: AIR	Matrix: SLUDGE	Matrix: OTHER (Specify)	Method Preserved: HCl	Method Preserved: HNO_3	Method Preserved: H_2SO_4	Method Preserved: ICE	Method Preserved: NONE	Method Preserved: OTHER (Specify)	Sampling: DATE	Sampling: TIME	Gas Hydrocarbons by 602 ☐ 8020 ☐ with MTBE ☐	BTEX only by 602 ☐ 8020 ☐ with MTBE ☐	EDB by 504 ☐	Oil and Grease 413 1 ☐ 413 2 ☐ 503B+D ☐	TPH 418 1 ☐ 503B D+E ☐ by GC ☐	EPA 503 1 ☐ 502 2 ☐	EPA 601 ☐ 8010 ☐ DCA only ☐	EPA 602 ☐ 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624 ☐ 8240 ☐ NBS(+15) ☐	EPA BNA 625 ☐ 8270 ☐ NBS(+25) ☐	EPA 625 BN only ☐ 8270 BN only ☐ NBS(+15) ☐	EPA 625 AE only ☐ 8270 AE only ☐ NBS(+10) ☐	EPA 610 ☐ 8310 ☐	EPTOX - Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi VOA ☐	EPA Metals - Priority Pollutant ☐ HSL ☐ RCRA ☐	LEAD 239 2 ☐ 200 7 ☐ 7420 ☐ 6010 ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	Product ID by GC (SimDis) ☐	OTHER: TPH as Diesel			
MW-11	Split Spoon Composite		1		X							X			12/5/89	1315																				X			

Received by: Date 12/5/89 Time 1330
Received by: Date Time
Received by Laboratory: Date Time

SPECIAL HANDLING

EXPEDITED (48 hrs) ☐
SEVEN BUSINESS DAYS ☐
OTHER ___ BUSINESS DAYS ☐
QA/QC Red Level ☐ Blue Level ☐
FAX ☒

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)

REMARKS

5 5°

LAB USE ONLY
Lot #
Storage Location 22BB
Work Order #

Relinquished by Sampler
Relinquished by
Relinquished by

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Project Number 400-142-9307
Work Order Number: M9-12-112

December 15, 1989

Craig Rupnow
Groundwater Technology, Inc.
23933 Research Drive
Farmington Hills, MI 48024

Dear Mr. Rupnow:

Attached please find the analytical results for the samples received by GTEL on 12/05/89. The samples were received and analyzed as indicated on chains of custody numbers 21225, 21231, 21232 and 21233, which are attached

GTEL maintains a formal quality assurance program to ensure the integrity of the analytical results. All quality assurance criteria were achieved during the analysis unless otherwise noted in the footnotes to the analytical report.

The specific analytical methods used and cited in this report are approved by state and federal regulatory agencies

If you have any questions regarding this analysis, or if we may service any additional analytical needs, please give us a call

Sincerely,

GTEL Environmental Laboratories, Inc

Bob Edwards
Gas Chromatography Manager

Project Number 400-142-9307
Work Order Number M9-12-112

Table 1

ANALYTICAL RESULTS

Total Petroleum Hydrocarbons as Diesel in Soil
Modified EPA Method 8015[a]

Sample Identification		Date Extracted	Date Analyzed	Concentration, mg/kg	Percent Solids (%)	Detection Limit mg/kg
GTEL No.	Client ID					
01	MW-10	12/07/89	12/08/89	< 10	84	10
02	MW-12	12/07/89	12/12/89	2400	87	100
03	MW-13	12/07/89	12/12/89	9700	93	100
04	MW-14	12/07/89	12/08/89	940	79	10
05	MW-15	12/07/89	12/08/89	< 10	88	10
06	MW-16	12/07/89	12/08/89	< 10	82	10
07	MW-17	12/07/89	12/08/89	< 10	85	10
08	MW-18	12/07/89	12/12/89	3300	90	100
09	MW-19	12/07/89	12/08/89	< 10	76	10
10	MW-20	12/07/89	12/08/89	720	80	10
11	MW-21	12/07/89	12/08/89	< 10	67	10

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986, Methylene chloride extraction by EPA Method 3550, modification as per California State Water Resources Control Board LUFT Manual protocols, May 1988 revision Concentration calculated on a dry weight basis

What depths?

GTEL ENVIRONMENTAL LABORATORIES, INC

Meadowbrook Industrial Park
Milford, New Hampshire 03055
(603) 672-4835

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

No. 21225

Project Manager: Craig Rupnow
Phone #: 313-473-0720
Address (Office): 23933 Research Dr. Farmington Hills, MI 48024
Site Location: Kalamazoo, MI
Project Number: 400-142-9307/4000-9307-01
Project Name: Conrail-Botsford Yard
I attest that the proper field sampling procedures were used during the collection of these samples
Sampler Name (Print): Sam Kitchen

ANALYSIS REQUEST

Field Sample ID	Source of Sample	GTEL Lab # (Lab use only)	# CONTAINERS	Matrix: WATER	Matrix: SOIL	Matrix: AIR	Matrix: SLUDGE	Matrix: OTHER (Specify)	Method Preserved: HCl	Method Preserved: HNO_3	Method Preserved: H_2SO_4	Method Preserved: ICE	Method Preserved: NONE	Method Preserved: OTHER (Specify)	Sampling: DATE	Sampling: TIME	Gas Hydrocarbons by 602 ☐ 8020 ☐ with MTBE ☐	BTEX only by 602 ☐ 8020 ☐ with MTBE ☐	EDB by 504 ☐	Oil and Grease 413.1 ☐ 413.2 ☐ 503B+D ☐	TPH 418.1 ☐ 503B,D+E ☐ by GC ☐	EPA 503.1 ☐ 502.2 ☐	EPA 601 ☐ 8010 ☐ DCA only ☐	EPA 602 ☐ 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624 ☐ 8240 ☐ NBS(+15) ☐	EPA BNA 625 ☐ 8270 ☐ NBS(+25) ☐	EPA 625 BN only ☐ 8270 BN only ☐ NBS(+15) ☐	EPA 625 AE only ☐ 8270 AE only ☐ NBS(+10) ☐	EPA 610 ☐ 8310 ☐	EPTOX - Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi VOA ☐	EPA Metals - Priority Pollutant ☐ HSL ☐ RCRA ☐	LEAD 239.2 ☐ 200.7 ☐ 7420 ☐ 6010 ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	Product ID by GC (SimDis) ☐	OTHER: TPH as Diesel			
MW-10	Split Spoon Composite		1		X							X			12/4/89	1600																				X			
MW-11	↓		1		X							X			↓	1610																				X			
MW-12	↓		1		X							X			↓	1620																				X			

CUSTODY RECORD

Received by:	Date	Time	Received by Laboratory	Date	Time	Way bill #
Received by:	12-4-89	19:00	Received by Laboratory: [signature]	12.05.89	12:05	Fedex

Relinquished by Sampler: [signature]
Relinquished by
Relinquished by

SPECIAL HANDLING

EXPEDITED (48 hrs) ☐
SEVEN BUSINESS DAYS ☐
OTHER __ BUSINESS DAYS ☐
QA/QC Red Level ☐ Blue Level ☐
FAX ☒

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)

REMARKS 2.7

LAB USE ONLY
Lot #
Storage Location 22LA
Work Order #

GTEL ENVIRONMENTAL LABORATORIES INC

Meadowbrook Industrial Park
Milford, New Hampshire 03055
(603) 672-4835

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

No. 21231

Project Manager: Craig Rupnow
Phone #: 313-473-0720
Address (Office): 23933 Research Dr. Farmington Hills, MI 48024
Site Location: Kalamazoo, MI
Project Number: 400-142-9307/4000-9307-01
Project Name: Conrail - Botsford Yard
I attest that the proper field sampling procedures were used during the collection of these samples
Sampler Name (Print): Sam Kitchen

Field Sample ID	Source of Sample	GTEL Lab # (Lab use only)	# CONTAINERS	Matrix: WATER	Matrix: SOIL	Matrix: AIR	Matrix: SLUDGE	Matrix: OTHER (Specify)	Method Preserved: HCl	Method Preserved: HNO_3	Method Preserved: H_2SO_4	Method Preserved: ICE	Method Preserved: NONE	Method Preserved: OTHER (Specify)	Sampling: DATE	Sampling: TIME	Gas Hydrocarbons by 602 ☐ 8020 ☐ with MTBE ☐	BTEX only by 602 ☐ 8020 ☐ with MTBE ☐	EDB by 504 ☐	Oil and Grease 413 1 ☐ 413 2 ☐ 503B+D ☐	TPH 418 1 ☐ 503B D+E ☐ by GC ☐	EPA 503 1 ☐ 502 2 ☐	EPA 601 ☐ 8010 ☐ DCA only ☐	EPA 602 ☐ 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624 ☐ 8240 ☐ NBS(+15) ☐	EPA BNA 625 ☐ 8270 ☐ NBS(+25) ☐	EPA 625 BN only ☐ 8270 BN only ☐ NBS(+15) ☐	EPA 625 AE only ☐ 8270 AE only ☐ NBS(+10) ☐	EPA 610 ☐ 8310 ☐	EPTOX - Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi VOA ☐	EPA Metals - Priority Pollutant ☐ HSL ☐ RCRA ☐	LEAD 239.2 ☐ 200 7 ☐ 7420 ☐ 6010 ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	Product ID by GC (SimDis) ☐	OTHER: TPH as Diesel			
MW-13	Split Spoon Composite		1		X							X			12/4/89	1630																					X			
MW-14	↓		1		X							X				1640																					X			
MW-15	↓		1		X							X				1650																					X			

SPECIAL HANDLING
EXPEDITED (48 hrs) ☐
SEVEN BUSINESS DAYS ☐
OTHER __ BUSINESS DAYS ☐
QA/QC Red Level ☐ Blue Level ☐
FAX ☒

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)

REMARKS: 5°

LAB USE ONLY
Lot #
Storage Location: 22 ~~TA~~ LA
Work Order #

CUSTODY RECORD

Received by	Date	Received by	Date	Received by Laboratory	Date	Time	Way bill #
	12-1-89	19:00		12/5/89	11 55		Fedex

Relinquished by Sampler: Sam Kitchen
Relinquished by
Relinquished by

GTEL ENVIRONMENTAL LABORATORIES INC

Meadow Brook Industrial Park
Milford New Hampshire 03055
(603) 672-4835

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

No. 21232

Project Manager: Craig Rupnow
Phone #: 313-473-0720
Address (Office): 23933 Research Dr. Farmington Hills, MI 48024
Site Location: Kalamazoo, MI
Project Number: 400-142-9307 / 4000-9307-01
Project Name: Conrail-Botsford Yard
I attest that the proper field sampling procedures were used during the collection of these samples
Sampler Name (Print): Sam Kitchen

Field Sample ID	Source of Sample	GTEL Lab # (Lab use only)	# CONTAINERS	Matrix: WATER	Matrix: SOIL	Matrix: AIR	Matrix: SLUDGE	Matrix: OTHER (Specify)	Method Preserved: HCl	Method Preserved: HNO_3	Method Preserved: H_2SO_4	Method Preserved: ICE	Method Preserved: NONE	Method Preserved: OTHER (Specify)	Sampling: DATE	Sampling: TIME	Gas Hydrocarbons by 602 ☐ 8020 ☐ with MTBE ☐	BTEX only by 602 ☐ 8020 ☐ with MTBE ☐	EDB by 504 ☐	Oil and Grease 413 1 ☐ 413 2 ☐ 503B+D ☐	TPH 418 1 ☐ 503B,D+E ☐ by GC ☐	EPA 503 1 ☐ 502 2 ☐	EPA 601 ☐ 8010 ☐ DCA only ☐	EPA 602 ☐ 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624 ☐ 8240 ☐ NBS(+15) ☐	EPA BNA 625 ☐ 8270 ☐ NBS(+25) ☐	EPA 625 BN only ☐ 8270 BN only ☐ NBS(+15) ☐	EPA 625 AE only ☐ 8270 AE only ☐ NBS(+10) ☐	EPA 610 ☐ 8310 ☐	EPTOX - Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi VOA ☐	EPA Metals - Priority Pollutant ☐ HSL ☐ RCRA ☐	LEAD 239.2 ☐ 200 7 ☐ 7420 ☐ 6010 ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	Product ID by GC (SimDis) ☐	OTHER: TPH as Diesel			
MW-16	Split Spoon Composite		1		X							X			12/4/89	1700																					X			
MW-17	↓		1		X							X			↓	1710																					X			
MW-18	↓		1		X							X			↓	1720																					X			

SPECIAL HANDLING
EXPEDITED (48 hrs) ☐
SEVEN BUSINESS DAYS ☐
OTHER. __ BUSINESS DAYS ☐
QA/QC Red Level ☐ Blue Level ☐
FAX ☒

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)

REMARKS

2.8 cc

LAB USE ONLY
Lot #
Storage Location 22LA
Work Order #

STO RECORD

Received by: Date 12-4-89 Time 19 00
Received by: Date Time
Received by Laboratory: Date Time
Relinquished by Sampler: Sam Kitchen
Relinquished by

GTEL ENVIRONMENTAL LABORATORIES INC

Mead[illegible]k Industrial Park
Milford, Ne[illegible] Hampshire 03055
(603) 672-4835

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

No. 21233

Project Manager: Craig Rupnow
Phone # 313-473-0720
Address (Office): 23933 Research Dr. Farmington Hills, MI 48024
Site Location. Kalamazoo, MI
Project Number. 400-142-9307/4000-9307-01
Project Name. Conrail-Botsford Yard
I attest that the proper field sampling procedures were used during the collection of these samples
Sampler Name (Print). Sam Kitchen

Field Sample ID	Source of Sample	GTEL Lab # (Lab use only)	# CONTAINERS	Matrix: WATER	Matrix: SOIL	Matrix: AIR	Matrix: SLUDGE	Matrix: OTHER (Specify)	Method Preserved: HCl	Method Preserved: HNO_3	Method Preserved: H_2SO_4	Method Preserved: ICE	Method Preserved: NONE	Method Preserved: OTHER (Specify)	Sampling: DATE	Sampling: TIME	Gas Hydrocarbons by 602 ☐ 8020 ☐ with MTBE ☐	BTEX only by 602 ☐ 8020 ☐ with MTBE ☐	EDB by 504 ☐	Oil and Grease 413.1 ☐ 413.2 ☐ 503B+D ☐	TPH 418.1 ☐ 503B,D+E ☐ by GC ☐	EPA 503.1 ☐ 502.2 ☐	EPA 601 ☐ 8010 ☐ DCA only ☐	EPA 602 ☐ 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624 ☐ 8240 ☐ NBS(+15) ☐	EPA BNA 625 ☐ 8270 ☐ NBS(+25) ☐	EPA 625 BN only ☐ 8270 BN only ☐ NBS(+15) ☐	EPA 625 AE only ☐ 8270 AE only ☐ NBS(+10) ☐	EPA 610 ☐ 8310 ☐	EPTOX - Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi VOA ☐	EPA Metals - Priority Pollutant ☐ HSL ☐ RCRA ☐	LEAD 239.2 ☐ 200.7 ☐ 7420 ☐ 6010 ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	Product ID by GC (SimDis) ☐	OTHER: TPH as Diesel			
MW-19	Split Spoon Composite		1		X							X			12/4/89	1730																					X			
MW-20	↓		1		X							X			↓	1740																					X			
MW-21	↓		1		X							X			↓	1750																					X			

CUSTODY RECORD

Received by:	Received by:	Received by Laboratory	Way bill #
Date 12-4-89	Date	Date 12-5-89	
Time 19:00	Time	Time 11:45	

Relinquished by Sampler: Sam Kitchen
Relinquished by:
Relinquished by

SPECIAL HANDLING

EXPEDITED (48 hrs) ☐
SEVEN BUSINESS DAYS ☐
OTHER __ BUSINESS DAYS ☐
QA/QC Red Level ☐ Blue Level ☐
FAX ☒

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)

REMARKS

32 ~~[illegible]~~ 5°
LA

LAB USE ONLY
Lot #
Storage Location
Work Order #

GTEL
ENVIRONMENTAL
LABORATORIES, INC

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Project Number: 400-142-9307
Work Order Number: M9-12-185

December 27, 1989

Craig Rupnow
Groundwater Technology, Inc.
23933 Research Dr.
Farmington Hills, MI 48024

Dear Mr. Rupnow:

Attached please find the analytical results for the samples received by GTEL on 12/07/89. The samples were received and analyzed as indicated on chain of custody number 21241, which is attached.

GTEL maintains a formal quality assurance program to ensure the integrity of the analytical results. All quality assurance criteria were achieved during the analysis unless otherwise noted in the footnotes to the analytical report.

The specific analytical methods used and cited in this report are approved by state and federal regulatory agencies.

If you have any questions regarding this analysis, or if we may service any additional analytical needs, please give us a call.

Sincerely,

GTEL Environmental Laboratories, Inc.

Bob Edwards
Gas Chromatography Manager

Project Number: 400-142-9307
Work Order Number: M9-12-185

Table 1

ANALYTICAL RESULTS

Total Petroleum Hydrocarbons as Gasoline in Water
Modified EPA Method 8015[a]

Sample Identification		Date Extracted	Date Analyzed	Concentration, ug/L[b]	Dilution Factor
GTEL No.	Client ID				
01	MW-1	12/13/89	12/14/89	< 10	1
02	MW-17	12/13/89	12/14/89	< 10	1
03	MW-19	12/13/89	12/14/89	< 10	1
04	MW-15	12/13/89	12/14/89	< 10	1
05	MW-20	12/13/89	12/14/89	< 10	1
06	MW-4	12/13/89	12/14/89	< 10	1
07	MW-5	12/13/89	12/15/89	< 10	1
08	MW-21	12/13/89	12/14/89	< 10	1
09	STANDARD	12/14/89	12/15/89	C	--
10	EQUIPMENT BLANK	12/13/89	12/14/89	< 10	1

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986, Methylene chloride extraction by EPA Method 3510 (liquid-liquid); modification as per California Water Resources Control Board LUFT Manual protocols, May 1988 revision.

b Method detection limit = 10 ug/L; analyte below this level would not be detected.

C Sample 09 is a product sample containing contaminants in the diesel region. Based on percent composition, the sample contains 100% diesel.

Project Number: 400-142-9307
Work Order Number: M9-12-185

Table 2

ANALYTICAL RESULTS

Total Petroleum Hydrocarbons as Diesel in Water
Modified EPA Method 8015[a]

Sample Identification		Date Extracted	Date Analyzed	Concentration, ug/L[b]	Dilution Factor
GTEL No.	Client ID				
01	MW-1	12/13/89	12/14/89	< 10	1
02	MW-17	12/13/89	12/14/89	< 10	1
03	MW-19	12/13/89	12/14/89	4900	1
04	MW-15	12/13/89	12/14/89	< 10	1
05	MW-20	12/13/89	12/14/89	15000	1
06	MW-4	12/13/89	12/14/89	3400	1
07	MW-5	12/13/89	12/15/89	6500	1
08	MW-21	12/13/89	12/14/89	< 10	1
09	STANDARD	12/14/89	12/15/89	C	--
10	EQUIPMENT BLANK	12/13/89	12/14/89	< 10	1

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986, Methylene chloride extraction by EPA Method 3510 (liquid-liquid); modification as per California Water Resources Control Board LUFT Manual protocols, May 1988 revision

b Method detection limit = 10 ug/L; analyte below this level would not be detected

C Sample 09 is a product sample containing contaminants in the diesel region. Based on percent composition, the sample contains 100% diesel

Project Number. 400-142-9307
Work Order Number· M9-12-185

Table 3

ANALYTICAL RESULTS

Total Petroleum Hydrocarbons as Mineral Spirits in Water
Modified EPA Method 8015[a]

Sample Identification		Date Extracted	Date Analyzed	Concentration, ug/L[b]	Dilution Factor
GTEL No.	Client ID				
01	MW-1	12/13/89	12/14/89	< 10	1
02	MW-17	12/13/89	12/14/89	< 10	1
03	MW-19	12/13/89	12/14/89	< 10	1
04	MW-15	12/13/89	12/14/89	< 10	1
05	MW-20	12/13/89	12/14/89	< 10	1
06	MW-4	12/13/89	12/14/89	< 10	1
07	MW-5	12/13/89	12/15/89	< 10	1
08	MW-21	12/13/89	12/14/89	< 10	1
09	STANDARD	12/14/89	12/15/89	C	--
10	EQUIPMENT BLANK	12/13/89	12/14/89	< 10	1

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986, Methylene chloride extraction by EPA Method 3510 (liquid-liquid); modification as per California Water Resources Control Board LUFT Manual protocols, May 1988 revision.

b Method detection limit = 10 ug/L; analyte below this level would not be detected

C Sample 09 is a product sample containing contaminants in diesel region. Based on percent composition, the sample contains 100% diesel.

Project Number: 400-142-9307
Work Order Number: M9-12-185

Table 4

ANALYTICAL RESULTS

Total Petroleum Hydrocarbons as Kerosene in Water
Modified EPA Method 8015[a]

Sample Identification		Date Extracted	Date Analyzed	Concentration, ug/L[b]	Dilution Factor
GTEL No.	Client ID				
01	MW-1	12/13/89	12/14/89	< 10	1
02	MW-17	12/13/89	12/14/89	< 10	1
03	MW-19	12/13/89	12/14/89	< 10	1
04	MW-15	12/13/89	12/14/89	< 10	1
05	MW-20	12/13/89	12/14/89	< 10	1
06	MW-4	12/13/89	12/14/89	< 10	1
07	MW-5	12/13/89	12/15/89	< 10	1
08	MW-21	12/13/89	12/14/89	< 10	1
09	STANDARD	12/14/89	12/15/89	C	--
10	EQUIPMENT BLANK	12/13/89	12/14/89	< 10	1

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Methylene chloride extraction by EPA Method 3510 (liquid-liquid); modification as per California Water Resources Control Board LUFT Manual protocols, May 1988 revision.

b Method detection limit = 10 ug/L; analyte below this level would not be detected.

C Sample 09 is a product sample containing contaminants in diesel region Based on percent composition, the sample contains 100% diesel

Project Number: 400-142-9307
Work Order Number: M9-12-185

Table 5

ANALYTICAL RESULTS

Total Petroleum Hydrocarbons as Fuel Oil #6 in Water
Modified EPA Method 8015[a]

Sample Identification		Date Extracted	Date Analyzed	Concentration, ug/L[b]	Dilution Factor
GTEL No.	Client ID				
01	MW-1	12/13/89	12/14/89	< 10	1
02	MW-17	12/13/89	12/14/89	< 10	1
03	MW-19	12/13/89	12/14/89	< 10	1
04	MW-15	12/13/89	12/14/89	< 10	1
05	MW-20	12/13/89	12/14/89	< 10	1
06	MW-4	12/13/89	12/14/89	< 10	1
07	MW-5	12/13/89	12/15/89	< 10	1
08	MW-21	12/13/89	12/14/89	< 10	1
09	STANDARD	12/14/89	12/15/89	C	--
10	EQUIPMENT BLANK	12/13/89	12/14/89	< 10	1

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Methylene chloride extraction by EPA Method 3510 (liquid-liquid); modification as per California Water Resources Control Board LUFT Manual protocols, May 1988 revision

b Method detection limit = 10 ug/L; analyte below this level would not be detected.

C Sample 09 is a product sample containing contaminants in diesel region Based on percent composition, the sample contains 100% diesel.

Project Number: 400-142-9307
Work Order Number: M9-12-185

Table 6

ANALYTICAL RESULTS

Total Petroleum Hydrocarbons as Lube Oil in Water
Modified EPA Method 8015[a]

Sample Identification		Date Extracted	Date Analyzed	Concentration, ug/L[b]	Dilution Factor
GTEL No.	Client ID				
01	MW-1	12/13/89	12/14/89	< 10	1
02	MW-17	12/13/89	12/14/89	< 10	1
03	MW-19	12/13/89	12/14/89	< 10	1
04	MW-15	12/13/89	12/14/89	< 10	1
05	MW-20	12/13/89	12/14/89	< 10	1
06	MW-4	12/13/89	12/14/89	< 10	1
07	MW-5	12/13/89	12/15/89	< 10	1
08	MW-21	12/13/89	12/14/89	< 10	1
09	STANDARD	12/14/89	12/15/89	C	--
10	EQUIPMENT BLANK	12/13/89	12/14/89	< 10	1

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986, Methylene chloride extraction by EPA Method 3510 (liquid-liquid); modification as per California Water Resources Control Board LUFT Manual protocols, May 1988 revision.
b Method detection limit = 10 ug/L; analyte below this level would not be detected.
C Sample 09 is a product sample containing contaminants in diesel region. Based on percent composition, the sample contains 100% diesel

GTEL ENVIRONMENTAL LABORATORIES INC

Meadowbrook Industrial Park
Milford, New Hampshire 03055
(603) 672-4835

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

No. 21241

Project Manager: Craig Rupnow
Phone #: (313) 473-0720
FAX #: (313) 473-0892

Address (Office): 23933 Research Farmington Hills, MI 48024
Site Location: Kalamazoo, MI

Project Number: 4000-9307-01 400-142-9307
Project Name: Conrail-Botsford Yard

I attest that the proper field sampling procedures were used during the collection of these samples
Sampler Name (Print): Sam Kitchin

ANALYSIS REQUEST

Field Sample ID	Source of Sample	GTEL Lab # (Lab use only)	# CONTAINERS	Matrix: WATER	SOIL	AIR	SLUDGE	OTHER (Specify)	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	NONE	OTHER (Specify)	Sampling: DATE	TIME	Gas Hydrocarbons by 602 ☐ 8020 ☐ with MTBE ☐	BTEX only by 602 ☐ 8020 ☐ with MTBE ☐	EDB by 504 ☐	Oil and Grease 413.1 ☐ 413.2 ☐ 503B+D ☐	TPH 418.1 ☐ 503B D+E ☐ by GC ☐	EPA 503.1 ☐ 502.2 ☐	EPA 601 ☐ 8010 ☐ DCA only ☐	EPA 602 ☐ 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624 ☐ 8240 ☐ NBS(+15) ☐	EPA BNA 625 ☐ 8270 ☐ NBS(+25) ☐	EPA 625 BN only ☐ 8270 BN only ☐ NBS(+15) ☐	EPA 625 AE only ☐ 8270 AE only ☐ NBS(+10) ☐	EPA 610 ☐ 8310 ☐	EPTOX - Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi VOA ☐	EPA Metals - Priority Pollutant ☐ HSL ☐ RCRA ☐	LEAD 239.2 ☐ 200.7 ☐ 7420 ☐ 6010 ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	Product ID by GC (SimDis) ☐	OTHER: TPH as product
MW-1	teflon bailer	01	2	X							X	X			12-6-89	13:15																						X
MW-17	teflon bailer	02	2	X							X	X			12-6	13:30																						X
MW-19	teflon bailer	03	2	X							X	X			12-6	13:40																						X
MW-15	teflon bailer	04	2	X							X	X			12-6	13:50																						X
MW-20	teflon bailer	05	2	X							X	X			12-6	14:00																						X
MW-4	teflon bailer	06	2	X							X	X			12-6	14:15																						X
MW-5	teflon bailer	07	2	X							X	X			12-6	14:30																						X
MW-21	teflon bailer	08	2	X							X	X			12-6	14:45																						X
standard	acrylic bailer	09	1					oil				X	X		12-6	11:25																						X
Equip. blank	teflon bailer	10	1	X							X	X			12-6	14:50																						X

SPECIAL HANDLING

EXPEDITED (48 hrs) ☐
SEVEN BUSINESS DAYS ☐
OTHER __ BUSINESS DAYS ☐
QA/QC Red Level ☐ Blue Level ☐
FAX ☐

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)

REMARKS: All samples contained in 1L bottles except standard which is contained in a 40 ml vial. Samples suspected to have high values.

1.3°

LAB USE ONLY
Lot #
Storage Location #19
Work Order #

CUSTODY RECORD

Relinquished by Sampler	Received by	Relinquished by	Received by Laboratory	Relinquished by
Sam Kitchin				
Date 12-6-89	Date 12-6-89	Date 12-7-89	Date 12-7-89	Date 12-7-89
Time 17:00	Time 17:00	Time 1:00	Time 1:00	Time 1:00

Way bill # Sedex

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northwest Region
4080 Pike Lane
Concord CA 94520
(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*

02/14/90 sp

WORK ORD#: D002083
CLIENT: CRAIG RUPNOW
GROUNDWATER TECHNOLOGY, INC.
23933 RESEARCH DRIVE
FARMINGTON HILLS, MI 48024
PROJECT#: 4000-9307-01
LOCATION: KALAMAZOO, MI

SAMPLED: 01/31/90 BY: T. BERTRAM
RECEIVED: 02/02/90 BY: K. FILLINGER
ANALYZED: 02/13/90 BY: R. CONDIT
MATRIX: WATER
UNITS: ug/L (ppb)

TEST RESULTS

PARAMETER	MDL	SAMPLE # I.D.	01 S2-B			
Total Petroleum Hydrocarbons as Gasoline	10		<10			
Total Petroleum Hydrocarbons as Diesel	10		3800*			
Total Petroleum Hydrocarbons as Waste Oil	100		<100			

MDL = Method Detection Limit; compound below this level would not be detected.
Results rounded to two significant figures.

METHOD: Modified EPA 8015

* Biodegradaded diesel fuel

EMMA P. POPEK, Laboratory Director

GTEL
ENVIRONMENTAL
LABORATORIES, INC

Northwest Region
4080 Pike Lane
Concord CA 94520
(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*

02/12/90 sp

WORK ORD#: D002082
CLIENT: CRAIG RUPNOW
GROUNDWATER TECHNOLOGY, INC.
23933 RESEARCH DRIVE
FARMINGTON HILLS, MI 48024
PROJECT#: 4000-9307.01
LOCATION: KALAMAZOO, MI

SAMPLED: 01/31/90 BY: T. BERTRAM
RECEIVED: 02/02/90 BY: K. FILLINGER
ANALYZED: 02/06/90 BY: M. LY
MATRIX: WATER
UNITS: ug/L (ppb)

TEST RESULTS

COMPOUND	MDL	LAB # / I.D.#	01 / S2-A		
Benzene	0.5		17		
Bromodichloromethane	0.5		<0.5		
Bromoform	0.5		<0.5		
Bromomethane	0.5		<0.5		
Carbon tetrachloride	0.5		<0.5		
Chlorobenzene	0.5		<0.5		
Chloroethane	0.5		<0.5		
2-Chloroethylvinyl ether	1.0		<1.0		
Chloroform	0.5		<0.5		
Chloromethane	0.5		<0.5		
Dibromochloromethane	0.5		<0.5		
1,2-Dichlorobenzene	0.5		<0.5		
1,3-Dichlorobenzene	0.5		<0.5		
1,4-Dichlorobenzene	0.5		<0.5		
Dichlorodifluoromethane	0.5		<0.5		
1,1-Dichloroethane	0.5		3.2		
1,2-Dichloroethane	0.5		<0.5		
1,1-Dichloroethene	0.2		<0.2		
trans-1,2-Dichloroethene	0.5		48		
1,2-Dichloropropane	0.5		<0.5		
cis-1,3-Dichloropropene	0.5		<0.5		
trans-1,3-Dichloropropene	0.5		<0.5		
Ethylbenzene	0.5		8.8		
Methylene chloride	0.5		<0.5		
1,1,2,2-Tetrachloroethane	0.5		<0.5		
Tetrachloroethene	0.5		0.5		
Toluene	0.5		3.5		
1,1,1-Trichloroethane	0.5		<0.5		
1,1,2-Trichloroethane	0.5		<0.5		
Trichloroethene	0.5		0.55		
Trichlorofluoromethane	0.5		<0.5		
Vinyl Chloride	1.0		7.1		
Xylenes	0.5		22		

MDL = Method Detection Limit.
METHOD: EPA Method 8010/8020

Emma P. Popek

EMMA P. POPEK Laboratory Director

GTEL ENVIRONMENTAL LABORATORIES INC

Meadowbrook Industrial Park
Milford, New Hampshire 03055
(603) 672-4835 / FAX (603) 673-8105

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

No. 23510

Project Manager: Craig Rupnow
Phone #: (313) 473-0720
FAX: (313) 473-0892
Address (Office): 23933 Research Dr. Farmington Hills, MI 48024
Site Location: Kalamazoo, MI
Project Number: 400-127-9307 / 4000-9307-01
Project Name: Conrail-Botsford Yard
I attest that the proper field sampling procedures were used during the collection of these samples
Sampler Name (Print): Tim Bertram

Field Sample ID	Source of Sample	GTEL Lab # (Lab use only)	# CONTAINERS	Matrix: WATER	SOIL	AIR	SLUDGE	OTHER (Specify)	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	NONE	OTHER (Specify)	Sampling: DATE	TIME	Gas Hydrocarbons by 602 ☐ 8020 ☐ with MTBE ☐	BTEX only by 602 ☐ 8020 ☐ with MTBE ☐	EDB by 504 ☐	Oil and Grease 413 1 ☐ 413 2 ☐ 503B+D ☐	TPH 418 1 ☐ 503B,D+E ☐ by GC ☐	EPA 503 1 ☐ 502 2 ☐	EPA 601 ☐ 8010 ☐ DCA only ☐	EPA 602 ☐ 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624 ☐ 8240 ☐ NBS(+15) ☐	EPA BNA 625 ☐ 8270 ☐ NBS(+25) ☐	EPA 625 BN only ☐ 8270 BN only ☐ NBS(+15) ☐	EPA 625 AE only ☐ 8270 AE only ☐ NBS(+10) ☐	EPA 610 ☐ 8310 ☐	EPTOX - Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi VOA ☐	EPA Metals - Priority Pollutant ☐ HSL ☐ RCRA ☐	LEAD 239 2 ☐ 200 7 ☐ 7420 ☐ 6010 ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	Product ID by GC (SimDis) ☐	OTHER: EPA 601/602
2-A	grab		4	X								X			1-31-90	22:00																		X
2-B	grab		2	X								X			1-31-90	22:00					X													

SPECIAL HANDLING

EXPEDITED (48 hrs) ☐
SEVEN BUSINESS DAYS ☐
OTHER ___ (#) BUSINESS DAYS ☐
QA/QC Level CLP ☐ Blue ☐

CONTACT PERSON ____
QUOTE # ____
CONTRACT # ____
FAX ☐

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)

REMARKS: Sample S2-A contains 4 - 40ml vials (3 duplicates), sample S2-B contains 2 - 1L. bottles (1 duplicate).

LAB USE ONLY
Storage Location ____
Lot #
Work Order #

CUSTODY RECORD

Received by	Received by	Received by Laboratory	Way bill #
Date	Time	Date	Time
2-1-90	11:30 Am		
Relinquished by Sampler	Relinquished by	Relinquished by:	

GTEL
ENVIRONMENTAL
LABORATORIES, INC.
Midwest Region
4211 May Avenue
Wichita, KS 67209
(316) 945-2624
(800) 633-7936

Project Number: 040009307.01
Work Order Number: X0-10-422
X0-10-423
X0-10-424
X0-10-425
X0-10-426

December 02, 1990

Charles Szentendrey
Groundwater Technology, Inc.
23933 Research Drive
Farmington Hills, MI 48024

Dear Mr. Szentendrey:

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories on 11-07-90 under chain-of-custody record 74-4440.

A formal quality control/quality assurance program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified by the Kansas Department of Health and Environment to perform analyses for drinking water, wastewater, and hazardous waste materials according to approved protocols.

If you have any questions concerning this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,

Terry R. Loucks
Laboratory Director

Project Number: 040009307.01
Work Order Number: X0-10-422
Date Reported: 11-07-90

Table 1

ANALYTICAL RESULTS

TCLP Metals[a]

GTEL Sample Number			01A			
Client Identification			Man Hole Grab			
Date Digested			10-31-90			
Date Analyzed			11-02-90			
Analyte	Method	Detection Limit mg/L	Concentration, mg/L			
Arsenic	EPA 7060	.05	<.05			
Barium	EPA 7080	.3	**0.6**			
Cadmium	EPA 7130	.05	<.05			
Chromium	EPA 7190	.05	**.05**			
Lead	EPA 7420	.1	**.1**			
Mercury	EPA 7471	.001	<.001			
Selenium	EPA 7740	.05	<.05			
Silver	EPA 7760	.05	<.05			

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Digestion by Method 3020. Sample leachate preparation per Federal Reigstrar vol. 55, no. 126 (6-29-90) pp. 26986-26998.

Project Number: 040009307.01
Work Order Number: X0-10-423
Date Reported: 11-30-90

ANALYTICAL RESULTS

Semivolatile Organics in TCLP Leachate[a]
EPA Method 8270[b]

GTEL Sample Number		01	01	01	
Client Identification		Manhole Aqueous	Manhole Non-Aqueous	Manhole Total	
Date Sampled		10-17-90	10-17-90	—	
Date Leached		10-31-90	10-31-90	—	
Date Extracted		11-02-90	11-02-90	—	
Date Analyzed		11-06-90	11-14-90	—	
Analyte	Quantitation Limit, mg/L	Concentration, mg/L			
o-Cresol	0.033	<0.66	<1000	<25	
m-Cresol + p-Cresol	0.033	<0.66	<1000	<25	
1,4-Dichlorobenzene	0.033	<0.66	<1000	<25 X	
2,4-Dinitrotoluene	0.033	<0.66	<1000	<25 X	
Hexachloro-1,3-butadiene	0.033	<0.66	<1000	<25 X	
Hexachlorobenzene	0.033	<0.66	<1000	<25 X	
Hexachloroethane	0.033	<0.66	<1000	<25 X	
Nitrobenzene	0.033	<0.66	<1000	<25 X	
Pentachlorophenol	0.17	<3.4	<5000	<125	
Pyridine	0.033	<0.66	<1000	<25 X	
2,4,5-Trichlorophenol	0.033	<0.66	<1000	<25 X	
2,4,6-Trichlorophenol	0.033	<0.66	<1000	<25 X	
Quantitation Limit Multiplier[c]		20	100,000	NA	

a Federal Register, June 29, 1990, 40 CFR, Part 261, Appendix II - Method 1311. These data are corrected for analytical bias as required by Method 1311 by applying a correction determined by matrix spike recovery.

b Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA, November 1986; extraction by EPA Method 3510 (liquid/liquid).

c The quantitation limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.

d The total value is the volume weighted average of the concentration in the non-aqueous and aqueous phases, as required by Method 1311.

X The < value exceeds the regulatory limit in the non-aqueous and/or aqueous phases. Matrix interferences necessitated dilution. The percentage of each phase was Aqueous 97.6% and Non-aqueous 2.4%.

Project Number: 040009307.01
Work Order Number: X0-10-424
Date Reported: 12-02-90

ANALYTICAL RESULTS

Volatile Organics in TCLP Leachate[a]
EPA Method 8240[b]

GTEL Sample Number		01			
Client Identification		Man Hole			
Date Sampled		10-17-90			
Date Leached		10-22-90			
Date Analyzed		10-29-90			
Analyte	Quantitation Limit, mg/L	Concentration, mg/L			
Benzene	0.050	<0.050			
Carbon tetrachloride	0.050	<0.050			
Chlorobenzene	0.050	<0.050			
Chloroform	0.050	<0.050			
1,4-Dichlorobenzene	0.050	<0.050			
1,2-Dichloroethane	0.050	<0.050			
1,1-Dichloroethylene	0.050	<0.050			
Methyl ethyl ketone	1.0	<1.0			
Tetrachloroethylene	0.050	<0.050			
Trichloroethylene	0.050	<0.050			
Vinyl chloride	0.10	<0.10			
Quantitation Limit Multiplier[c]		1			

a Federal Register, June 29, 1990, 40 CFR, Part 261, Appendix II - Method 1311. These data are corrected for analytical bias as required by Method 1311 by applying a correction determined by matrix spike recovery.

b Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA, November 1986.

c The quantitation limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.

Project Number: 040009307.01
Work Order Number: X0-10-425
Date Reported: 12-02-90

ANALYTICAL RESULTS

Pesticides in TCLP Leachate[a]
EPA Method 8080[b]

GTEL Sample Number		01	01	01	
Client Identification		Manhole Aqueous Layer	Manhole non-Aqueous Layer	Manhole[d] Total	
Date Sampled		10-17-90	10-17-90	—	
Date Filtered		10-24-90	10-24-90	—	
Date Extracted		11-09-90	—	—	
Date Analyzed		11-26-90	11-26-90	—	
Analyte	Quantitation Limit, mg/L	Leachate Concentration, mg/L			
Lindane (gamma-BHC)	.0001	<.0004	<.4	<.01	
Heptachlor	.0001	<.0004	<.4	<.01	
Heptachlor Epoxide	.0001	<.0004	<.4	<.01	
Endrin	.0001	<.0004	<.4	<.01	
Methoxychlor	.0001	<.0004	<.4	<.01	
Chlordane	.001	<.004	<4	<.1	
Toxaphene	.004	<.016	<16	<.4	
Quantitation Limit Multiplier[c]		4	4000	—	

a Federal Register, June 29, 1990, 40 CFR, Part 261, Appendix II-Method 1311. These data are corrected for analytical bias as required by Method 1311 by applying a correction determined by matrix spike recovery.

b Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Leachate procedure by Method 1311; Extraction by Method 3510.

c The quantitation limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.

d The total value is the volume-weighted average of the concentration in the non-aqueous phase and the aqueous filtrate, as required by Method 1311. The percentage of each phase is 97.6% Aqueous and 2.4% non-Aqueous.

Project Number: 040009307.01
Work Order Number: X0-10-426
Date Reported: 11-07-90

Table 1

ANALYTICAL RESULTS

Inorganics in Water

		GTEL Sample Number	01A	02A	03A	
		Client Identification	Man Hole	Man Hole	Man Hole	
		Date Sampled	10-17-90	10-17-90	10-17-90	
		Date Analyzed	10-23-90	10-23-90	10-23-90	
Analyte	Method	PQL,* & Units	Concentration			
Total Cyanide	EPA 335.2	0.02 mg/L			.074	
Total Sulfide**	EPA 9030	1.0 mg/L			20	
Flashpoint	ASTM D-93	oF		>200		
pH	EPA 150.1	NA	7.1			

* Practical Quantitation Limit.
** Sample was not properly preserved.
NA Not Applicable.

GTEL ENVIRONMENTAL LABORATORIES INC

Midwest Region
4211 May Avenue
Wichita, KS 67209

800-633-7936
FAX 316-945-0506

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Nº 74-1432

Project Manager: Craig Rupnow
Phone # 313-473-0720
FAX # 313-471-2764

Address: 23933 Research Dr Farmington Hills, MI
Site location: Kalamazoo, MI

Project Number: 4000-9307-01
Project Name: Conrail - Botsford Yrd

I attest that the proper field sampling procedures were used during the collection of these samples
Sampler Name (Print): Craig Rupnow

ANALYSIS REQUEST

Field Sample ID	Source of Sample	GTEL Lab # (Lab use only)	# CONTAINERS	Matrix: WATER	SOIL	AIR	SLUDGE	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	NONE	OTHER	Sampling: DATE	TIME	BTEX 602 ☐ 8020 ☐ with MTBE ☐	BTEX/TPH Gas 602/8015 ☐ 8020/8015 ☐ MTBE ☐	TPH as ☐ Gas ☐ Diesel ☐ Jet Fuel	Product I.D by GC (SIMDIS) ☐	Total Oil & Grease 413.1 ☐ 413.2 ☐ 503A ☐	Total Petroleum Hydrocarbons 418.1 ☐ 503E ☐	EPA 601 ☐ 8010 ☐ DCA only ☐	EPA 602 ☐ 8020 ☐	EPA 608 ☐ 8080 ☐ PCBs only ☐	EPA 610 ☐ 8310 ☐	EPA 624 ☐ 8240 ☐ NBS +15 ☐	EPA 625 ☐ 8270 ☐ NBS +25 ☐	EPTOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☒ TCLP VOA ☒ TCLP Semi VOA ☒	EPA Priority Pollutant Metals ☐ HSL ☐	LEAD 7420 ☐ 7421 ☐ 239.2 ☐ 6010 ☐ Org. Lead ☐	CAM Metals ☐ STLC ☐ TTLC	Corrosivity ☐ Flashpoint ☒ Reactivity ☐	pH	Reactivity, Sulfide & Cyanide	TCLP Pesticides
Man Hole	Grab	10-426-01	1	X								X			10/17/90	1550																			X		
Man Hole	↓	-02	1	X								X			↓	1555																		X			
Man Hole	↓	-03	1	X								X			↓	1600																				X	
Man Hole	↓	XO-10-424	3	X								X			↓	1605															X						
Man Hole	↓	XO-10-423	2	X								X			↓	1610															X						
Man Hole	↓	XO-10-422	1	X								X			↓	1615															X						
Man Hole	↓	XO-10-425	1	X								X			↓	1620																					X

CUSTODY RECORD

Received by:	Received by:	Received by Laboratory:	Way bill #
Date 10-18-90	Time 14:00	Date 10/19/90	Time 9AM

Relinquished by Sampler: [signature]
Relinquished by:
Relinquished by:

SPECIAL HANDLING

24 HOURS ☐
EXPEDITED 48 Hours ☐
SEVEN DAY ☐
OTHER _____ (#) BUSINESS DAYS
QA/QC CLP Level ☐ Blue Level ☐
FAX ☐

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)

REMARKS Please Fax Results to Project Manager

Lab Use Only Storage Location
Lot #: Work Order #:

temp 5.0°C

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Client Number. 040056001
Project ID: Conral Botsford
Login Number M3-01-0143

January 21, 1993

Bill Bow
Groundwater Technology, Inc.
255 28th Street, SE
Grand Rapids, MI 49548

Dear Mr. Bow:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 01/08/93 under chain-of-custody record 52553.

A formal Quality Assurance / Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Susan C. Uhler
Laboratory Director

Client Number: 040056001
Project ID: Conral Botsford
Login Number M3-01-0143

ANALYTICAL RESULTS

Volatile Organics in TCLP Leachate[a]
EPA Method 8240[b]

GTEL Sample Number		010143-01	--	--	--
Client Identification		SEWER	--	--	--
Date Sampled		01/07/93	--	--	--
Dates Leached		01/12/93-01/12/93	--	--	--
Extraction Fluid		--	--	--	--
Date Analyzed		01/15/93	--	--	--
Analyte	Quantitation Limit, mg/L	Concentration, mg/L			
Benzene	0.005	< 0.050	--	--	--
Carbon Tetrachloride	0.005	< 0.050	--	--	--
Chlorobenzene	0.005	< 0.050	--	--	--
Chloroform	0.005	< 0.050	--	--	--
1,2-Dichloroethane	0.005	< 0.050	--	--	--
1,1-Dichloroethylene	0 005	< 0.050	--	--	--
Methyl ethyl ketone	0 010	< 0.10	--	--	--
Tetrachloroethylene	0.005	< 0.050	--	--	--
Trichloroethylene	0.005	< 0.050	--	--	--
Vinyl Chloride	0 010	< 0 10	--	--	--
Quantitation Limit Multiplier[c]		10	--	--	--

a Federal Register, June 29, 1990, 40 CFR, Part 261, Appendix II - Method 1311 These data are corrected for analytical bias as required by Method 1311 by applying a correction determined by matrix spike recovery

b Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA, November 1986 All samples analyzed by purge and trap

c The quantitation limit multiplier indicates the adjustments made to the data and quantitation limits for sample dilutions

Client Number: 040056001
Project ID: Conral Botsford
Login Number: M3-01-0143

ANALYTICAL RESULTS

Herbicides in TCLP Leachate[a]
EPA Method 8150[b]

GTEL Sample Number		010143-01	--	--	--
Client Identification		SEWER	--	--	--
Date Sampled		01/07/93	--	--	--
Dates Leached		01/12/93-01/13/93	--	--	--
Extraction Fluid		1	--	--	--
Date Extracted		01/13/93	--	--	--
Date Analyzed		01/20/93	--	--	--
Analyte	Quantitation Limit, mg/L	Concentration, mg/L			
2,4-D	0.0012	< 0 40	--	--	--
Silvex (2,4,5-TP)	0.00017	< 0.057	--	--	--
Quantitation Limit Multiplier[c]		333[d]	--	--	--

a Federal Register, June 29, 1990, 40 CFR, Part 261, Appendix II - Method 1311. These data are corrected for analytical bias as required by Method 1311 by applying a correction determined by matrix spike recovery.
b Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986
c The quantitation limit multiplier indicates the adjustments made to the data and quantitation limits as a result of dilutions and percent solids.
d Sample analyzed diluted due to demonstrated matrix interference.

Client Number. 040056001
Project ID Conral Botsford
Login Number M3-01-0143

ANALYTICAL RESULTS

Pesticides in TCLP Leachate[a]
EPA Method 8080[b]

GTEL Sample Number		010143-01	--	--	--
Client Identification		SEWER	--	--	--
Date Sampled		01/07/93	--	--	--
Dates Leached		01/12/93-01/13/93	--	--	--
Extraction Fluid		1	--	--	--
Date Extracted		01/13/93	--	--	--
Date Analyzed		01/20/93	--	--	--
Analyte	Quantitation Limit, mg/L	Concentration, mg/L			
Lindane (gamma-BHC)	0.00004	< 0.0029	--	--	--
Endrin	0.00006	< 0.0044	--	--	--
Methoxychlor	0.0018	< 0.13	--	--	--
Toxaphene	0.0024	< 0.17	--	--	--
Heptachlor	0.00003	< 0.0022	--	--	--
Heptachlor Epoxide	0.00083	< 0.060	--	--	--
Chlordane	0.00014	< 0.010	--	--	--
Quantitation Limit Multiplier[c]		72 7[d]	--	--	--

a Federal Register, June 29, 1990, 40 CFR, Part 261, Appendix II - Method 1311 These data are corrected for analytical bias as required by Method 1311 by applying a correction determined by matrix spike recovery.

b Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986, Extraction by Method 3510

c The quantitation limit multiplier indicates the adjustments made to the data and quantitation limits for sample dilutions.

d Sample analyzed diluted due to demonstrated matrix interference

Client Number 040056001
Project ID Conral Botsford
Login Number. M3-01-0143

ANALYTICAL RESULTS

Polychlorinated Biphenyls in Oil
EPA Method 8080[a]

GTEL Sample Number		010143-02	--	--	--
Client Identification		SEWER	--	--	--
Date Sampled		01/07/93	--	--	--
Date Diluted		01/12/93	--	--	--
Date Analyzed		01/16/93	--	--	--
Analyte	Detection Limit, mg/kg	Concentration, mg/kg			
Aroclor-1221	1.0	< 5.0	--	--	--
Aroclor-1232	1.0	< 5.0	--	--	--
Aroclor-1242 (1016)	1.0	< 5 0	--	--	--
Aroclor-1248	1.0	< 5.0	--	--	--
Aroclor-1254	1.0	< 5.0	--	--	--
Aroclor-1260	1.0	< 5.0	--	--	--
Detection Limit Multiplier[b]		5.00[c]	--	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3580 (waste dilution)
b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids
c Sample analyzed diluted due to extract viscosity

Client Number: 040056001
Project ID: Conral Botsford
Login Number: M3-01-0143

ANALYTICAL RESULTS
(Non-aqueous Phase Only)
Metals in Organic Phase TCLP Leachate[a]

GTEL Sample Number			010143-02	--	--	--
Client Identification			SEWER	--	--	--
Date Sampled			01/07/93	--	--	--
Dates Leached			01/12/93-01/12/93	--	--	--
Extraction Fluid			--	--	--	--
Date Analyzed (Method 245.5 CLP-M)			01/15/93	--	--	--
Date Analyzed (Method 6010)			01/19/93	--	--	--
Date Analyzed (Method 7060)			01/18/93	--	--	--
Date Analyzed (Method 7740)			01/18/93	--	--	--
Analyte	Method[b]	Quantitation Limit, mg/L	Concentration, mg/L			
Arsenic	7060	0.50	< 0.46	--	--	--
Barium	6010	20	< 18	--	--	--
Cadmium	6010	0.50	< 0.45	--	--	--
Chromium	6010	1.0	< 0.90	--	--	--
Lead	6010	10	< 9.1	--	--	--
Mercury	245.5 CLP-M[d]	0 10	< 0.091	--	--	--
Selenium	7740	0.20	< 0.18	--	--	--
Silver	6010	1.0	< 0.91	--	--	--
Quantitation Limit Multiplier (245.5 CLP-M)[c]			0.910	--	--	--
Quantitation Limit Multiplier (6010)[c]			0.901	--	--	--
Quantitation Limit Multiplier (7060)[c]			0.910	--	--	--
Quantitation Limit Multiplier (7740)[c]			0.910	--	--	--

a Federal Register, June 29, 1990, 40 CFR, Part 261, Appendix II - Method 1311 These data are corrected for analytical bias as required by Method 1311 by applying a correction determined by matrix spike recovery

b Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA, November 1986 Digestion by Method 3050 (except mercury).

c The quantitation limit multiplier indicates the adjustments made to the data and quantitation limits for sample dilutions

d US EPA Contract Laboratory Program, Statement of Work for Inorganics Analysis. Document Number ILM02 0

Client Number 040056001
Project ID Conral Botsford
Login Number M3-01-0143

ANALYTICAL RESULTS
(Aqueous Phase Only)
Metals in TCLP Leachate[a]

GTEL Sample Number			010143-01	--	--	--
Client Identification			SEWER	--	--	--
Date Sampled			01/07/93	--	--	--
Dates Leached			01/12/93-01/12/93	--	--	--
Extraction Fluid			--	--	--	--
Date Analyzed (Method 7470)			01/13/93	--	--	--
Date Analyzed (Method 6010)			01/15/93	--	--	--
Analyte	Method[b]	Quantitation Limit, mg/L	Concentration, mg/L			
Arsenic	6010	0.50	< 0.50	--	--	--
Barium	6010	1.0	< 1.0	--	--	--
Cadmium	6010	0.050	< 0.050	--	--	--
Chromium	6010	0.050	< 0.050	--	--	--
Lead	6010	0.50	< 0.50	--	--	--
Mercury	7470	0.002	< 0.002	--	--	--
Selenium	6010	0.20	< 0.20	--	--	--
Silver	6010	0.050	< 0.050	--	--	--
Quantitation Limit Multiplier[c]			1.00	--	--	--

a Federal Register, June 29, 1990, 40 CFR, Part 261, Appendix II - Method 1311. These data are corrected for analytical bias as required by Method 1311 by applying a correction determined by matrix spike recovery

b Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA, November 1986, Digestion by Method 3010 (except for mercury).

c The quantitation limit multiplier indicates the adjustments made to the data and quantitation limits for sample dilutions.

Client Number: 040056001
Project ID. Conral Botsford
Login Number: M3-01-0143

ANALYTICAL RESULTS
(Volume-Weighted Average)
Metals in Two-Phase TCLP Leachate[a]

GTEL Sample Number	010143-01 & 010143-02	--	--	--
Client Identification	SEWER	--	--	--
Analyte	Concentration, mg/L[c]			
Arsenic	< 0 47	--	--	--
Barium	< 15	--	--	--
Cadmium	< 0.37	--	--	--
Chromium	< 0.73	--	--	--
Lead	< 7 4	--	--	--
Mercury	< 0.073	--	--	--
Selenium	< 0 18	--	--	--
Silver	< 0 74	--	--	--

a Federal Register, June 29, 1990, 40 CFR, Part 261, Appendix II - Method 1311 These data are corrected for analytical bias as required by Method 1311 by applying a correction determined by matrix spike recovery

b Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA, November 1986; Digestion by Method 3010 (except for mercury)

c The concentration is the volume-weighted average of the non-aqueous phase and the aqueous phase leachates, as required by Method 1311

Client Number: 040056001
Project ID. Conral Botsford
Login Number: M3-01-0143

ANALYTICAL RESULTS

Corrosivity of a Water
EPA Method 9040[a]

Sample Identification		Date Sampled	Date Analyzed	pH Units[b]
GTEL No.	Client ID	--	--	--
010143-01	SEWER	01/07/93	01/14/93	6.9

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986.

b Estimated concentration. This sample was analyzed upon receipt in the laboratory, but was beyond the recommended holding time.

Client Number: 040056001
Project ID: Conral Botsford
Login Number: M3-01-0143

ANALYTICAL RESULTS

Ignitability of Liquid
EPA Method 1010[a]

Sample Identification		Date Sampled	Date Analyzed	Flash Point, °F[b]
GTEL No.	Client ID	--	--	--
010143-01	SEWER	01/07/93	01/12/93	> 200

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986.

b > 200 indicates that the test termination point of 200 °F was reached without ignition.

Client Number: 040056001
Project ID: Conral Botsford
Login Number: M3-01-0143

ANALYTICAL RESULTS

Reactive Cyanide in Water
EPA SW-846, Section 7.3.3.2[a]

Sample Identification		Date Sampled	Date Analyzed	Detection Limit, mg/L	Concentration, mg/L
GTEL No.	Client ID	--	--	--	--
010143-01	SEWER	01/07/93	01/18/93	5.0	< 5.0

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986.

Client Number. 040056001
Project ID: Conral Botsford
Login Number. M3-01-0143

ANALYTICAL RESULTS

Reactive Sulfide in Water
EPA SW-846, Section 7.3 4.2[a]

Sample Identification		Date Sampled	Date Analyzed	Detection Limit, mg/L	Concentration, mg/L
GTEL No.	Client ID	--	--	--	--
010143-01	SEWER	01/07/93	01/18/93	200	< 200

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986.

GTEL
ENVIRONMENTAL
LABORATORIES, INC

...ADOW ROCK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST 52553

me: ...ote Technology
Phone #: 616-246-6455
FAX # 616-246-1977
dress: ...th St SE Grand Rapids, Mi
Site location: Kalamazoo, Mi
ger: ...
Client Project ID (#) 04N056001.630108
(NAME) Conrad Rotsford
...e proper field sampling ...ere used during the collection ...ples.
Sampler Name (Print): Steven Benton

...eld ...mple ...D	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☒ VOA ☒ Semi-VOA ☒ Pest ☒ Herb ☒	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☒ Flash Point ☐ Reactivity ☒	[illegible]	[illegible]	[illegible]
...	1	5	X			X						X	X		1/7	10:15																X					X	X	X	X

...AT ☐ ...r) ☐ ...s ☐ ...ard ☐

Special Handling
GTEL Contact
Quote/Contract #
Confirmation #
PO #

QA / QC LEVEL
CLP ☐ OTHER

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS: Please fax an additional copy of the results to Patsy Meehan at Farmington Hills

Lab Use Only Lot #
Storage Location: W-8-B
Work Order #

...ODY ...ORD

Relinquished by Sampler	Date	Time	Received by:
[signature]	1/7/92	10:30	
Relinquished by	Date	Time	Received by:
Relinquished by	Date	Time	Received by Laboratory
	1/8/92	11:00	[signature]

Work Bill # ...

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Client Number 040056001
Project ID Conrail Botsford
Login Number M2-10-0528

November 6, 1992

Bill Bow
Groundwater Technology, Inc.
255 28th Street, SE
Grand Rapids, MI 49548

Dear Mr. Bow:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 10/22/92 under chain-of-custody record 48919.

A formal Quality Assurance / Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,

GTEL Environmental Laboratories, Inc.

Susan C. Uhler
Laboratory Director

Client Number 040056001
Project ID Conrail Botsford
Login Number. M2-10-0528

ANALYTICAL RESULTS

Purgeable Aromatics in Water
Modified EPA Method 602[a]

GTEL Sample Number		100528-03	100528-06	100528-07	100528-08
Client Identification		MW5	MW21	MW17	MW15
Date Sampled		10/21/92	10/21/92	10/21/92	10/21/92
Date Analyzed		10/27/92	10/25/92	10/25/92	10/25/92
Analyte	Reporting Limit, ug/L	Concentration, ug/L			
Benzene	1 0	**3.2**	< 1.0	< 1.0	< 1.0
Toluene	1.0	< 1.0	< 1 0	< 1.0	< 1.0
Ethyl Benzene	1.0	< 1.0	< 1 0	< 1.0	< 1.0
Xylenes (total)	1.0	**1.9**	< 1.0	< 1 0	< 1.0
Sample Dilution Factor[b]		1	1	1	1

a Federal Register, Vol 49, October 26, 1984 Method modified to include additional compounds
b The sample dilution factor indicates the adjustments made to the data and detection limits for sample dilutions

Client Number. 040056001
Project ID. Conrail Botsford
Login Number· M2-10-0528

ANALYTICAL RESULTS

Purgeable Aromatics in Water
Modified EPA Method 602[a]

GTEL Sample Number		100528-10	--	--	--
Client Identification		MW1	--	--	--
Date Sampled		10/21/92	--	--	--
Date Analyzed		10/23/92	--	--	--
Analyte	Reporting Limit, ug/L	Concentration, ug/L			
Benzene	1.0	< 1.0	--	--	--
Toluene	1.0	< 1.0	--	--	--
Ethyl Benzene	1.0	< 1.0	--	--	--
Xylenes (total)	1.0	< 1.0	--	--	--
Sample Dilution Factor[b]		1	--	--	--

a Federal Register, Vol 49, October 26, 1984. Method modified to include additional compounds
b The sample dilution factor indicates the adjustments made to the data and detection limits for sample dilutions

Client Number 040056001
Project ID Conrail Botsford
Login Number M2-10-0528

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Water
EPA Method 610[a]

GTEL Sample Number		100528-01	100528-02	100528-03	100528-04
Client Identification		MW4	MW19	MW5	MW20
Date Sampled		10/21/92	10/21/92	10/21/92	10/21/92
Date Extracted		10/23/92	10/23/92	10/23/92	10/23/92
Date Analyzed		11/02/92[c]	11/02/92[c]	11/02/92	11/02/92[d]
Analyte	Reporting Limit, ug/L	Concentration, ug/L			
Naphthalene	5.0	< 5.0	< 5.0	< 5.0	**50**
Acenaphthylene	5.0	< 5.0	< 5.0	< 5.0	< 12
Acenaphthene	5.0	**13**	**7.8**	< 5.0	**23**
Fluorene	5.0	**32**	**19**	**5.0**	**67**
Phenanthrene	5 0	**84[c]**	**58[c]**	**7.4**	**350[d]**
Anthracene	5.0	**16**	**9.2**	< 5.0	**30[d]**
Fluoranthene	5.0	**14**	**7.1**	< 5 0	**15**
Pyrene	5 0	< 5.0	< 5 0	< 5.0	< 5 0
Benzo[*a*]anthracene	5 0	< 5.0	< 5.0	< 5.0	< 5.0
Chrysene	5 0	< 5.0	< 5.0	< 5.0	< 5 0
Benzo[*b*]fluoranthene	5 0	< 5.0	< 5.0	< 5.0	< 5.0
Benzo[*k*]fluoranthene	5.0	< 5 0	< 5 0	< 5 0	< 5.0
Benzo[*a*]pyrene	5 0	< 5.0	< 5.0	< 5.0	< 5.0
Dibenzo[*a,h*]anthracene	5 0	< 5.0	< 5.0	< 5 0	< 5.0
Benzo[*g,h.i*]perylene	5 0	< 5.0	< 5 0	< 5.0	< 5 0
Indeno[1,2 3-*cd*]pyrene	5 0	< 5.0	< 5 0	< 5.0	< 5.0
Sample Dilution Factor[b]		2.00[c]	2 00[c]	1.00	5.00[d]

a Federal Register, Vol 49, October 26, 1984 Sample preparation by liquid/liquid extractions
b The sample dilution factor indicates the adjustments made to the data and detection limits for sample dilutions
c Sample dilution factor for analyte noted = 400, Date analyzed = 10/29/92
d Sample dilution factor for analyte noted = 500; Date analyzed = 10/29/92

Client Number 040056001
Project ID Conrail Botsford
Login Number. M2-10-0528

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Water
EPA Method 610[a]

GTEL Sample Number		100528-05	100528-06	100528-07	100528-08
Client Identification		MW6	MW21	MW17	MW15
Date Sampled		10/21/92	10/21/92	10/21/92	10/21/92
Date Extracted		10/23/92	10/23/92	10/23/92	10/23/92
Date Analyzed		11/03/92[e]	10/29/92	10/30/92	10/30/92
Analyte	Reporting Limit, ug/L	Concentration, ug/L			
Naphthalene	5.0	**57**	< 5.0	< 5.0	< 5.0
Acenaphthylene	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acenaphthene	5.0	**61**	< 5 0	< 5.0	< 5.0
Fluorene	5.0	**150**[e]	< 5.0	< 5.0	< 5.0
Phenanthrene	5.0	**780**[e]	< 5.0	< 5.0	< 5.0
Anthracene	5.0	**170**[e]	< 5.0	< 5.0	< 5.0
Fluoranthene	5.0	**45**[e]	< 5.0	< 5.0	< 5 0
Pyrene	5.0	< 5.0	< 5 0	< 5.0	< 5.0
Benzo[*a*]anthracene	5.0	< 5 0	< 5.0	< 5 0	< 5.0
Chrysene	5.0	< 5.0	< 5.0	< 5.0	< 5 0
Benzo[*b*]fluoranthene	5.0	< 5.0	< 5.0	< 5 0	< 5.0
Benzo[*k*]fluoranthene	5.0	< 5.0	< 5 0	< 5 0	< 5.0
Benzo[*a*]pyrene	5 0	< 5 0	< 5 0	< 5.0	< 5.0
Dibenzo[*a,h*]anthracene	5.0	< 5 0	< 5.0	< 5.0	< 5 0
Benzo[*g,h,i*]perylene	5 0	< 5 0	< 5 0	< 5.0	< 5 0
Indeno[1.2.3-*cd*]pyrene	5 0	< 5 0	< 5 0	< 5.0	< 5 0
Sample Dilution Factor[b]		1 00[e]	1 00	1 00	1.00

a Federal Register, Vol 49, October 26, 1984 Sample preparation by liquid/liquid extractions
b The sample dilution factor indicates the adjustments made to the data and detection limits for sample dilutions
e Sample dilution factor for analyte noted = 200, Date analyzed = 10/29/92

Client Number: 040056001
Project ID: Conrail Botsford
Login Number: M2-10-0528

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Water
EPA Method 610[a]

GTEL Sample Number		100528-09	100528-10	--	--
Client Identification		MW9	MW1	--	--
Date Sampled		10/21/92	10/21/92	--	--
Date Extracted		10/23/92	10/23/92	--	--
Date Analyzed		10/30/92	10/30/92	--	--
Analyte	Reporting Limit, ug/L	Concentration, ug/L			
Naphthalene	5.0	< 3600	< 5.0	--	--
Acenaphthylene	5.0	< 4600	< 5.0	--	--
Acenaphthene	5.0	< 3600	< 5.0	--	--
Fluorene	5.0	**2500**	< 5.0	--	--
Phenanthrene	5.0	**13000**	< 5.0	--	--
Anthracene	5.0	**2000**	< 5.0	--	--
Fluoranthene	5.0	**580**	< 5.0	--	--
Pyrene	5.0	< 540	< 5.0	--	--
Benzo[*a*]anthracene	5 0	< 26	< 5.0	--	-
Chrysene	5.0	< 300	< 5 0	--	--
Benzo[*b*]fluoranthene	5.0	< 36	< 5 0	--	--
Benzo[*k*]fluoranthene	5 0	< 34	< 5 0	--	--
Benzo[*a*]pyrene	5.0	< 46	< 5.0	--	--
Dibenzo[*a,h*]anthracene	5 0	< 60	< 5.0	--	--
Benzo[*g,h,i*]perylene	5 0	< 150	< 5.0	--	--
Indeno[1.2.3-*cd*]pyrene	5.0	< 86	< 5.0	--	--
Sample Dilution Factor[b]		2000	1 00	--	--

a Federal Register, Vol. 49, October 26, 1984 Sample preparation by liquid/liquid extractions
b The sample dilution factor indicates the adjustments made to the data and detection limits for sample dilutions

GTEL
ENVIRONMENTAL
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(603) 672-4835
(800) 441-4835

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST 48919

ame: TI
Phone #: 616-246-6455
FAX # 616-246-1977

dress: 814 St. SE
Site location: Kalamazoo, MI

ager: Bob
Client Project ID (#)
(NAME) Conrail Botsford

he proper field sampling
were used during the collection
ples.
Sampler Name (Print): Steve Benton

ield mple ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☒ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☒ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐
[illegible]	01	5	X						X			X			10/21	11:00	X													X							
[illegible]	02	5	X						X			X			10/21	11:30	X													X							
[illegible]	03	5	X						X			X			10/21	12:00	X													X							
20	04	5	X						X			X			10/21	12:20	X													X							
[illegible]	05	5	X						X			X			10/21	12:35	X													X							
[illegible]	06	5	X						X			X			10/21	13:00	X													X							
[illegible]	07	5	X						X			X			10/21	13:25	X													X							
[illegible]	08	5	X						X			X			10/21	13:45	X													X							
[illegible]	09	5	X						X			X			10/21	14:10	X													X							
	10	5	X						X			X			10/21	14:30	X													X							

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dent
☐

Special Handling
GTEL Contact
Quote/Contract #
Confirmation #
PO #

QA / QC LEVEL
CLP ☐ OTHER

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS
Heavy sheen in all samples

Lab Use Only Lot #
Storage Location: 22-3D/W1B
Work Order #

ODY
ORD

Relinquished by Sampler	Date	Time	Received by:
Steve E. Benton	10/21	16:20	
Relinquished by	Date	Time	Received by:
Relinquished by	Date	Time	Received by Laboratory
	10-22-98	16:30	[illegible]