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PHASE II INVESTIGATION REPORT
SITE NO. 915019

Prepared for:
E.I. du Pont de Nemours & Company, Inc.
Yerkes Plant
Sheridan Drive Station B
Tonawanda, New York 14207
August 1993

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Project Number 92C2284-6

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August 16, 1993
92C2284-6

Mr. W. Ervin
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PHASE II INVESTIGATION REPORT
DuPont Yerkes Plant
Tonawanda, New York
Site No. 915019

Dear Mr. Ervin:

Woodward-Clyde Consultants (WCC) is pleased to submit the Phase II Investigation Report for the DuPont Yerkes Plant. The investigation was conducted in accordance with the approved Work Plan, dated January 24, 1992, and its addendum, dated April 30, 1992.

If you have any questions or comments on the plan, please contact the undersigned. We appreciate the opportunity to work with DuPont on this project.

Sincerely,

Kelly R. McIntosh, P.E., P.HGW.
Associate

James F. Roetzer, Ph.D.
Senior Associate

KRM/JFR:jee

Yerph2.rep

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EXECUTIVE SUMMARY

E.I. du Pont de Nemours and Company (DuPont) and the New York State Department of Environmental Conservation (NYSDEC) have entered into an Order on Consent to perform a Phase II Investigation of ten landfilled areas at Du Pont's Yerkes Plant located in Tonawanda, New York. DuPont retained Woodward-Clyde Consultants (WCC) to conduct the investigation in accordance with the NYSDEC approved Phase II Investigation Work Plan (WCC, January 24, 1992) and its Addendum (WCC, April 30, 1992).

DuPont has reported disposal during a period from 1921 to 1978 of just over 91,400 tons of general waste and product waste in eight landfill areas at the Yerkes Plant Site. A majority of this waste was disposed of in an extensive topographic low and in six pits (12- to 30-feet deep) in the northeastern portion of the site. In addition, lesser quantities of wastes (including laboratory waste) from the Plant Research and Development Department were reported to have been landfilled at the two discrete on-site locations. The following materials were disposed of in the landfill areas (volume estimates provided by DuPont):

• cellulosic viscose, cellophane, rayon, and sponges	80,000 tons
• dry Corian™ wastes	5,000 tons
• wet Corian™ wastes	1,500 tons
• methyl methacrylate, methylene chloride, inert filler	1,500 tons
• polyvinyl alcohol film	100 tons
• Vexar™ netting	1,500 tons
• Tedlar™ with dimethylacetamide	1,000 tons
• Tedlar™ polyvinyl fluoride film	750 tons
• nylon shutters and water-based paint	75 tons
• laboratory waste	1 ton

A Phase I Investigation of the plant concluded that potential environmental impacts of the landfill areas could occur through migration of waste constituents to surface water, in particular to the Niagara River. Therefore, the Phase II Investigation was focused on characterization of the landfilled materials and on investigation of the two potential routes of migration of waste constituents to surface water: transport in shallow groundwater and transport in stormwater.

The overburden outside of the landfill areas at the plant consists, in descending order from ground surface, of: (1) 2 to 8 feet of coarse, hard fill materials, (2) 42 to 70 feet of lacustrine silty clay, and (3) 3 to 20 feet of a silt/clay till. Depth to bedrock varies from 62 to 82 feet across the site. Landfill areas are estimated to be underlain and surrounded by 18 to 70 feet of lacustrine clay. This low permeability clay (tested to be approximately 10^{-8} cm/sec) constitutes a barrier to migration of leachate generated in the landfill areas below the top of the surrounding clay.

The landfilled waste was generally found to contain relatively low levels of Target Compound List/Target Analyte List (TCL/TAL) chemicals. The exception was one of the R&D waste landfill areas, which contained material with elevated levels of TCL volatile organic chemicals and mercury. However, the volume of material impacted in this area was small and does not likely constitute a major potential source of groundwater contamination.

The groundwater investigation found no evidence that the site has resulted in groundwater contamination. Based on these findings, the Phase II Investigation concluded that the landfills do not pose a substantial potential for impacting surface water via leachate migration in groundwater.

1.0
INTRODUCTION

E.I. du Pont de Nemours & Company (DuPont) and the New York State Department of Environmental Conservation (NYSDEC) have entered into an Order on Consent to perform a Phase II Investigation of several landfilled areas at its Yerkes Plant. DuPont retained Woodward-Clyde Consultants (WCC) to conduct the investigation in accordance with the NYSDEC approved Phase II Investigation Work Plan (WCC, January 24, 1992) and its Addendum (WCC, April 30, 1992).

1.1 BACKGROUND PLANT HISTORY

The DuPont Yerkes Plant is located on River Road, southeast of New York State Thruway Route 190, in the Town of Tonawanda, Erie County, New York (Figure 1-1). The Plant is approximately 90 acres in area and is located in a highly industrialized section of Tonawanda. It is bounded on the northeast by Kenmore Avenue, on the northwest by properties owned by Trans American Properties Inc. and the New York State Thruway Authority, on the southwest by River Road and on the southeast by property owned by General Motors Corporation. The following products have been manufactured at the Plant since 1921:

• Rayon™	1921-1955
• cellophane	1924-1968
• Cel-O-Seal caps and bands	1931-1964
• cellulose sponge	1936-1951
• Cordura™ yarn	1941-1955
• polyethylene film	1951-1961
• Vexar™ netting	1959-1979
• Tedlar™ polyvinyl fluoride film	Since 1955

- Corian™ sheet and shape Since 1968

Corian™ is produced as simulated marble sheets, sinks, and sink/countertop units.

DuPont has reported disposal during a period from 1921 to 1978 of just over 91,400 tons of general waste and product waste in eight landfill areas at the Yerkes Plant Site. The locations of the landfill areas are shown on Figure 1-2. In addition, lesser quantities of wastes (including laboratory waste) from the Plant Research and Development Department were landfilled at the two locations shown on Figure 1-2 (Units 9 and 10). A majority of the waste was disposed of in an extensive topographic low (Unit 8) and in six pits (12- to 30-feet-deep) in the northeastern portion of the Site (Units 1, 3, 4, 5, 6 and 7). The following materials were disposed of in the landfill areas identified in Figure 1-2:

• cellulosic viscose, cellophane, rayon, and sponges	80,000 tons
• dry Corian™ Wastes	5,000 tons
• wet Corian™ Wastes	1,500 tons
• methyl methacrylate, methylene chloride, inert filler	1,500 tons
• polyvinyl alcohol film	100 tons
• Vexar™ netting	1,500 tons
• Tedlar™ with dimethylacetamide	1,000 tons
• Tedlar™ polyvinyl fluoride film	750 tons
• nylon shutters and water-based paint	75 tons
• laboratory waste	

Landfill Area 8 was used primarily for the disposal of cellophane waste and has been inactive since 1978. A 10- to 12-acre parcel of land, including a large portion of Landfill Area 8, was sold to General Motors Corporation. It is now paved and used as a parking lot. Landfill Area 2 was used solely for Tedlar™ waste. Within the past few years, some of the disposal areas on DuPont property have been used for surficial disposal of coarse

demolition debris.

1.2 PREVIOUS INVESTIGATIONS

A Phase I Investigation of the site was conducted for NYSDEC by Ecology and Environmental Engineering, P.C. (E&E). The major conclusions of the Phase I Investigation are described below. The reader is referred to the Phase I Investigation Report (E&E, January 1990) for additional information concerning the plant operational history and environmental data collected prior to the current Phase II Investigation.

The Phase I Investigation Report indicates that relatively low levels of inorganics, some marginally in excess of drinking water standards, had been measured in groundwater samples from the monitoring wells installed by DuPont in 1979 within and adjacent to the landfill areas. The Phase I Report concludes that these levels may represent background conditions in this area. It also suggested that polyaromatic hydrocarbons (PAHs) found in soil samples may represent background conditions.

The Phase I Report also included a review of geologic and hydrogeologic data for the site. It concluded that the bedrock water-bearing zones were hydraulically isolated from the landfilled materials by low permeability lacustrine clay (tested to have a permeability of approximately 10^{-8} cm/sec).

The Phase I Report presented a preliminary application of the Hazard Ranking System (HRS). Under the HRS, three numerical scores are computed to express the site's relative risk for damage to the population and the environment. The three scores are:

- S_M reflects the potential for harm to humans or the environment from migration of a hazardous substance away from the facility by routes involving groundwater, surface water, or air. It is a composite of separate scores for each of the three routes (S_{GW} = groundwater route score, S_{SW} = surface

water route score, and S_A = air route score).

- S_{FE} reflects the potential for harm from substances that can explode or cause fires.

- S_{DC} reflects the potential for harm from direct contact with hazardous substances at the facility (i.e., no migration need be involved).

The preliminary HRS score presented in the Phase I Report was:

S_M = 24.99 (based on S_{GS} = 4.32; S_{SW} = 43.01; and S_A = 0)
S_{FE} = Not applicable
S_{DL} = 0

These scores indicate that potential surface water migration routes were considered to be of concern at the site, with minimal potential for exposure via potential air or groundwater routes. This Phase II Investigation, therefore, focusses on the potential for contaminant migration from the site to surface water, specifically the Niagara River. There are two potentially significant routes of migration to the Niagara River from the Yerkes Plant:

1. Migration in groundwater above the lacustrine clay, with eventual discharge to surface water

2. Stormwater runoff

The Phase II Investigation Work Plan (Work Plan) was developed to investigate these potential migration routes. The Work Plan also included additional investigations to characterize the chemical composition of the fill materials in the ten landfill areas.

1.3 OBJECTIVE

As presented in the Work Plan, the objective of this Phase II Investigation is to assess the nature of material placed in the landfill areas and to ascertain if contaminants are migrating from the plant property toward the Niagara River. The scope-of-work designed to achieve this objective is presented in the following section.

2.0
PHASE II INVESTIGATION

2.1 SCOPE-OF-WORK

As presented in the Work Plan, the Phase II Investigation for the DuPont Yerkes Plant consisted of the following investigative tasks:

- Installation and sampling of five perimeter overburden groundwater monitoring wells.
- Four quarterly rounds of groundwater hydraulic head measurements.
- Completion of a total of 31 soil borings within the landfilled areas shown on Figure 1-2. Composite samples of the landfilled materials were obtained for chemical analysis.
- Stormwater and catch basin sediment sampling.

Field activities were conducted in accordance with the NYSDEC approved Site Health and Safety Plan (HSP). Specific investigation methods are described below.

2.2 METHODS

2.2.1 Monitoring Well Installation

As discussed in the Work Plan, previous studies of the unconsolidated overburden deposits at the Yerkes Plant indicate that the surficial fill and/or alluvial deposits above the lacustrine clay, and the interface of the till and upper weathered bedrock (beneath

the clay) could be water-bearing zones. Because of the documented thickness of the clay layer and the lack of contamination found in previous sampling of deep overburden/upper bedrock wells installed at the site by DuPont in 1979, the Phase II Investigation focused on groundwater above the clay layer. A total of five new wells were installed at locations along the perimeter of the site as shown on Figure 2-1. Each well was screened to monitor shallow or perched groundwater in the surficial fill or alluvium deposits.

All drilling, excavation, cutting, and welding was performed in accordance with applicable Dupont Yerkes Plant Safety Guidelines and the HSP. All solid and liquid material generated during drilling activities were containerized for proper disposal by DuPont.

2.2.1.1 Materials Specifications

The following materials were used for the monitoring well installations:

- Well screen: 2-inch I.D. 10 slot threaded PVC screen
- Well riser: 2-inch I.D. Schedule 40 PVC riser pipe
- Sand pack: Jesse Morie sand No. 2 or equivalent (fine sand)
- Well seal: Bentonite pellets
- Grout mix for annular space: 94-pounds Type 1 Portland cement, 8-gallons of potable water, 5-pounds of powdered bentonite

2.2.1.2 Drilling Procedures and Well Construction

The five new monitoring wells were installed to monitor the shallow groundwater. Well completion diagrams are presented in Appendix A. Drilling logs are presented in Appendix B. The wells were installed through the fill and/or alluvium to a minimum of 2 feet into the lacustrine clay. Well installations were performed as follows:

1. The borehole was advanced through the overburden to a minimum of 2 feet below the lacustrine clay interface using hollow-stem augers with continuous split-spoon soil samples collected ahead of the auger flights for visual identification of overburden materials. Split-spoon soil samples were field screened using an Organic Vapor Analyzer (OVA).

2. Eight feet of 2-inch I.D. Schedule 40 riser with 10 feet of 10 slot threaded PVC screen was installed through the hollow stem auger to the bottom of the borehole.

3. Fine washed silica sand was placed from the bottom of the hole to 2 feet above the top of the screen. The augers were slowly removed as the sand was placed, keeping the bottom of the augers a minimum of 2 feet below the top of the sand. One foot of bentonite pellets was placed above the sand pack in the annular space inside the augers as the augers were pulled to 2 feet above the screen. Both the sand and bentonite pellets were lightly tamped as they were placed.

4. Before grouting the hole to the surface, the volume of the annular space to be grouted was estimated. Grout mixtures were circulated through the pump on the drill rig at a high speed.

5. The final section of the augers was then removed and the grout seal was topped

off. A protective casing was then installed with the grout seal at the surface elevated to divert surface water away from the monitoring well.

2.2.1.3 Well Development

Monitoring well development serves to remove fines from the sandpack and ensure turbid-free groundwater samples. Wells were developed with bailers as follows:

1. The bailers were decontaminated prior to use.

2. At least five well volumes were purged and the discharged water was monitored, each one-half to one well volume, for pH, conductivity, temperature, and turbidity.

3. The bailer was used periodically to surge the monitoring well to suspend fine-grained sediment during development.

4. All development water was transferred to a designated 55-gallon drum.

Due to the low hydraulic conductivity of the soil penetrated by these wells, well development had to be performed over a period of several days in order to remove sufficient volume. One well (DYF-2) was dry and therefore could not be developed.

2.2.1.4 Elevation Control

A survey was conducted after the completion of the drilling program to establish the elevations of all new monitoring wells. The ground surface elevation adjacent to the well casing and the top of the well casing (for groundwater measurement purposes) were determined at each well location. All measurements were made to the nearest 0.01 foot. The survey was tied into the existing plant coordinate grid system.

2.2.2 Soil Borings

As discussed in Section 1.2, a thick sequence of low permeability lacustrine silty clay and clay underlie the Yerkes Plant and constitute the base and walls for the excavated disposal pits. To assess soil conditions and waste materials present within and below the landfill areas, a minimum of two soil borings were advanced through the fill materials to the top of the lacustrine clay unit in each disposal area.

Borings were advanced using hollow-stem auger drilling techniques and split-spoon soil/waste samples were collected continuously ahead of the auger flights. Samples were visually described and classified in the field by a WCC geologist and screened for potential contamination using an organic vapor analyzer. Soil boring logs are presented in Appendix C.

Single composite samples of fill materials were obtained from each of nine of the ten landfill areas (Areas 1, 2, 3, 4, 5, 6, 7, 8, and 9). Two composite samples were obtained from Landfill Area 10 because OVA readings suggested the upper fill (0-6 feet) contained lower levels of volatile organic compounds than the lower fill (6-14 feet).

The composite soil samples were obtained from the fill, and particularly from waste materials (where present). The samples were analyzed for the Contract Laboratory Program (CLP) Target Compound List (TCL) and Target Analyte List (TAL). Based on the results of the TCL/TAL analyses, several soil samples were selected for Toxicity Characteristic Leaching Procedure (TCLP) analyses. The TCLP analyses were performed if the results of the TCL/TAL analyses (in mg/kg) exceeded the TCLP criteria (in mg/l) for hazardous waste determination by a factor of 20 or more for a given analyte. In accordance with Addendum 1 to the Work Plan, only the TCLP analytes meeting this criterion were analyzed.

2.2.3 Groundwater Sampling Procedures

Groundwater sampling techniques were performed in accordance with procedures outlined in the RCRA Groundwater Monitoring Technical Enforcement Document (TEGD). These procedures were followed to ensure sample representativeness and validity as well as to minimize sample contamination from outside sources. The following procedures were followed in the collection of groundwater samples:

1. The condition of the well to be sampled was examined, particularly with respect to the possibility of security breaches, tampering or well damage, and reported on the WCC Field Sampling Sheet.

2. The depth to water (DTW) and total well depth were measured and recorded on field sampling sheets. All measuring devices were decontaminated prior to use as described in Section 2.2.4.

3. The well was purged of a minimum of three well volumes (or to dryness) using dedicated decontaminated bailers. All purge water was containerized for proper disposal. During purging, water quality parameters (pH, turbidity, specific conductance and temperature) were monitored.

4. Wells were sampled using the dedicated bottom loading bailer. The bailer was lowered smoothly into the well to the middle of the screened interval.

5. The number and types of sample containers filled for each sample and all identification codes were recorded in the field log book and on the field sampling sheet. Appropriate preservatives were added, as necessary, according to NYSDEC ASP 9/89 protocols and samples were placed in shuttles with ice for transport to the laboratory.

2.2.4 Decontamination Procedures

All non-dedicated equipment used during well purging/sampling and soil sampling activities was thoroughly decontaminated prior to each use according to the following procedures:

1. Wash with non-phosphate detergent/potable water solution
2. Tap water rinse
3. Deionized water rinse
4. Rinse with methanol followed by hexane
5. Deionized water rinse
6. 10 percent nitric acid rinse
7. Deionized water rinse
8. Air dry

Sampling equipment was wrapped in aluminum foil (shiny side out) until ready for use. Any equipment not involved with sample acquisition efforts (i.e., equipment for hydraulic head monitoring) was decontaminated with a non-phosphate detergent solution wash and deionized water rinse. All fluids generated during decontamination were containerized for proper disposal by DuPont.

2.2.5 Stormwater and Catch Basin Sediment Sampling

As part of the stormwater management program for the Yerkes Plant, DuPont sampled stormwater and sediment from a catch basin located in the Tedlar Area (Figure 2-1) of the plant. This catch basin was selected for the following reasons:

1. It is located downgradient and collects runoff from the landfill areas

2. It is located along the traffic pattern for materials being brought into the plant

The catch basin sediment and stormwater samples were collected and analyzed by Recra Environmental, Inc., under contract to DuPont. Samples were collected in August 1993 and analyzed for the TCL/TAL in accordance with Addendum 1 to the Work Plan. The stormwater sample was collected during dry weather flow. The storm sewers will be sampled again during a precipitation event. This sampling is scheduled to be performed during August or September 1993, depending on rainfall. DuPont will forward the results to NYSDEC as an Addendum to this Phase II Investigation Report.

2.2.6 Analytical Program

Analytical services were provided by Recra Environmental, Incorporated of Amherst, New York. A summary of the number and type of samples collected and analyses performed is presented in Table 2-1. All newly installed monitoring wells were sampled once following development using the procedures outlined in Section 2.2.3. All collected groundwater samples were analyzed for the full CLP TCL and TAL and sulfate and chloride. The soil and groundwater TCL and TAL analyses were performed using New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocol (ASP), December 1991 methods. Chloride and sulfate analyses were performed using Methods 325.3 and 375.4 ("Methods for Chemical Analysis of Water and Wastes,

USEPA 500/4-79-020", March 1983).

In accordance with the Work Plan and Addendum 1 to the Work Plan (April 30, 1992), some soil/fill samples were selected for Toxicity Characteristic Leaching Procedure (TCLP) on the basis of the reported concentrations of TCLP chemical parameters in the bulk sample analyses. The bulk sample analytical results were compared to TCLP regulatory limits as listed in 40 CFR Part 261.24. All samples for which TCLP chemical parameters were reported in the bulk sample analytical results at concentrations (mg/kg) exceeding 20 times the TCLP regulatory limit (mg/l) were analyzed using TCLP methodology for the indicated parameters. The samples were collected in duplicate to allow for this contingency. In accordance with Addendum 1 to the Work Plan holding time limits were waived for these analyses.

2.3 QUALITY ASSURANCE/QUALITY CONTROL

The Quality Assurance/Quality Control (QA/QC) program for the DuPont Yerkes Phase II Investigation is presented in detail in the Work Plan. Briefly, the QA/QC program required the following:

1. Adherence to the field sampling decontamination and chain-of-custody procedures presented in the Work Plan.

2. Collection and analysis of QC samples (field blanks, field duplicates, rinsate blanks, trip blanks, and matrix spike/matrix spike duplicates (MS/MSD).

3. Adherence, by the contracted laboratory, to the QA/QC requirements specified under NYSDEC Analytical Services Protocol (ASP) Category B, September 1989 for the TCL/TAL analyses.

4. Analytical data validation of results (conducted by WCC).

Specific QA/QC acceptance criteria are discussed in the Data Validation Report, presented in Appendix D.

2.4 PROJECT TEAM

WCC personnel assignments for this project were as follows:

Project Manager:	Kelly R. McIntosh, P.E., P.HGW.
Responsible Professional:	James F. Roetzer, Ph.D.
Project Geologist:	Paul F. Mazierski/ Frank R. Garbe
Data Validation:	Anthony J. Misercola
Peer Review:	James F. Roetzer, Ph.D.

Resumes for each of these WCC personnel were included in the Work Plan.

3.0
PHYSICAL CHARACTERISTICS OF THE SITE

3.1 TOPOGRAPHY, SITE DRAINAGE AND HYDROLOGY

The DuPont Yerkes Plant Site occupies approximately 90 acres. The topography at the site is relatively flat. In general, the land slopes very gently from the northeast (elevation approximately 603 feet) toward the southwest (elevation approximately 588 feet). Surface runoff near the plant production areas drains to storm sewers which converge at a single catch basin. The undeveloped sections of the property, including the landfill areas have very little slope and are well vegetated. Infiltration and evapotranspiration likely limit the amount of runoff in these areas except during periods of sustained precipitation or snowmelt. The surrounding industrial area is generally flat lying with less than 1 percent slope.

The major surface water body in the area is the Niagara River, located approximately 600 feet southwest of the plant. The landfill areas are located in an area classified as Zone C based upon Flood Insurance Rate Maps (FIRM) prepared by the Federal Emergency Management Agency (FEMA, 1982). Zone C represents areas of minimal flooding.

3.2 GEOLOGY

The site is located within the Erie-Ontario Lowlands Physiographic Province of New York, which is characterized by a thick, gently dipping (southward at a rate of 20 to 50 feet per mile) sequence of rock formations, ranging from sandstones and shales to dolomites and limestones from the Silurian and Devonian Periods. The site overburden is underlain by shale and siltstone of the Camillus Formation. The Camillus Formation, a member of the Salina Group, is Late Silurian in age (420 million years before present)

and, in general, consists of light gray to gray shale and siltstone, with abundant thin to thick anhydride, gypsum, and salt beds. The surficial geology of the region has been largely controlled by the effects of Pleistocene glaciation. A majority of the moraines and tills of Erie County have been assigned to the Port Huron Glacial Substage (late Wisconsin), being deposited during the last 12,000 years.

Previous studies performed at the site, including geotechnical investigations and installation of the existing monitoring wells, have characterized the overburden stratigraphy (outside of the landfill areas) in descending order from ground surface as follows: (1) 2 to 8 feet of coarse, hard fill material, (2) 42 to 70 feet of lacustrine silty clay, and (3) 3 to 20 feet of a silt/clay till. Depth to the bedrock interface varies from 62 to 82 feet across the site.

3.3 HYDROGEOLOGY

There are no municipal wells within a 3-mile radius of the site (New York State Department of Health 1982). The entire area is serviced by the Niagara River and there are no known private water wells in use (ECDEP 1982).

Based upon the stratigraphy delineated in the previous investigations, and water level observations in soil borings and monitoring wells, the upper two potential groundwater-bearing zones at the site are: 1) surface deposits (alluvial or fill) above the lacustrine clay (overburden zone), and 2) clay/silt till interface with the upper bedrock (upper bedrock zone). These two zones are the focus of the groundwater flow characterization presented below.

3.3.1 Overburden Zone

Saturated conditions in fill or alluvium above the lacustrine clay were observed in most soil borings and monitoring wells. Four quarterly rounds of hydraulic head

measurements were obtained for all intact monitoring wells. Measurements were taken in September 1992, December 1992, March 1993, and June 1993. The hydraulic head data were used to prepare groundwater potentiometric surface maps for each quarterly monitoring event. Figures 3-1, 3-2, 3-3, and 3-4 present the potentiometric surface maps for the overburden zone. These maps are quite consistent and show very low hydraulic gradients in the landfill areas. A groundwater divide is indicated in the vicinity of MW-3S (approximately coincident with the boundary with General Motors). Groundwater flow across the DuPont property is toward the southwest.

3.3.2 Lacustrine Clay

As described above, the upper 2 to 8 feet of soil and fill materials is underlain by 42 to 70 feet of lacustrine clay. Permeability tests run by Empire Soils in 1980 on three undisturbed clay samples indicate very low permeabilities, ranging from 1.08×10^{-8} to 1.60×10^{-8} cm/second (Blas 1980). This low permeability clay confines the overburden zone from the upper bedrock zone.

3.3.3 Upper Bedrock Zone

There are five existing deep wells at the site which monitor the upper bedrock zone. These wells were installed in 1979 as part of a groundwater study. Figures 3-5, 3-6, 3-7, 3-8 present the potentiometric surface maps for the quarterly hydraulic head monitoring events. These maps show a general flow direction toward the Niagara River, except for September 1992, where a more northerly flow direction is indicated.

3.3.4 Lower Bedrock

Groundwater flow in the lower bedrock (Camillus Formation) was not investigated during this study. In general, groundwater flow in the Camillus Formation can occur through secondary openings such as fractures and solution cavities. However, the

Camillus Formation, in general, is not utilized for water supply because of high salinity and the general poor quality of groundwater obtained from wells.

3.4 SURROUNDING LAND USE

The DuPont Yerkes Plant is located on River road, southeast of New York State Thruway Route 190, in the Town of Tonawanda, Erie County, New York (Figure 1-1). The plant is approximately 90 acres in area and is located in a highly industrialized section of Tonawanda. It is bounded on the northeast by Kenmore Avenue, on the northwest by properties owned by Trans American Properties Inc. and the New York State Thruway Authority, on the southwest by River Road and the southeast by property owned by General Motors Corporation.

No residential properties bound the site, nor are there any residential properties downgradient of the site. The closest residential community is the Woodward Avenue West neighborhood located approximately 250 feet north (upgradient) of the northern corner of the plant property. The Edgar Avenue/Vulcan Street neighborhood lies approximately 1,200 feet southeast of the plant, on the other side of the General Motors Corporation.

Recreational activities that would take place in the vicinity are limited to boating and other water related activities on the Niagara River 600 feet southwest of the plant. In addition the riverwalk, a paved hiking and biking path following the river, lies on the opposite side of the New York State Thruway Route 190 from the plant.

4.0
ENVIRONMENTAL ASSESSMENT

This Section presents and interprets the results of the investigations described in Section 2.0. The results of the soil boring program are used to assess the presence of TCL/TAL chemicals within the landfilled material (Section 4.1). Hydraulic head and groundwater analytical data are used to evaluate the occurrence and potential for migration of TCL/TAL chemicals in groundwater in Section 4.2. Surface water and catch basin sediment analytical results are presented and interpreted in Section 4.3 with respect to potential transport of TCL/TAL chemicals in surface water runoff from the site. Appendix D presents the Data Validation Report for the soil/waste and groundwater samples analyzed.

4.1 CHARACTERIZATION OF LANDFILL AREAS

The ten landfill areas at the plant (shown on Figure 1-2) were investigated through soil borings and composite sampling of landfilled materials. The composite samples were selected to include waste materials found (such as Corian™ and Tedlar™). The composite sample selection was determined in the field by representatives of WCC and NYSDEC. Tables 4-1 through 4-4 present the results of TCL/TAL analyses of soil/waste samples. Samples selected for TCLP analyses are listed on Table 4-5 and the results of the TCLP analyses are summarized in Table 4-6. The individual landfills are considered separately below. In the descriptions that follow, sample observations and OVA measurements are discussed. This information is presented in detail in the soil boring logs presented in Appendix C.

4.1.1 Landfill Area 1

4.1.1.1 General Characteristics

Landfill Area 1 is located in the southern portion of the undeveloped land between the plant production buildings and Kenmore Avenue. It was excavated in 1960 to an estimated depth of 12 feet below ground surface (based on DuPont's 1979 estimate). It is roughly rectangular in shape, approximately 150 feet by 80 feet. Based on these dimensions, the landfill contains approximately 5,300 cubic yards of fill and reworked soil.

The landfill has been classified by DuPont as containing General Waste, which could include any of the materials identified in Section 1.1, except for research and disposal waste (laboratory waste) and Corian™ waste which was not produced at the plant until 1968.

4.1.1.2 Materials Encountered

Two soil borings (SB-1A and SB-1B) were advanced in Landfill Area 1. Landfilled materials encountered included: gravel; brick fragments; clay; wood; dark gray fine sand; white, thin layered, synthetic material; tedlar; and cellophane. A septic odor from the borehole was also reported. OVA measurements off the split-spoon samples were 0 to 5 ppm.

The clay base was encountered at 16 feet BGS in SB-1A and at 8 feet below ground surface (BGS) in SB-1B, suggesting that the 12 feet estimate provided by DuPont may be more representative of the average depth of the landfill area. The nearest deep soil boring to Landfill Area 1 is 7D, located approximately 120 feet south of the area. Lacustrine clay was encountered in this boring from 6 to 48 feet BGS. Based on this, the thickness of the clay layer beneath Landfill Area 1 is estimated to be approximately

32 to 40 feet. The clay layer, therefore, presents a low permeability barrier to vertical migration of groundwater from Landfill Area 1.

4.1.1.3 Results of Chemical Analyses

TCL/TAL analyses were performed on a composite sample of waste material from SB-1A. Tables 4-1 through 4-4 present the analytical results for all detected compounds. Several TCL/TAL chemicals were detected. The highest concentration reported for volatile organic chemicals was 13J (estimated) mg/kg for carbon disulfide. No other volatiles were reported above 10 mg/kg. Semivolatile organics were also detected, with the highest concentrations reported for the polyaromatic hydrocarbon (PAH) compounds phenanthrene (15J (estimated) mg/kg), fluoranthene (14J mg/kg), and pyrene (11J mg/kg). No other semivolatiles were detected at concentrations above 10 mg/kg. Reported PAH concentrations were generally higher in the blind field duplicate of SB-1A. Only one pesticide/PCB compound was detected (PCB-1248 at 1.0 mg/kg). Several metals were detected, as shown on Table 4-4, at concentrations typical of urban soils.

Addendum 1 to the Work Plan states that TCLP analyses would be performed for any TCLP chemical parameters which were reported in the bulk sample analytical results at concentrations (mg/kg) exceeding the TCLP regulatory limit (mg/l) by a factor of more than 20. For Landfill Area 1, this condition was met for only one analyte -- lead. Lead was reported in the bulk sample at a concentration of 169 mg/kg, which exceeded its regulatory limit of 5.0 mg/l by a factor of 34.

The results of the TCLP analyses for lead of the duplicate sample of SB-1A provided to the laboratory was 0.003U mg/l (not detected at a detection limit of 0.003 mg/l). Based on this result, lead leaching to groundwater from Landfill Area 1 does not likely present an environmental concern.

The fill/waste in Landfill Area 1 is isolated by the underlying and surrounding low

permeability clay which would inhibit migration of leachate below the top of the surrounding clay.

4.1.2 Landfill Area 2

4.1.2.1 General Characteristics

Landfill Area 2 is located in an undeveloped field west of the plant production facilities, just northeast of the Co-Generation Facility (Figure 1-2). It was excavated in 1962 to an estimated depth of 20 feet below ground surface (based on DuPont's estimate). It is roughly square in shape, approximately 250 feet on a side. Based on these dimensions, the landfill contains approximately 46,000 cubic yards of fill and reworked soil.

The landfill has been classified by DuPont as containing Tedlar Waste.

4.1.2.2 Materials Encountered

Three soil borings (SB-2A2, SB-2A3, and SB-2B1) were advanced into the fill at Landfill Area 2. An additional boring, SB-2A1 encountered natural clay at 4 feet BGS and was assumed to be outside the landfill area. Landfilled materials encountered in SB-2A2, SB-2A3, and SB-2B1 included: Tedlar™, clay, silt, dark gray sand, wood, and cinders. No odors from the borehole or samples were noted. Due to an equipment malfunction, OVA measurements were not obtained during these borings.

The clay base was encountered at 6 feet BGS in SB-2A2, 12 feet BGS in SB-2B1, and at 12 feet BGS in SB-2A3, suggesting that the 20 feet estimate for fill depth provided by DuPont may be too high or may represent a maximum depth of the landfill area. Therefore, the volume estimate presented above is likely to overestimate the actual waste volume. The nearest deep soil boring to Landfill Area 2 is B-5, located approximately 500 feet south of the area. Lacustrine clay was encountered in this boring

from 1 to 56 feet BGS. Based on this, the thickness of the clay layer beneath Landfill Area 2 is estimated to be approximately 36 to 44 feet. The clay layer, therefore, presents a low permeability barrier to vertical migration of groundwater from Landfill Area 2.

4.1.2.3 Results of Chemical Analyses

WCC was not able to obtain sufficient Tedlar™ for analyses from the split-spoon samples because of low recovery. Therefore, a composite sample of Tedlar™ waste from SB-2A3 was obtained directly from the outside of the augers as they were removed.

TCL/TAL analyses were performed on this composite sample. Tables 4-1 through 4-4 present the analytical results for all detected compounds. No volatile organic chemicals were detected in the composite sample at levels above 1 mg/kg. Only one semivolatile compound was present above 1 mg/kg (bis(2-ethylhexyl)phthalate at 1.8 mg/kg). Only one pesticide/PCB compound was detected (PCB-1248 at 3.9 mg/kg). Several metals were detected, as shown on Table 4-4, at concentrations typical of urban soils.

Addendum 1 to the Work Plan states that TCLP analyses would be performed for any TCLP chemical parameters which were reported in the bulk sample analytical results at concentrations (mg/kg) exceeding the TCLP regulatory limit (mg/l) by a factor of more than 20. For Landfill Area 2, this condition was met for only one analyte -- lead. Lead was reported in the bulk sample at a concentration of 174 mg/kg, which exceeded it s regulatory limit of 5.0 mg/l by a factor of 35.

The results of the TCLP analyses for lead of the duplicate sample of SB-2A3 provided was 0.166 mg/l, well below the regulatory limit of 5.0 mg/l. Based on this result, lead leaching to groundwater from Landfill Area 2 does not likely present an environmental concern.

Based on the low concentrations of TCL/TAL chemicals detected, the fill in Landfill Area 2 does not likely pose an environmental concern. The fill/waste is isolated by the underlying and surrounding low permeability clay which would inhibit migration of leachate below the top of the surrounding clay.

4.1.3 Landfill Area 3

4.1.3.1 General Characteristics

Landfill Area 3 is located in the southern portion of the undeveloped land between the plant production buildings and Kenmore Avenue (Figure 1-2). It was excavated in 1963 to an estimated depth of 30 feet below ground surface (based on DuPont's estimate). Based on these dimensions, the landfill contains approximately 76,000 cubic yards of fill and reworked soil.

The landfill has been classified by DuPont as containing General Waste, which could include any of the materials identified in Section 1.1, except for research and disposal waste (laboratory waste).

4.1.3.2 Materials Encountered

Two soil borings (SB-3A and SB-3B) were advanced in Landfill Area 3. Landfilled materials encountered included: Tedlar™, Vexar™ netting, Corian™, dark gray sandy silt, clay, and building rubble. A septic odor from the borehole was also reported. OVA measurements off the split-spoon samples ranged from 0 to greater than 1,000 ppm. It is likely that the higher measurements are attributable to methane being detected by the OVA. Decomposed wood was found immediately below the spoon with the highest (500-1,000 ppm) reading.

The clay base was encountered at 20 feet BGS in SB-3A and at 18.4 feet BGS in SB-3B,

suggesting that the 30 feet estimate for depth of fill provided by DuPont may be too high or represent a maximum depth of the landfill area. Therefore, the volume estimate presented above is likely to be an overestimate. The nearest deep soil boring to Landfill Area 3 is 7D, located approximately 180 feet south of the area. Lacustrine clay was encountered in this boring from 6 to 48 feet BGS. Based on this, the thickness of the clay layer beneath Landfill Area 3 is estimated to be approximately 18 to 30 feet in thickness. The clay layer, therefore, presents a low permeability barrier to vertical migration of groundwater from Landfill Area 3.

4.1.3.3 Results of Chemical Analyses

TCL/TAL analyses were performed on a composite sample of waste material from SB-3B. Tables 4-1 through 4-4 present the analytical results for all detected compounds. No TCL volatile organic chemicals were detected. Five TCL semivolatile compounds were detected at concentrations above 10 mg/kg. All were PAH compounds: naphthalene at 14J mg/kg, phenanthrene at 33J mg/kg, fluoranthene at 26J mg/kg, pyrene at 19J mg/kg, and benzo(a)anthracene at 16J mg/kg (J qualifier indicates the concentration is estimated). There were three pesticide/PCB compounds detected (gamma-BHC, endosulfan II and gamma-chlordane), all with estimated (J qualifier) concentrations below 0.003 mg/kg. Several TAL metals were also detected, as shown on Table 4-4, at concentrations typical of urban soils.

Addendum 1 to the Work Plan states that TCLP analyses would be performed for any TCLP chemical parameters which were reported in the bulk sample analytical results at concentrations (mg/kg) exceeding the TCLP regulatory limit (mg/l) by a factor of more than 20. For Landfill Area 3, no chemicals were detected above this level. Therefore, no TCLP analyses were required.

Based on the low concentrations of TCL/TAL chemicals detected, the fill in Landfill Area 3 is not likely to pose an environmental concern. The fill/waste is isolated by the

underlying and surrounding low permeability clay which would inhibit migration of leachate below the top of the surrounding clay.

4.1.4 Landfill Area 4

4.1.4.1 General Characteristics

Landfill Area 4 is located in the southern portion of the undeveloped land between the plant production buildings and Kenmore Avenue (Figure 1-2). It was excavated in 1974 to an estimated depth of 15 feet below ground surface (based on DuPont's estimate). It is roughly rectangular in shape, approximately 125 feet by 65 feet. Based on these dimensions, the landfill contains approximately 4,500 cubic yards of fill and reworked soil.

The landfill has been classified by DuPont as containing General Waste, which could include any of the materials identified in Section 1.1, except for research and disposal waste (laboratory waste).

4.1.4.2 Materials Encountered

Two soil borings (SB-4A and SB-4B) were advanced in Landfill Area 4. Landfilled materials encountered included: Corian™, Tedlar™, Vexar™ netting, wood, dark gray sand, silt, and clay. OVA measurements off the split-spoon samples ranged from 0 to 10 ppm, with one reading of 40 ppm off of decomposed wood likely attributable to methane.

The clay base was encountered at 18.2 feet BGS in SB-4A and at 18 feet BGS in SB-4B, suggesting that the 15 feet estimate for depth of fill provided by DuPont may be representative of the average depth of the landfill area. The nearest deep soil boring to Landfill Area 4 is 7D, located approximately 75 feet north northeast of the area.

Lacustrine clay was encountered in this boring from 6 to 48 feet BGS. Based on this, the clay layer beneath Landfill Area 4 is estimated to be approximately 30 to 33 feet in thickness. The clay layer, therefore, presents a low permeability barrier to vertical migration of groundwater from Landfill Area 4.

4.1.4.3 Results of Chemical Analyses

TCL/TAL analyses were performed on a composite sample of waste material from SB-4A. Tables 4-1 through 4-4 present the analytical results for all detected compounds. No TCL volatiles were detected in the sample at concentrations above 1 mg/kg. TCL semivolatiles detected above 10 mg/kg were pyrene at 14J mg/kg and butylbenzylphthalate at 28J mg/kg (J qualifier indicates concentration is estimated). Five pesticide/PCB compounds were detected: endosulfan II at 0.00049J mg/kg, 4,4'-DDT at 0.012J mg/kg, methoxychlor at 0.016J mg/kg, endrin aldehyde at 0.022 mg/kg, and alpha-chlordane at 0.0031J mg/kg. Several TAL metals were also detected, as shown on Table 4-4, at concentrations typical of urban soils.

Addendum 1 to the Work Plan states that TCLP analyses would be performed for any TCLP chemical parameters which were reported in the bulk sample analytical results at concentrations (mg/kg) exceeding the TCLP regulatory limit (mg/l) by a factor of more than 20. For Landfill Area 4, no chemicals were detected above this level. Therefore, no TCLP analyses were required.

Based on the low concentrations of TCL/TAL chemicals detected, the fill in Landfill Area 4 is not likely to pose an environmental concern. The fill/waste is isolated by the underlying and surrounding low permeability clay which would inhibit migration of leachate below the top of the surrounding clay.

4.1.5 Landfill Area 5

4.1.5.1 General Characteristics

Landfill Area 5 is located in the southern portion of the undeveloped land between the plant production buildings and Kenmore Avenue (Figure 1-2). It was excavated in 1974 to an estimated depth of 15 feet below ground surface (based on DuPont's estimate). It is roughly rectangular in shape, approximately 200 feet by 100 feet. Based on these dimensions, the landfill would be estimated to contain approximately 11,000 cubic yards of fill and reworked soil.

The landfill has been classified by DuPont as containing General Waste, which could include any of the materials identified in Section 1.1, except for research and development waste (laboratory waste).

4.1.5.2 Materials Encountered

Two soil borings (SB-5A and SB-5B) were advanced in Landfill Area 5. Landfilled materials encountered included: Tedlar™, Vexar™, netting, cellophane, building rubble, and reworked clay. A septic odor from the SB-5B borehole was also reported. OVA measurements from the split-spoon samples ranged from 0 to 7 ppm.

The clay base was encountered at 12 feet BGS in SB-5A and at 12 feet BGS in SB-5B, suggesting that the 15 feet estimate for depth of fill provided by DuPont may be more representative of the maximum than the average depth of the landfill area. Therefore, the volume estimate presented above is likely to be an overestimate. The nearest deep soil boring to Landfill Area 5 is 2D, located approximately 170 feet north of the area. Lacustrine clay was encountered in this boring to a depth of 55 feet BGS. Based on this, the clay layer beneath Landfill Area 1 is estimated to be approximately 40 to 43 feet in thickness. The clay layer, therefore, presents a low permeability barrier to vertical

migration of groundwater from Landfill Area 5.

4.1.5.3 Results of Chemical Analyses

TCL/TAL analyses were performed on a composite sample of waste material from SB-5A. Tables 4-1 through 4-4 present the analytical results for all detected compounds. One TCL volatile was detected in the sample at a concentration above 1 mg/kg (toluene at 1.1 mg/kg). One TCL semivolatile was detected in the sample at a concentration above 10 mg/kg (di-n-butylphthalate at 13J (estimated) mg/kg). One pesticide/PCB compound was detected (PCB-1254 at 0.72 mg/kg). Several TCL metals were also detected, as shown on Table 4-4, at concentrations typical of urban soils.

Addendum 1 to the Work Plan states that TCLP analyses would be performed for any TCLP chemical parameters which were reported in the bulk sample analytical results at concentrations (mg/kg) exceeding the TCLP regulatory limit (mg/l) by a factor of more than 20. For Landfill Area 5, this condition was met for only one analyte -- lead. Lead was reported in the bulk sample at a concentration of 115 mg/kg, which exceeded its regulatory limit of 5.0 mg/l by a factor of 23.

The results of the TCLP analyses for lead of the duplicate sample of SB-5A provided to the laboratory was 0.003 U mg/l (not detected at a detection limit of 0.003 mg/l). Based on this result, lead leaching to groundwater from Landfill Area 5 does not present a significant environmental concern.

Based on the low concentrations of TCL/TAL chemicals detected, the fill in Landfill Area 5 is not likely to pose an environmental concern. The fill/waste is isolated by the underlying and surrounding low permeability clay which would inhibit migration of leachate below the top of the surrounding clay.

4.1.6 Landfill Area 6

4.1.6.1 General Characteristics

Landfill Area 6 is located in the central portion of the undeveloped land between the plant production buildings and Kenmore Avenue (Figure 1-2). It was excavated in 1975 to an estimated depth of 15 feet below ground surface (based on DuPont's estimate). It is roughly rectangular in shape, approximately 200 feet by 100 feet. Based on these dimensions, the landfill would be estimate to contain approximately 11,000 cubic yards of fill and reworked soil.

The landfill has been classified by DuPont as containing General Waste, which could include any of the materials identified in Section 1.1, except for research and development waste (laboratory waste).

4.1.6.2 Materials Encountered

Two soil borings (SB-6A and SB-6B) were advanced in Landfill Area 6. Landfilled materials encountered included: Corian™, transparent film (polyvinylalcohol according to DuPont) and building rubble. A septic odor from the SB-6A borehole was also reported. OVA measurements of the split-spoon samples ranged from 0 to 70 ppm. Based on the septic odor, the elevated OVA measurements were likely attributable to methane evolution.

This landfill contained large blocks of Corian™ which were difficult to auger through and prevented penetration of the clay base at SB-6A. The clay base was encountered at 22 feet BGS in SB-6B, suggesting that the depth estimate of 15 feet provided by DuPont and the volume estimate presented above may be low. The nearest deep soil boring to Landfill Area 6 is 3D, located approximately 120 feet north northwest of the area. Lacustrine clay was encountered in this boring from 7 to 68 feet BGS. Based on this,

the clay layer beneath Landfill Area 6 is estimated to be approximately 46 to 53 feet in thickness. The clay layer, therefore, presents a low permeability barrier to vertical migration of groundwater from Landfill Area 6.

4.1.6.3 Results of Chemical Analyses

TCL/TAL analyses were performed on a composite sample of waste material from SB-6B. Tables 4-1 through 4-4 present the analytical results for all detected compounds. No TCL volatile organic chemicals were detected above 1 mg/kg in the sample. Two TCL semivolatiles were detected above 10 mg/kg: butylbenzylphthalate (110 mg/kg) and bis(2-ethylhexyl)phthalate (170 mg/kg). Two pesticide/PCB compounds were detected: PCB-1248 at 0.18 mg/kg and PCB-1260 at 0.13J (estimated) mg/kg. Several TAL metals were also detected, as shown on Table 4-4, at concentrations typical of urban soils.

Addendum 1 to the Work Plan states that TCLP analyses would be performed for any TCLP chemical parameters which were reported in the bulk sample analytical results at concentrations (mg/kg) exceeding the TCLP regulatory limit (mg/l) by a factor of more than 20. For Landfill Area 6, this condition was met for only one analyte -- lead. Lead was reported in the bulk sample at a concentration of 197 mg/kg, which exceeded its regulatory limit of 5.0 mg/l by a factor of 39.

The results of the TCLP analyses for lead of the duplicate sample of SB-6B provided to the laboratory was 0.0653 mg/l, well below the regulatory limit of 5.0 mg/l. Based on this result, lead leaching to groundwater from Landfill Area 6 does not present a significant environmental concern.

Based on the low concentrations of TCL/TAL chemicals detected, the fill in Landfill Area 6 is not likely to pose an environmental concern. The fill/waste is isolated by the underlying and surrounding low permeability clay which would inhibit migration of

leachate below the top of the surrounding clay.

4.1.7 Landfill Area 7

4.1.7.1 General Characteristics

Landfill Area 7 is located in the southwest portion of the undeveloped land between the plant production buildings and Kenmore Avenue (Figure 1-2). It was excavated in 1976 to an estimated depth of 15 feet below ground surface (based on DuPont's estimate). The landfill is roughly rectangular in shape, approximately 200 feet by 100 feet. Based on these dimensions, the landfill would be estimated to contain approximately 11,000 cubic yards of fill.

Landfill Area 7 has been classified by DuPont as containing General Waste, which could include any of the materials identified in Section 1.1, except for research and development waste (laboratory waste).

4.1.7.2 Materials Encountered

Two soil borings (SB-7A and SB-7B) were advanced in Landfill Area 7. Landfilled materials encountered included: Corian™, reworked dark grey clay and silt, transparent film (possibly polyvinylalcohol) and white fibrous woven material. A septic odor from the borehole was also reported. OVA measurements of the split-spoon samples ranged from 6 to 40 ppm. The septic odor suggests the higher readings were probably influenced by methane evolution.

This landfill contained large blocks of Corian™ which could not be augured through. This prevented penetration to the clay base at SB-7A. The clay base was encountered at 18.2 feet BGS in SB-7B, suggesting that the 15 feet estimate provided by DuPont and the volume estimate presented above may be low. The nearest deep soil boring to

Landfill Area 7 is 3D, located approximately 300 feet north of the area. Lacustrine clay was encountered in this boring from 7 to 68 feet BGS. Based on this, the clay layer beneath Landfill Area 7 is estimated to be approximately 50 to 53 feet in thickness. The clay layer, therefore, presents a low permeability barrier to vertical migration of groundwater from Landfill Area 7.

4.1.7.3 Results of Chemical Analyses

TCL/TAL analyses were performed on a composite sample of waste material from SB-7B. Tabled 4-1 through 4-4 present the analytical results for all detected compounds. No TCL volatiles were detected in the sample at concentrations above 1 mg/kg. Two TCL semivolatiles were detected above 10 mg/kg: butylbenzylphthalate at 690 mg/kg and bis(2-ethylhexyl)phthalate at 180J (estimated) mg/kg. Three pesticide/PCB compounds were detected: PCB-1248 at 4.8 mg/kg, PCB-1254 at 0.59 mg/kg, and PCB-1260 at 0.4 mg/kg. Several TAL metals were also detected, as shown on Table 4-4, at concentrations typical of urban soils.

Addendum 1 to the Work Plan states that TCLP analyses would be performed for any TCLP chemical parameters which were reported in the bulk sample analytical results at concentrations (mg/kg) exceeding the TCLP regulatory limit (mg/l) by a factor of more than 20. For Landfill Area 7, this condition was met for only one analyte -- lead. Lead was reported in the bulk sample at a concentration of 178 mg/kg, which exceeded its regulatory limit of 5.0 mg/l by a factor of 36.

The results of the TCLP analyses for lead of the duplicate sample of SB-7B provided to the laboratory was 0.0043 mg/l, well below the regulatory limit of 5.0 mg/l. Based on this result, lead leaching to groundwater from Landfill Area 7 does not likely present an environmental concern.

Based on the low concentrations of TCL/TAL chemicals detected, the fill in Landfill

Area 7 is not likely to pose an environmental concern. The fill/waste is isolated by the underlying and surrounding low permeability clay which would inhibit migration of leachate generated below the top of the surrounding clay.

4.1.8 Landfill Area 8

4.1.8.1 General Characteristics

Landfill Area 8 encompasses most of the northeastern portion of the undeveloped land between the plant production buildings and Kenmore Avenue (Figure 1-2). This area was originally a topographic low. DuPont estimates that 4 to 5 feet of fill was placed on the ground surface throughout the low-lying area. Landfill Area 8 was not excavated.

Most of the landfill area is currently owned by General Motors Corporation. The area encompasses approximately 600,000 ft^2 (approximately 530,000 ft^2 on GM property and 70,000 ft^2 on DuPont property. Using a thickness of 4.5 feet, landfill Area 8 would be estimated to contain approximately 100,000 cubic yards of fill.

The landfill has been classified by DuPont as containing General Waste, which could include any of the materials identified in Section 1.1, except for research and development waste (laboratory waste).

4.1.8.2 Materials Encountered

Two soil borings (SB-8A and SB-8B) were advanced in the portion of Landfill Area 8 on DuPont property. Landfilled materials encountered included: building rubble, cinders, Tedlar™, and dark grey fill. HNu measurements of the split-spoon sample ranged from 0 to 5 ppm.

The clay base was encountered at approximately 6 feet BGS in both SB-8A and SB-8B.

In both borings, the fill was present to a depth of 4 to 5 feet and was underlain by 1 to 2 feet of an organic muck or peat. Lacustrine clay underlied the organic soil at approximately 6 feet BGS. This suggests that the 4 to 5 feet estimate provided by DuPont may be representative of the average depth of the landfill area. The nearest deep soil boring to Landfill Area 8 is 4D, located approximately 100 feet north northwest of the area. Lacustrine clay was encountered in this boring to a depth of 77 feet BGS. Based on this, the clay layer beneath Landfill Area 8 is estimated to be approximately 71 feet in thickness. The clay layer, therefore, presents a low permeability barrier to vertical migration of groundwater from Landfill Area 8.

4.1.8.3 Results of Chemical Analyses

TCL/TAL analyses were performed on a composite sample of waste material from SB-8B. Tables 4-1 through 4-4 present the analytical results for all detected compounds. No TCL volatile organic chemicals were detected in the sample at concentrations above 1 mg/kg. TCL semivolatiles detected above 10 mg/kg were: fluoranthene at 12J mg/kg, pyrene at 29J mg/kg, chrysene at 11J (mg/kg) and benzo(a)pyrene at 12J mg/kg (J qualifier indicates estimated concentrations). Two pesticide/PCB compounds were detected: PCB-1248 at 0.36 mg/kg and PCB-1254 at 0.62 mg/kg. Several TAL metals were also detected, as shown on Table 4-4, at concentrations typical of urban soils.

Addendum 1 to the Work Plan states that TCLP analyses would be performed for any TCLP chemical parameters which were reported in the bulk sample analytical results at concentrations (mg/kg) exceeding the TCLP regulatory limit (mg/l) by a factor of more than 20. For Landfill Area 8, this condition was met for only one analyte -- lead. Lead was reported in the bulk sample at a concentration of 628 mg/kg, which exceeded its regulatory limit of 5.0 mg/l by a factor of 126.

The results of the TCLP analyses for lead of the duplicate sample of SB-8B provided to the laboratory was 0.550 mg/l, well below the regulatory limit of 5.0 mg/l. Based on this

result, lead leaching to groundwater from Landfill Area 8 does not likely present an environmental concern.

Based on the low concentrations of TCL/TAL chemicals detected, the fill in Landfill Area 8 is not likely to pose an environmental concern. The fill/waste is isolated by the underlying and surrounding low permeability clay which would inhibit migration of leachate generated below the top of the surrounding clay.

4.1.9 Landfill Area 9

4.1.9.1 General Characteristics

Landfill Area 9 is reported by DuPont to be a small research and development waste landfill located approximately 300 feet northeast of Landfill Area 2 (Figure 1-2). It was excavated in 1956 to an estimated depth of 10 feet below ground surface (based on DuPont's estimate). It is roughly square in shape, approximately 25 feet on a side. Based on these dimensions, the landfill would be estimated to contain approximately 230 cubic yards of fill and reworked soil.

4.1.9.2 Materials Encountered

Five soil borings, designated SB-9A, SB-9B, SB-9C, SB-9D, and SB-9E, were advanced in or in the vicinity of Landfill Area 9. Fill material was encountered in each boring. Fill materials observed included primarily building rubble with some slag, reworked clay, and dark grey fill. No evidence of glass or other laboratory waste as observed in any boring.

The clay base was encountered at the following depths:

Boring ID	Depth to Clay Base
SB-9A	6.3 feet
SB-9B	6.5 feet
SB-9C	5.4 feet
SB-9D	6.5 feet
SB-9E	6.5 feet

This suggests that the 10 feet depth estimated by DuPont is too high. The nearest deep soil boring to Landfill Area 9 is B-7, located approximately 450 feet southeast of the area. Lacustrine clay was encountered in this boring from 6 to 62 feet BGS. Based on this, the clay layer beneath Landfill Area 9 is estimated to be approximately 52 to 56 feet in thickness. The clay layer, therefore, presents a low permeability barrier to vertical migration of groundwater from Landfill Area 9.

4.1.9.3 Results of Chemical Analyses

TCL/TAL analyses were performed on a composite sample of waste material from four of the borings (sample designated as SB-9BCDE). Tables 4-1 through 4-4 presents the analytical results for all detected compounds. No TCL volatiles were detected in the sample above 0.1 mg/kg. No TCL semivolatiles were detected above 10 mg/kg in SB-9BCDE. However, in the blind field duplicate sample, the following semivolatiles were detected above 10 mg/kg: phenanthrene (14 mg/kg), fluoranthene (14 mg/kg), and pyrene (13 mg/kg). No pesticide/PCB compounds were detected. Several TAL metals were also detected, as shown on Table 4-4, at concentrations typical of urban soils.

Addendum 1 to the Work Plan states that TCLP analyses would be performed for any TCLP chemical parameters which were reported in the bulk sample analytical results at concentrations (mg/kg) exceeding the TCLP regulatory limit (mg/l) by a factor of more than 20. For Landfill Area 9, this condition was met for only one analyte -- lead. Lead

was reported in the bulk sample at a concentration of 148.2 mg/kg, which exceeded its regulatory limit of 5.0 mg/l by a factor of 30.

The results of the TCLP analyses for lead of the duplicate sample of SB-9ABCDE provided was 0.003 U mg/l (not detected at a detection limit of 0.003 mg/l). Based on this result, lead leaching to groundwater from Landfill Area 9 does not present a significant environmental concern.

No evidence of laboratory waste was encountered in any of the five borings in this area. The low concentrations of chemicals present in the composite sample from four borings located close to the suspected waste disposal area suggest that any horizontal migration of contaminants has been minimal. The landfilled material is isolated by the underlying and surrounding low permeability clay which would inhibit migration of leachate below the top of the surrounding clay.

4.1.10 Landfill Area 10

4.1.10.1 General Characteristics

Landfill Area 10 is a small research and development waste landfill located near the northeast end of the plant production buildings (Figure 1-2). It was excavated in 1957 to an estimated depth of 10 feet below ground surface (based on DuPont's estimate). It is roughly square in shape, approximately 25 feet on a side. Based on these dimensions, the landfill would be estimated to contain approximately 230 cubic yards of fill and reworked soil.

4.1.10.2 Materials Encountered

Eight soil borings, designated SB-10A, SB-10B, SB-10C, SB-10D, SB-10E, SB-10F, SB-10G, and SB-10H, were advanced in or in the vicinity of Landfill 10. The first seven

borings encountered primarily building rubble and reworked soil above the lacustrine clay and no evidence of laboratory waste was observed. Furthermore, there were no elevated OVA measurements from the first seven borings (range: 0 to 1.5 ppm). However, split-spoon samples from the eighth soil boring, SB-10H, contained glass fragments and fibers within the reworked clay. A strong odor was noted and OVA measurements were elevated (100 to greater than 1,000 ppm) from the samples from the 8 to 10 feet and 10 to 12 feet intervals. The OVA measurement taken off the clay (12.9 to 14 feet BGS) was 0 ppm, suggesting little vertical migration into the clay base has occurred.

The clay base was encountered at the following depths:

Boring ID	Depth to Clay Base
SB-10A	4 feet
SB-10B	4 feet
SB-10C	6 feet
SB-10D	Concrete slab at 0.5 feet
SB-10E	4 feet
SB-10F	4 feet
SB-10G	4 feet
SB-10H	12.9 feet

The nearest deep soil boring to Landfill Area 10 is 1D, located approximately 250 feet northeast of the area. Lacustrine clay was encountered in this boring to a depth of 62 feet BGS. Based on this, the clay layer beneath Landfill Area 10 is estimated to be approximately 49 feet in thickness. The clay layer, therefore, presents a low permeability barrier to vertical migration of groundwater from Landfill Area 10.

4.1.10.3 Results of Chemical Analyses

TCL/TAL analyses were performed on two composite samples of waste material from SB-10H. Sample SB-10H1 was a composite sample obtained from 2 to 6 feet BGS where the glass fragments and fibers were first encountered. Sample SB-10H2 was obtained from 8 to 14 feet BGS where the elevated OVA measurements were recorded. Tables 4-1 through 4-4 present the analytical results for all detected compounds.

The deeper sample (SB-10H2) contained much higher TCL/TAL concentrations than the upper sample (SB-10H1). TCL volatiles were not detected in SB-10H1 above 1 mg/kg. Several volatiles were detected in SB-10H2, with the maximum concentration of 3,800 mg/kg reported for toluene. No TCL semivolatiles were detected above 10 mg/kg in SB-10H1. TCL semivolatiles detected above 10 mg/kg in SB-10H2 were: phenol at 31E (estimated due to exceedance of calibration range) mg/kg, dimethylphthalate at 23E mg/kg, diethylphthalate at 370J (estimated) mg/kg, di-n-butylphthalate at 2,500 mg/kg, and bis(2-ethylhexyl)phthalate at 11E mg/kg. One pesticide/PCB compound was detected in SB-10H1: PCB-1254 at 3.4 mg/kg. Very low concentrations of six pesticide/PCB compounds were detected in SB-10H2: gamma BHC at 0.0014 J (estimated) mg/kg, heptachlor at 0.0049 mg/kg, endosulfan II at 0.0093 mg/kg, 4,4'-DDT at 0.010 mg/kg, endrin ketone at 0.020 mg/kg, and alpha-chlordane at 0.0037 mg/kg. TAL metals concentrations in both samples were in the typical range for urban soils except for mercury which was elevated (99.5 mg/kg in SB-10H1 and 4,010 mg/kg in SB-10H2).

Addendum 1 to the Work Plan states that TCLP analyses would be performed for any TCLP chemical parameters which were reported in the bulk sample analytical results at concentrations (mg/kg) exceeding the TCLP regulatory limit (mg/l) by a factor of more than 20. For sample SB-10H1, this condition was met for only one analyte -- mercury. Mercury was reported in the bulk sample at a concentration of 99.5 mg/kg, which exceeded its regulatory limit of 0.2 mg/l by a factor of 498.

For sample SB-10H2, five chemicals required the TCLP analyses:

Chemical	Bulk Concentration	TCLP Regulatory Limit	Exceedance Factor
Chloroform	250 mg/kg	6.0 mg/l	42
Trichloroethene	440 mg/kg	0.5 mg/l	880
Benzene	140 mg/kg	0.5 mg/l	280
Tetrachloroethene	2,600 mg/kg	0.7 mg/l	3,700
Mercury	4,010 mg/kg	0.2 mg/l	20,000

Although only four volatile organic chemicals met the criteria for TCLP analyses, the laboratory was instructed to analyze for the entire TCLP volatile fraction.

The results of the TCLP analyses of duplicate samples provided to the laboratory were:

Sample ID	Chemical	TCLP Concentration (mg/l)	TCLP Regulatory Limit[1] (mg/l)
SB-10H1	Mercury	0.0002U	0.2
SB-10H2	Vinyl chloride	0.031J	0.2
	1,1-Dichloroethene	0.033J	0.7
	Chloroform	6.2	6.0
	1,2-Dichloroethane	0.1U	0.5
	2-Butanone	3.1	200
	Carbon tetrachloride	0.1U	0.5
	Trichloroethene	7.9	0.5
	Benzene	2.7	0.5

Sample ID	Chemical	TCLP Concentration (mg/l)	TCLP Regulatory Limit[1] (mg/l)
SB-10H2	Tetrachloroethene	17.0	0.7
(continued)	Chlorobenzene	0.39	100
	Mercury	0.0037	0.2

Exceedance of the TCLP regulatory limit was limited to the four volatile organic chemicals which met the bulk sample concentration criteria for TCLP analysis in SB-10H2: chloroform, trichloroethene, benzene, and tetrachloroethene.

The observations (no evidence of laboratory waste) and the low OVA measurements during seven of the eight soil borings in Landfill Area 10 suggest that the area of laboratory waste disposal is small (probably less than the 25 feet by 25 feet area estimated by DuPont). TCL and mercury concentrations are elevated within this disposal area. However, the low OVA readings in the surrounding borings suggest that little horizontal migration of volatile organics has occurred. The contaminated material was found at depth, primarily from 8 to 14 feet, indicating it is surrounded by clay on the bottom and on the sides. The fill/waste is isolated by the underlying and surrounding low permeability clay which would inhibit migration of leachate below the top of the surrounding clay.

4.2 GROUNDWATER QUALITY

Groundwater quality at the site was investigated through sampling of the five new shallow overburden wells (DYF-1, DYF-2, DYF-3, DYF-4, and DYF-5) located along the downgradient perimeter of the plant (see Figures 3-1 through 3-4). Samples were analyzed in accordance with the Work Plan for the TCL and TAL. The results of these analyses are presented in Table 4-7 (volatiles), 4-8 (semivolatiles), 4-9 (pesticide/PCBs), and 4-10 (TAL metals).

No TCL volatiles were detected in any samples. One TCL semivolatile was detected in one sample: bis(2-ethylhexyl)phthalate, reported at 10J (estimated) ug/l in monitoring well DYF-1. The presence of this chemical at low concentrations in monitoring wells is often attributable to leaching from PVC well casings or sampling equipment, or from laboratory contamination, and therefore is not indicative of groundwater contamination. No pesticide/PCB compounds were detected.

TAL metals results show no evidence of elevated contaminant levels relative to urban/industrial background. New York State Groundwater Quality Standards (NYSGQS) for Class GA groundwater were exceeded in more than one groundwater sample for three metals: iron, manganese, and sodium. There were only two exceedances of NYSGQS for the toxic metals, both occurring in DYF-3. One was a nominal exceedance for lead (26.5 ug/l in the sample versus a standard of 25 ug/l). The other was for silver (122 ug/l in the sample versus a standard of 50 ug/l). Both lead (17 ug/l) and silver (14 ug/l) were below NYSGQS in the blind duplicate sample from DYF-3 (Table 4-10).

The results of the groundwater sampling show that the plant has not significantly impacted shallow overburden groundwater quality at the downgradient plant perimeter.

4.3 STORMWATER AND SEDIMENT SAMPLING

Analytical results of the stormwater and sediment sampling were provided by DuPont and are presented in Appendix F. For the sediment sample, no volatile organic chemicals were present above detection limits. No semivolatile organic compounds were detected above 1 mg/kg and no pesticide/PCB compounds were present above detection limits. Metals concentrations were within typical ranges for urban/industrial drainageways.

No TCL volatiles, semivolatiles, or pesticide/PCB compounds were detected in the

sample of dry weather storm flow. TAL metals results were all below NYSGQS for Class A surface water except for iron (concentration of 4,800 ug/l versus a standard of 300 ug/l), which is likely to be naturally occurring in the soil.

These results suggest that the landfill areas have not impacted the water quality of dry weather storm sewer flow or sediment chemistry. A sampling of storm sewer flow during a precipitation event is scheduled for August or September 1993, depending on rainfall. The analytical results will be submitted to NYSDEC as an Addendum to this Phase II Investigation Report.

5.0
CONCLUSIONS

As described in Section 1.2, the Phase I Investigation Report for the DuPont Yerkes Plant (E&E, January 1990) indicated that potentially significant environmental impacts of the plant (in particular the 10 landfill areas) were limited to potential migration of landfilled constituents to the Niagara River. This Phase II Investigation focused on the two most likely potential pathways for contaminant migration to the Niagara River:

1. Migration in shallow groundwater (above the thick layer of lacustrine clay underlying the entire site)

2. Migration in stormwater runoff

The Phase II Investigation also characterized the materials present in the landfill areas and assessed the potential for leaching and migration of leached constituents. Conclusions of the Phase II Investigation are summarized below.

5.1 LANDFILL CHARACTERIZATION

The ten landfill areas at the plant (Figure 1-2) were individually investigated through soil borings and analyses of soil/waste samples. Composite samples from the borings, which included waste materials present, were prepared as determined in the field by representatives of WCC and NYSDEC. The results of the chemical analyses performed showed that Landfill Areas 1, 2, 3, 4, 5, 6, 7, 8, and 9 contain fill with relatively low concentrations of TCL/TAL constituents. Polyaromatic hydrocarbons (PAH) compounds were the organic chemicals detected most frequently, with several reported concentrations above 10 ppm. However, these PAH concentrations are typical of urban and industrial fill as they are constituents of tars, asphalts, and other heavy petroleum

based products. The reported levels may represent the background concentrations in this industrial area.

In these nine landfills, lead was the only heavy metal detected at or above the total concentration used in this investigation to trigger Toxicity Characteristic Leaching Procedure (TCLP) testing (see Section 2.2.2). The TCLP results for lead were in all cases very low, indicating that it has a low potential for leaching and does not present a concern with respect to causing groundwater contamination. The total lead concentrations detected were generally typical for urban areas near busy highways such as I-190 (which borders the site).

The fill/waste in these nine landfill areas is underlain by 18 to 70 feet of low permeability lacustrine clay. Since the landfill areas were excavated into the clay (except for Landfill Area 8), the clay sides of the pits also present barriers to lateral migration of potential leachate constituents.

Based on the results of chemical analyses of waste and the presence of the clay beneath and surrounding the areas, the fill in Landfill Areas 1, 2, 3, 4, 5, 6, 7, 8, and 9 do not pose a significant potential for causing groundwater contamination, and therefore present no significant threat to surface water quality via the groundwater pathway.

Landfill Area 10 was reported by DuPont to contain laboratory waste. One boring in Landfill Area 10 did encounter glass fragments and other evidence of laboratory waste. Organic odors and high OVA measurements were recorded for samples from this boring. Two composite samples were prepared from this boring, one from the upper fill (2 to 6 feet BGS) and one from the lower fill (8 to 14 feet BGS). TCLP regulatory limits were exceeded for the lower sample for four chemicals: chloroform, trichloroethene, benzene, and tetrachloroethene. The upper sample had much lower chemical concentrations, with no detections of volatile organics and no semivolatile or pesticide/PCB detections above 10 mg/kg. Based on these findings, the laboratory waste

is primarily limited to the bottom of the former excavation, and is therefore surrounded on the bottom and sides by low permeability clay.

The observations and OVA measurements from the other seven borings showed no evidence of waste and no OVA measurements above 1.5 ppm. This suggests that the laboratory waste in Landfill Area 10 is localized to a small area (probably less than the 25 feet by 25 feet estimated by DuPont), and that little horizontal migration of volatile organic constituents has occurred. Furthermore, the split-spoon sample of native clay obtained immediately below the laboratory waste was screened with the OVA and no volatile organic vapors were detected, suggesting little penetration of volatile organic constituents into the clay layer has occurred. Based on these findings, the small volume of laboratory waste present is isolated by the underlying and surrounding low permeability clay which would inhibit migration of leachate generated below the top of the surrounding clay.

In general, based on the findings of the soil borings in the 10 landfill areas, the waste materials are isolated and do not constitute a significant potential source of groundwater contamination at the site, and therefore present no significant threat to surface water quality via the groundwater pathway. Based on the results of chemical analyses of soil samples, WCC recommends that no further investigation or action is required at Landfill Areas 1, 2, 3, 4, 5, 6, 7, 8, and 9. Some further investigation or monitoring should be considered for Landfill Area 10.

5.2 OVERBURDEN GROUNDWATER QUALITY

Groundwater quality above the lacustrine clay was investigated through sampling of five new overburden wells located along the downgradient perimeter of the site. Quarterly hydraulic head measurements from all existing wells confirmed the downgradient perimeter. There was only one detection of a TCL organic compound, bis(2-ethylhexyl)phthalate at 10J (estimated) ug/l. This level of bis(2-ethylhexyl)phthalate,

which is an ubiquitous component of plastics, is likely an artifact of the PVC well casing or a result of laboratory contamination. It is not indicative of site groundwater contamination. Metals concentrations were generally below New York State Groundwater Quality Standards for Class GA groundwater except for iron, manganese, and sodium. In addition, there was one minor exceedance for lead and one exceedance for silver, but both were below NYSGQS in the blind field duplicate sample. These low levels do not appear to be indicative of site contamination, but rather of background conditions in this unit, which is primarily urban/industrial fill placed above the clay.

5.3 STORMWATER

The results of the storm sewer water and catch basin sediment sampling showed no elevated levels of TCL/TAL chemicals, suggesting the landfill areas have not impacted the chemistry of dry weather storm sewer flow or sediment.

6.0
LIMITATIONS

WCC's work is in accordance with our understanding of professional practice and environmental standards existing at the time the work was performed. Professional judgements presented are based on our evaluation of technical information gathered and on our understanding of site conditions and site history. Our analyses, interpretations, and judgements rendered are consistent with professional standards of care and skill ordinarily exercised by the consulting community and reflect the degree of conservatism WCC deems proper for this project at this time. Methods are constantly changing and it is recognized that standards may subsequently change because of improvements in the state of the practice.

The information used for this investigation is presented in this report and includes boring logs, water level elevations, and soil and water quality analyses. Boring logs reflect subsurface conditions for the indicated locations and dates. WCC has endeavored to collect soil and water samples which are representative of site conditions. Soil and water quality samples, however, can only represent a small portion of the subsurface conditions in the area, both in volume and through time. The interpretations made in this report are based on the assumption that subsurface conditions do not deviate appreciably from those found during our field investigations.

7.0 REFERENCES

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Tables

TABLE 2-1

SUMMARY OF SAMPLES COLLECTED AND ANALYSES PERFORMED
YERKES PHASE II INVESTIGATION

Sample Date	Sample ID	Matrix	Analyses Performed
8/10/92	SB-2A3	soil	TCL/TAL[1] metals, TCLP[2]
8/10/92	SB-8B	soil	TCL/TAL[1] metals, TCLP[2]
8/11/92	SB-1A	soil	TCL/TAL[1] metals, TCLP[2]
8/11/92	SB-1C (Dup. of SB-1A)	soil	TCL/TAL[1] metals, TCLP[2]
8/12/92	SB-5A	soil	TCL/TAL[1] metals, TCLP[2]
8/12/92	SB-7B	soil	TCL/TAL[1] metals, TCLP[2]
8/13/92	SB-3B	soil	TCL/TAL[1] metals
8/13/92	RBSB-1	water	TCL/TAL[1] metals
8/14/92	SB-6B	soil	TCL/TAL[1] metals, TCLP[2]
8/14/92	RBSB-2	water	TCL/TAL[1] metals
8/17/92	SB-4A	soil	TCL/TAL[1] metals
8/18/92	SB-9 BCDE	soil	TCL/TAL[1] metals, TCLP[2]
8/18/92	SB-9 FGHI (Dup. of SB-9BCDE)	soil	TCL/TAL[1] metals
8/18/92	SB-10H1	soil	TCL/TAL[1] metals, TCLP[2]
8/18/92	SB-10H2	soil	TCL/TAL[1] metals, TCLP[2]
9/2/92	DYF-1	water	TCL VOCs, TCL BNAs
9/2/92	DYF-3	water	TCL/TAL metals
9/2/92	QA-1 (Dup. of DYF-3)	water	TCL/TAL metals
9/2/92	DYF-4	water	TCL/TAL metals
9/2/92	DYF-5	water	TCL/TAL metals
9/2/92	Trip blank	water	TCL VOCs
4/1/93	DYF-1	water	TCL Pest/PCBs/TAL metals chloride, sulfate
4/1/93	DYF-2	water	TCL/TAL metals
8/5/93	Stormwater[3]	water	TCL/TAL metals
8/5/93	Sediment[4]	soil	TCL/TAL metals

(1) TCL/TAL - Target compound list/target analyte list
(2) Toxicity Characteristic Leaching Procedure (TCLP) analyses for selected analytes (see Table 4-5)
(3) Dry weather flow in storm sewer
(4) Sediment from catch basin

TABLE 4-1
DUPONT YERKES PHASE II
TCL VOLATILES ANALYSES FOR SOIL/WASTE SAMPLES

Sample I.D.	SB-1A	SB-1A Duplicate	SB-2A3	SB-3B	SB-4A	SB-5A	SB-6B	SB-7B	SB-8B	RBSB-1
Date Sampled	8/11/92	08/11/92	08/10/92	8/13/92	8/17/92	8/12/92	8/14/92	8/12/92	8/10/92	8/13/92
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Volatiles										
vinyl chloride	55U	47U	23U	11U	13U	25J	13U	17U	14U	10U
methylene chloride	7J	47U	6J	11U	59	71U	48	21	14U	10U
acetone	4100	880	360	38U	140	270	180	140	48	12
carbon disulfide	13000J	650	23U	11U	13U	71U	13U	17U	14U	10U
1,1-dichloroethene	42J	100	23U	11U	13U	16J	13U	17U	14U	10U
1,2-dichloroethene (total)	55U	47U	23U	11U	13U	71U	13U	17U	14U	10U
chloroform	55U	5J	23U	11U	13U	71U	13U	17U	14U	1J
1,2-dichloroethane	55U	47U	23U	11U	13U	120	13U	17U	14U	10U
2-butanone	5500	4300	23U	11U	13U	500	13U	14J	14U	10U
1,1,1-trichlorethane	55U	47U	23U	11U	13U	71U	13U	17U	14U	10U
carbon tetrachloride	55U	47U	23U	11U	13U	71U	13U	17U	14U	10U
1,2-dichloropropane	55U	47U	23U	11U	13U	71U	13U	17U	14U	1J
trichloroethene	13J	75	23U	11U	1J	7J	13U	17U	2J	10U
1,1,2-trichloroethane	55U	47U	23U	11U	13U	10J	13U	17U	14U	10U
benzene	74	140	10J	11U	8J	110	3J	2J	13J	10U
4-methyl-2-pentanone	46J	24J	23U	11U	13U	48J	13U	17U	14U	10U
tetrachloroethene	55U	47U	23U	11U	13U	71U	13U	17U	3J	10U
1,1,2,2-tetrachloroethane	55U	47U	23U	11U	13U	71U	13U	17U	14U	10U
toluene	490	2800	28	11U	11J	1100	3J	17U	11J	10U
chlorobenzene	55U	47U	23U	11U	2J	7J	13U	17U	14U	10U
ethylbenzene	4J	9J	6J	11U	3J	27J	13U	17U	14U	10U
total xylenes	75	88	310	11U	8J	350	13U	17U	14U	10U

Notes:
E - Concentration exceeded the instrument's linear calibration range, and is considered an estimated value.
J - Associated value is estimated.
U - Non-detected at the stated detection limit.

TABLE 4-1
DUPONT YERKES PHASE II
TCL VOLATILES ANALYSES FOR SOIL/WASTE SAMPLES

Sample I.D.	RBSB-2	SB-9BCDE	SB-9BCDE Duplicate	SB-10H1	SB-10H2
Date Sampled	8/14/92	8/18/92	8/18/92	8/18/92	8/18/92
Units	ug/l	ug/kg	ug/kg	ug/kg	ug/kg
Volatiles					
vinyl chloride	10U	13U	12U	11U	3300J
methylene chloride	10U	13U	12U	6J	35000
acetone	6J	52	52	22	94000
carbon disulfide	10U	13U	12U	11U	7300U
1,1-dichloroethene	10U	13U	12U	10J	2500J
1,2-dichloroethene (total)	10U	13U	12U	40	7600
chloroform	1J	13U	12U	240	250000
1,2-dichloroethane	10U	13U	12U	110	7300U
2-butanone	10U	13U	11J	11U	180000E
1,1,1-trichlorethane	10U	13U	12U	6J	7300U
carbon tetrachloride	10U	13U	12U	16	7300U
1,2-dichloropropane	1J	13U	12U	11U	7300U
trichloroethene	10U	13U	12U	560	440000
1,1,2-trichloroethane	10U	13U	12U	660	190000
benzene	10U	13U	12U	17	140000
4-methyl-2-pentanone	10U	13U	12U	11U	24000
tetrachloroethene	10U	13U	12U	410	2600000
1,1,2,2-tetrachloroethane	10U	13U	12U	270	360000
toluene	10U	13U	12U	550	3800000
chlorobenzene	10U	13U	12U	3J	32000
ethylbenzene	10U	13U	12U	7J	76000
total xylenes	10U	13U	12U	35	260000

Notes:
E - Concentration exceeded the instrument's linear calibration range, and is considered an estimated value.
J - Associated value is estimated.
U - Non-detected at the stated detection limit.

TABLE 4-2
DUPONT YERKES PHASE II
TCL SEMIVOLATILES ANALYSES FOR SOIL/WASTE SAMPLES

Sample I.D.	SB-1A	SB-1A Duplicate	SB-2A3	SB-3B	SB-4A	SB-5A
Date Sampled	8/11/92	08/11/92	8/10/92	8/13/92	8/17/92	8/12/92
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Semi-Volatiles						
phenol	310J	510	320J	430U	7700J	480U
1,4-dichlorobenzene	440UJ	430U	320U	430U	330U	480U
1,2-dichlorobenzene	440UJ	430U	320U	430U	330U	480U
2-methylphenol	63J	85J	320U	130J	330U	480U
4-methylphenol	130J	740	100J	300J	180J	480U
2,4-dimethylphenol	440UJ	84J	63J	270J	120J	480U
1,2,4-trichlorobenzene	440UJ	430U	320U	430U	250J	480U
naphthalene	2100J	18000J	74J	14000J	6400J	520
hexachlorobutadiene	440UJ	430U	320U	430U	330U	480U
4-chloro-3-methylphenol	440UJ	430U	320U	430U	330U	480U
2-methylnaphthalene	670J	2200	79J	6200J	2600	290J
2-chloronaphthalene	440UJ	430U	320U	430U	330U	480U
dimethyl phthalate	440UJ	430U	320U	430U	42J	480U
acenaphthylene	370J	890	320U	570	48J	480U
acenaphthene	1500J	20000J	30J	7700J	3100J	170J
dibenzofuran	1200J	13000J	28J	5400J	3000J	480U
diethylphthalate	440UJ	430U	320U	430U	460	480U
fluorene	1800J	24000J	42J	8400J	4100E	250J
n-nitrosodiphenylamine	440UJ	430U	320U	430U	300U	270J
phenanthrene	15000J	150000	290J	33000J	160J	1100
anthracene	2800J	42000J	64J	7300J	3900J	210J
carbazole	1400J	18000J	30J	3200J	360	130J
di-n-butylphthalate	810J	4700J	110J	430U	2500	13000J
fluoranthene	14000J	150000	310J	26000J	120J	910
pyrene	11000J	120000	280J	19000J	14000J	1200
butylbenzylphthalate	440UJ	430U	320U	150J	28000J	480U
benzo(a)anthracene	5700J	55000	100J	16000J	6600E	520
chrysene	6200J	67000	160J	1800	7700E	550
bis(2-ethylhexyl)phthalate	2600J	3200J	1800	5100J	5900E	2600
di-n-octyl phthalate	440UJ	430U	320U	430U	330U	480U
benzo(b)fluoranthene	6000J	65000	180J	7200J	8500E	560
benzo(k)fluoranthene	5400J	33000J	100J	2700J	3300E	330J
benzo(a)pyrene	5000J	52000	130J	5100J	3100E	480U
indeno(1,2,3-cd)pyrene	2000J	28000J	320U	1500	950	480U
dibenz(a,h)anthracene	400J	4900J	320U	450	390	480U
benzo(g,h,i)perylene	1200J	21000J	31J	1300	800	480U

Notes:
E - Concentration exceeded the instrument's linear calibration range, and is considered an estimated value.
J - Associated value is estimated.
U - Non-detected at the stated detection limit.

TABLE 4-2
DUPONT YERKES PHASE II
TCL SEMIVOLATILES ANALYSES FOR SOIL/WASTE SAMPLES

Sample I.D.	SB-6B	SB-7B	SB-8B	RBSB-1	RBSB-2	SB-9BCDE	SB-9BCDE Duplicate
Date Sampled	8/14/92	8/12/92	8/10/92	8/13/92	9/2/92	8/18/92	8/18/92
Units	ug/kg	ug/kg	ug/kg	ug/l	ug/l	ug/kg	ug/kg
Semi-Volatiles							
phenol	420U	400U	460U	10U	10U	390U	390U
1,4-dichlorobenzene	420U	400U	170J	10U	10U	390U	390U
1,2-dichlorobenzene	420U	400U	460U	10U	10U	390U	390U
2-methylphenol	420U	400U	460U	10U	10U	390U	390U
4-methylphenol	420U	400U	300J	10U	10U	390U	390U
2,4-dimethylphenol	29J	400U	460U	10U	10U	390U	390U
1,2,4-trichlorobenzene	420U	400U	460U	10U	10U	390U	390U
naphthalene	55J	71J	1000	10U	10U	390U	610
hexachlorobutadiene	420U	400U	460U	10U	10U	390U	390U
4-chloro-3-methylphenol	420U	400U	460U	10U	10U	390U	390U
2-methylnaphthalene	65J	94J	820	10U	10U	390U	430
2-chloronaphthalene	420U	400U	460U	10U	10U	390U	390U
dimethyl phthalate	420U	400U	460U	10U	10U	390U	390U
acenaphthylene	14J	400U	130J	10U	10U	390U	390U
acenaphthene	21J	400U	850	10U	10U	110J	2600
dibenzofuran	23J	44J	950	10U	10U	70J	1300
diethylphthalate	420U	400U	460U	10U	10U	390U	390U
fluorene	26J	55J	1400	10U	10U	110J	2000
n-nitrosodiphenylamine	420J	400U	460U	10U	10U	390U	390U
phenanthrene	190J	370J	9800J	10U	10U	910	14000
anthracene	46J	400U	3100J	10U	10U	290J	4900
carbazole	22J	400U	1300	10U	10U	85J	1400
di-n-butylphthalate	300J	540	5800J	10U	10U	390U	390U
fluoranthene	260J	460	12000J	10U	10U	1500	14000
pyrene	330J	410	29000J	10U	10U	1400	13000
butylbenzylphthalate	110000	690000	460U	0.8J	10U	390U	390U
benzo(a)anthracene	420U	250J	9900J	10U	10U	940	9100
chrysene	260J	230J	11000J	10U	10U	1000	8000
bis(2-ethylhexyl)phthalate	170000	180000J	3700J	10U	10U	2000	940
di-n-octyl phthalate	520	1200	460U	10U	10U	390U	390U
benzo(b)fluoranthene	340J	400U	3500	10U	10U	980	8300
benzo(k)fluoranthene	180J	350J	9300J	10U	10U	430	4700
benzo(a)pyrene	220J	180J	12000J	10U	10U	680	3000J
indeno(1,2,3-cd)pyrene	420U	86J	460U	10U	10U	180J	1200
dibenz(a,h)anthracene	420U	20J	460U	10U	10U	64J	55J
benzo(g,h,i)perylene	70J	51J	460U	10U	10U	200J	1200

Notes:
E - Concentration exceeded the instrument's linear calibration range, and is considered an estimated value.
J - Associated value is estimated.
U - Non-detected at the stated detection limit.

TABLE 4-2
DUPONT YERKES PHASE II
TCL SEMIVOLATILES ANALYSES FOR SOIL/WASTE SAMPLES

Sample I.D.	SB-10H1	SB-10H2
Date Sampled	8/18/92	8/18/92
Units	ug/kg	ug/kg
Semi-Volatiles		
phenol	380U	31000E
1,4-dichlorobenzene	380U	1000U
1,2-dichlorobenzene	380U	230J
2-methylphenol	380U	1000000U
4-methylphenol	380U	580J
2,4-dimethylphenol	380U	1000000U
1,2,4-trichlorobenzene	380U	81J
naphthalene	750	490J
hexachlorobutadiene	380U	67J
4-chloro-3-methylphenol	380U	1000000U
2-methylnaphthalene	960	110J
2-chloronaphthalene	380U	540J
dimethyl phthalate	43J	23000E
acenaphthylene	380U	1000U
acenaphthene	200J	1000U
dibenzofuran	350J	1000U
diethylphthalate	70J	370000J
fluorene	250J	1000U
n-nitrosodiphenylamine	380U	1000U
phenanthrene	2400	150J
anthracene	360J	120J
carbazole	260J	1000U
di-n-butylphthalate	140J	2500000
fluoranthene	2100	1000U
pyrene	2600	1000U
butylbenzylphthalate	49J	1500
benzo(a)anthracene	1700	1000U
chrysene	1900	1000U
bis(2-ethylhexyl)phthalate	1800J	11000E
di-n-octyl phthalate	380U	1000U
benzo(b)fluoranthene	2600	1000U
benzo(k)fluoranthene	860	1000U
benzo(a)pyrene	1200	1000U
indeno(1,2,3-cd)pyrene	230J	1000U
dibenz(a,h)anthracene	380U	1000U
benzo(g,h,i)perylene	250J	1000U

Notes:
E - Concentration exceeded the instrument's linear calibration range, and is considered an estimated value.
J - Associated value is estimated.
U - Non-detected at the stated detection limit.

TABLE 4-3
DUPONT YERKES PHASE II
TCL PESTICIDES/PCBS ANALYSES FOR SOIL/WASTE SAMPLES

Sample I.D.	SB-1A	SB-1A Duplicate	SB-2A3	SB-3B	SB-4A	SB-5A	SB-6B	SB-7B	SB-8B	RBSB-1
Date Sampled	8/11/92	08/11/92	08/10/92	08/13/92	8/17/92	8/12/92	8/14/92	8/12/92	8/10/92	8/13/92
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Pesticides/PCBs										
gamma-BHC	23U	22U	3.4U	2.4J	6.8U	25U	8.7U	21U	12U	0.050U
heptachlor	23U	22U	3.4U	9.1UJ	6.8UR	25U	8.7U	21U	12U	0.050U
endosulfan II	44U	43U	6.6U	2.7J	4.9J	48U	17U	40U	23U	0.10U
4,4'-DDD	44U	43U	6.6U	18UJ	13U	48U	17U	40U	23U	0.10U
4,4'-DDT	44U	43U	6.6U	18UJ	12J	48U	17U	40U	23U	0.10U
methoxychlor	230U	220U	34U	91UJ	16J	250U	87U	210U	120U	0.50U
endrin ketone	44U	43U	6.6U	18UJ	13U	48U	17U	40U	23U	0.10U
endrin aldehyde	44U	43U	6.6U	18UJ	22	48U	17U	40U	23U	0.10U
alpha-chlordane	23U	22U	3.4U	9.1UJ	3.1J	25U	8.7U	21U	12U	0.050U
gamma-chlordane	23U	22U	3.4U	2.0J	6.8U	25U	8.7U	21U	12U	0.050U
Aroclor 1242	440U	430U	66U	180UJ	130U	480U	170U	4800	230U	1.0U
Aroclor 1248	1000	720	3900	180UJ	130U	480U	180	400U	360	1.0U
Aroclor 1254	440U	430U	66U	180UJ	130U	720	170U	590	620	1.0U
Aroclor 1260	440U	430U	66U	180UJ	130U	480U	130J	400	230U	1.0U

Notes:
J - Associated value is estimated.
U - Non-detected at the stated detection limit.
R - Associated value is unusable.

TABLE 4-3
DUPONT YERKES PHASE II
TCL PESTICIDES/PCBS ANALYSES FOR SOIL/WASTE SAMPLES

Sample I.D.	RBSB-2	SB-9BCDE	SB-9BCDE Duplicate	SB-10H1	SB-10H2
Date Sampled	8/14/92	8/18/92	8/18/92	8/18/92	8/18/92
Units	ug/l	ug/kg	ug/kg	ug/kg	ug/kg
Pesticides/PCBs					
gamma-BHC	0.050U	2.0U	2.1U	20U	1.4J
heptachlor	0.050U	2.0U	2.1U	20U	4.9
endosulfan II	0.10U	4.0U	4.0U	39U	9.3
4,4'-DDD	0.10U	4.0U	0.88J	39U	5.1U
4,4'-DDT	0.10U	4.0U	4.0U	39U	10
methoxychlor	0.50U	20U	21U	200U	26U
endrin ketone	0.10U	4.0U	4.0U	39U	20
endrin aldehyde	0.10U	4.0U	4.0U	39U	5.1U
alpha-chlordane	0.050U	2.0U	2.1U	20U	3.7
gamma-chlordane	0.050U	2.0U	2.1U	20U	2.6U
Aroclor 1242	1.0U	40U	40U	390U	51U
Aroclor 1248	1.0U	40U	40U	390U	51U
Aroclor 1254	1.0U	40U	40U	3700J	51U
Aroclor 1260	1.0U	40U	40U	390U	51U

Notes:
J - Associated value is estimated.
U - Non-detected at the stated detection limit.
R - Associated value is unusable.

TABLE 4-4
DUPONT YERKES PHASE II
TAL METALS ANALYSES FOR SOIL/WASTE SAMPLES

Sample I.D.	SB-1A	SB-1A Duplicate	SB-2A3	SB-3B	SB-4A	SB-5A	SB-6B	SB-7B	SB-8B	RBSB-1
Date Sampled	8/11/92	08/11/92	08/10/92	08/13/92	8/17/92	8/12/92	8/14/92	8/12/92	8/10/92	8/13/92
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/l
TAL Metals										
Aluminum	10400	11300	7400	7850	2820J	9960	12300	21400	15700	60.0U
Antimony	1.3U	2.2B	2.4U	1.2U	1.3U	1.4B	1.3U	3.3B	1.8B	5.0U
Arsenic	13.3	10.8	6.8	8.1	24.6J	4.3	6.3	23.3	27.8	5.0U
Barium	136	240	76.6	165	27.2B	180	87.3	304	385	50.0U
Beryllium	1.2U	1.3U	2.4U	1.2U	1.2U	1.4U	1.3U	1.8U	1.5U	5.0U
Cadmium	1.2U	1.3U	2.4U	1.2U	1.2U	1.4U	1.3U	1.8U	1.5U	5.0U
Calcium	23300	46800	21000	54300	10400J	32900	120000	27300	14100	760B
Chromium	22.4	35.6	55.5	15.5	3.4J	18.7	18.6	31.4	45.4	10.0U
Cobalt	10.8B	9.3B	9.6U	9.4B	4.9UJ	7.1B	6.6B	14.0B	14.8	20.0U
Copper	62.3	163	83.3	43.1	9.6J	59.7	29.2	50.6	155	10.0U
Iron	26900	35100	33200	17600	6250J	19700	15800	37700	48800	105
Lead	169	334	174	53.4	54.2J	115	197	178	628	55.9
Magnesium	7770	8520	4780	16000	2070J	7530	44300	7610	3740	400U
Manganese	432	903	968	536	125J	594	580	695	504	10.0U
Mercury	0.84	0.23	0.46	0.22	0.12UJ	0.58	0.21	0.23	1.9	0.20U
Nickel	28	35.2	37.5	33.9	7.4U	23.5	12.4	31.5	40.9	30.0U
Potassium	1740	1560	1250B	1180B	229B	1170B	961B	1800	1820	600U
Selenium	1.3	1.4U	2.4U	1.2U	1.3U	1.4U	1.3U	1.8U	1.5U	5.0U
Silver	0.10B	1.5B	0.58B	0.07U	0.21B	0.09U	0.08U	0.18B	0.23B	0.30U
Sodium	3560	3550	2110B	1090B	1310	2610	1330	1530B	1570	877B
Thallium	1.3U	1.4U	2.4U	1.2U	1.3U	1.4U	1.3U	1.8U	1.5U	5.0U
Vanadium	24.7	20	14.5B	65.6	4.9U	19.2	16.7	38.1	41.7	20.0U
Zinc	181	516	632	112	44.6J	152	123	265	736	20

Notes:
B - Analyte detected above the instrument detection limit but below the contract required detection limit.
J - Associated value is estimated.
U - Non-detected at the stated detection limit.

TABLE 4-4
DUPONT YERKES PHASE II
TAL METALS ANALYSES FOR SOIL/WASTE SAMPLES

Sample I.D.	RBSB-2	SB-9BCDE	SB-9BCDE Duplicate	SB-10H1	SB-10H2
Date Sampled	8/14/92	8/18/92	8/18/92	8/18/92	8/18/92
Units	ug/l	mg/kg	mg/kg	mg/kg	mg/kg
TAL Metals					
Aluminum	60.0U	11600	14800	5890	11300
Antimony	5.0U	64.6	63.6	90.4	59.5
Arsenic	5.0U	5.9	5.4	60.6	15.4
Barium	50.0U	133	116	240	137
Beryllium	5.0U	1.3U	1.3U	1.2U	1.5U
Cadmium	5.0U	1.3U	1.3U	1.2U	11.6
Calcium	625B	118000	58900	17100	35300
Chromium	10.0U	19.7	23.7	25.3	63.5
Cobalt	20.0U	9.0B	12.1B	4.7U	12.0B
Copper	10.0U	27.2	26.9	30.3	1340
Iron	36.6B	21000	24400	83100	22400
Lead	59.7	148	22.3	63.2	94.4
Magnesium	400U	54700	19600	2650	10300
Manganese	10.0U	1060	631	268	494
Mercury	0.20U	0.12U	0.11U	99.5	4010
Nickel	30.0U	33.6	33.5	7.1U	29.4
Potassium	600U	1640	2660	1770	1640
Selenium	5.0U	1.3U	1.2U	4.9	1.6U
Silver	0.30U	2.7U	2.6U	2.4U	54.5
Sodium	819B	617B	582B	641B	660B
Thallium	5.0U	1.3U	1.2U	7.5	1.6U
Vanadium	20.0U	21.4	27.8	45.0B	23
Zinc	20.0U	155	92.8	95.6	283

Notes:
B - Analyte detected above the instrument detection limit but below the contract
E - Concentration exceeded the instrument's linear calibration range, and is cons
J - Associated value is estimated.
U - Non-detected at the stated detection limit.
R - Associated value is unusable.

TABLE 4-5

SAMPLES REQUIRING TCLP ANALYSES BASED ON TCL/TAL RESULTS EXCEEDING THE TCLP REGULATORY LEVEL BY A FACTOR OF 20 OR MORE DU PONT YERKES PHASE II INVESTIGATION

Sample ID	Chemical	Total Concentration (mg/kg)	TCLP Regulatory Limit[1] (mg/l)	Exceedance Factor[2]
Volatile Fraction:				
SB-10H2	Chloroform	250	6.0	42
	Trichloroethylene	440	0.5	880
	Benzene	140	0.5	280
	Tetrachloroethylene	2,600	0.7	3,700
Metals:				
SB-1A	Lead	169	5.0	34
SB-1A Dup	Lead	334	5.0	67
SB-2A-3	Lead	174	5.0	35
SB-5A	Lead	115	5.0	23
SB-6B	Lead	197	5.0	39
SB-7B	Lead	178	5.0	36
SB-8B	Lead	628	5.0	126
SB-9BCDE	Lead	148.2	5.0	30
SB-10H1	Mercury	99.5	0.2	498
SB-10H2	Mercury	4,010	0.2	20,000

(1) 40 CFR Part 261.24
(2) Total concentration in mg/kg divided by the TCLP Regulatory Limit in mg/l.

TABLE 4-6

TOXICITY CHARACTERISTIC LEACHING PROCEDURE ANALYTICAL RESULTS
DU PONT YERKES PHASE II INVESTIGATION

Sample ID	Chemical	TCLP Concentration (mg/l)	TCLP Regulatory Limit[1] (mg/l)
Volatile Fraction:			
SB-10H2	Vinyl chloride	0.031J	0.2
	1,1-Dichloroethene	0.033J	0.7
	Chloroform	6.2	6.0
	1,2-Dichloroethane	0.1U	0.5
	2-Butanone	3.1	200
	Carbon tetrachloride	0.1U	0.5
	Trichloroethene	7.9	0.5
	Benzene	2.7	0.5
	Tetrachloroethene	17.0	0.7
	Chlorobenzene	0.39	100
Metals:			
SB-1A	Lead	0.003U	5.0
SB-2A-3	Lead	0.166	5.0
SB-5A	Lead	0.003U	5.0
SB-6B	Lead	0.0653	5.0
SB-7B	Lead	0.0043	5.0
SB-8B	Lead	0.550	5.0
SB-9BCDE	Lead	0.003U	5.0
SB-10H1	Mercury	0.0002U	0.2
SB-10H2	Mercury	0.0037	0.2

Notes:

(1)	40 CFR Part 261.24
U	Non-detected at the stated detection limit
J	Estimated value

TABLE 4-7
DUPONT YERKES PHASE II
TCL VOLATILES ANALYSES FOR WATER SAMPLES

Sample I.D.	DYF-1	DYF-2	DYF-3	DYF-3 Dup.	DYF-4	DYF-5	Trip blank	Trip blank
Date Sampled	9/2/92	4/1/93	9/2/92	9/2/92	9/2/92	9/2/92	9/2/92	4/1/93
Units	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Volatiles								
vinyl chloride	10U	10U	10U	10U	10U	10U	10U	10U
methylene chloride	10U	10U	10U	10U	10U	10U	10U	10U
acetone	10U	10U	10U	10U	10U	10U	10U	10U
carbon disulfide	10U	10U	10U	10U	10U	10U	10U	10U
1,1-dichloroethene	10U	10U	10U	10U	10U	10U	10U	10U
1,2-dichloroethene (total)	10U	10U	10U	10U	10U	10U	10U	10U
chloroform	10U	10U	10U	10U	10U	10U	10U	10U
1,2-dichloroethane	10U	10U	10U	10U	10U	10U	10U	10U
2-butanone	10U	10U	10U	10U	10U	10U	10U	10U
1,1,1-trichlorethane	10U	10U	10U	10U	10U	10U	10U	10U
carbon tetrachloride	10U	10U	10U	10U	10U	10U	10U	10U
1,2-dichloropropane	10U	10U	10U	10U	10U	10U	10U	10U
trichloroethene	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2-trichloroethane	10U	10U	10U	10U	10U	10U	10U	10U
benzene	10U	10U	10U	10U	10U	10U	10U	10U
4-methyl-2-pentanone	10U	10U	10U	10U	10U	10U	10U	10U
tetrachloroethene	10U	10U	10U	10U	10U	10U	10U	10U
1,1,2,2-tetrachloroethane	10U	10U	10U	10U	10U	10U	10U	10U
toluene	10U	10U	10U	10U	10U	10U	10U	10U
chlorobenzene	10U	10U	10U	10U	10U	10U	10U	10U
ethylbenzene	10U	10U	10U	10U	10U	10U	10U	10U
total xylenes	10U	10U	10U	10U	10U	10U	10U	10U

Note:
U - Non-detected at the stated detection limit.

TABLE 4-8
DUPONT YERKES PHASE II
TCL SEMIVOLATILES ANALYSES FOR WATER SAMPLES

Sample I.D.	DYF-1	DYF-2	DYF-3	DYF-3 Duplicate	DYF-4	DYF-5
Date Sampled	9/2/92	4/1/93	9/2/92	9/2/92	9/2/92	9/2/92
Units	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Semi-Volatiles						
phenol	14U	11U	10U	10U	10U	10U
1,4-dichlorobenzene	14U	11U	10U	10U	10U	10U
1,2-dichlorobenzene	14U	11U	10U	10U	10U	10U
2-methylphenol	14U	11U	10U	10U	10U	10U
4-methylphenol	14U	11U	10U	10U	10U	10U
2,4-dimethylphenol	14U	11U	10U	10U	10U	10U
1,2,4-trichlorobenzene	14U	11U	10U	10U	10U	10U
naphthalene	14U	11U	10U	10U	10U	10U
hexachlorobutadiene	14U	11U	10U	10U	10U	10U
4-chloro-3-methylphenol	14U	11U	10U	10U	10U	10U
2-methylnaphthalene	14U	11U	10U	10U	10U	10U
2-chloronaphthalene	14U	11U	10U	10U	10U	10U
dimethyl phthalate	14U	11U	10U	10U	10U	10U
acenaphthylene	14U	11U	10U	10U	10U	10U
acenaphthene	14U	11U	10U	10U	10U	10U
dibenzofuran	14U	11U	10U	10U	10U	10U
diethylphthalate	14U	11U	10U	10U	10U	10U
fluorene	14U	11U	10U	10U	10U	10U
n-nitrosodiphenylamine	14U	11U	10U	10U	10U	10U
phenanthrene	14U	11U	10U	10U	10U	10U
anthracene	14U	11U	10U	10U	10U	10U
carbazole	14U	11U	10U	10U	10U	10U
di-n-butylphthalate	14U	11U	10U	10U	10U	10U
fluoranthene	14U	11U	10U	10U	10U	10U
pyrene	14U	11U	10U	10U	10U	10U
butylbenzylphthalate	14U	11U	10U	10U	10U	10U
benzo(a)anthracene	14U	11U	10U	10U	10U	10U
chrysene	14U	11U	10U	10U	10U	10U
bis(2-ethylhexyl)phthalate	10J	2BJ	10U	10U	10U	10U
di-n-octyl phthalate	14U	11U	10U	10U	10U	10U
benzo(b)fluoranthene	14U	11U	10U	10U	10U	10U
benzo(k)fluoranthene	14U	11U	10U	10U	10U	10U
benzo(a)pyrene	14U	11U	10U	10U	10U	10U
indeno(1,2,3-cd)pyrene	14U	11U	10U	10U	10U	10U
dibenz(a,h)anthracene	14U	11U	10U	10U	10U	10U
benzo(g,h,i)perylene	14U	11U	10U	10U	10U	10U

Notes:
B - Analyte detected above the instrument detection limit but below the contract required detection limit.
J - Associated value is estimated.
U - Non-detected at the stated detection limit.

TABLE 4-9
DUPONT YERKES PHASE II
TCL PESTICIDES/PCBS ANALYSES FOR WATER SAMPLES

Sample I.D.	DYF-1	DYF-2	DYF-3	DYF-3 Duplicate	DYF-4	DYF-5
Date Sampled	4/1/93	4/1/93	9/2/92	9/2/92	9/2/92	9/2/92
Units	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Pesticides/PCBs						
gamma-BHC	0.050U	0.056U	0.051UJ	0.050UJ	0.050U	0.056U
heptachlor	0.050U	0.056U	0.051UJ	0.050UJ	0.050U	0.056U
endosulfan II	0.10U	0.11U	0.10UJ	0.10UJ	0.10U	0.11U
4,4'-DDD	0.10U	0.11U	0.10UJ	0.10UJ	0.10U	0.11U
4,4'-DDT	0.10U	0.11U	0.10UJ	0.10UJ	0.10U	0.11U
methoxychlor	0.50U	0.56U	0.51UJ	0.50UJ	0.50U	0.56U
endrin ketone	0.10U	0.11U	0.10UJ	0.10UJ	0.10U	0.11U
endrin aldehyde	0.10U	0.11U	0.10UJ	0.10UJ	0.10U	0.11U
alpha-chlordane	0.050U	0.056U	0.051UJ	0.050UJ	0.050U	0.056U
gamma-chlordane	0.050U	0.056U	0.051UJ	0.050UJ	0.050U	0.056U
Aroclor 1242	1.0U	1.1U	1.0UJ	1.0UJ	1.0U	1.1U
Aroclor 1248	1.0U	1.1U	1.0UJ	1.0UJ	1.0U	1.1U
Aroclor 1254	1.0U	1.1U	1.0UJ	1.0UJ	1.0U	1.1U
Aroclor 1260	1.0U	1.1U	1.0UJ	1.0UJ	1.0U	1.1U
Chloride	195 mg/l	156 mg/l	116 mg/l	144 mg/l	22.0 mg/l	24.2 mg/l
Sulfate	5200 mg/l	1140 mg/l	413 mg/l	418 mg/l	3520 mg/l	800 mg/l

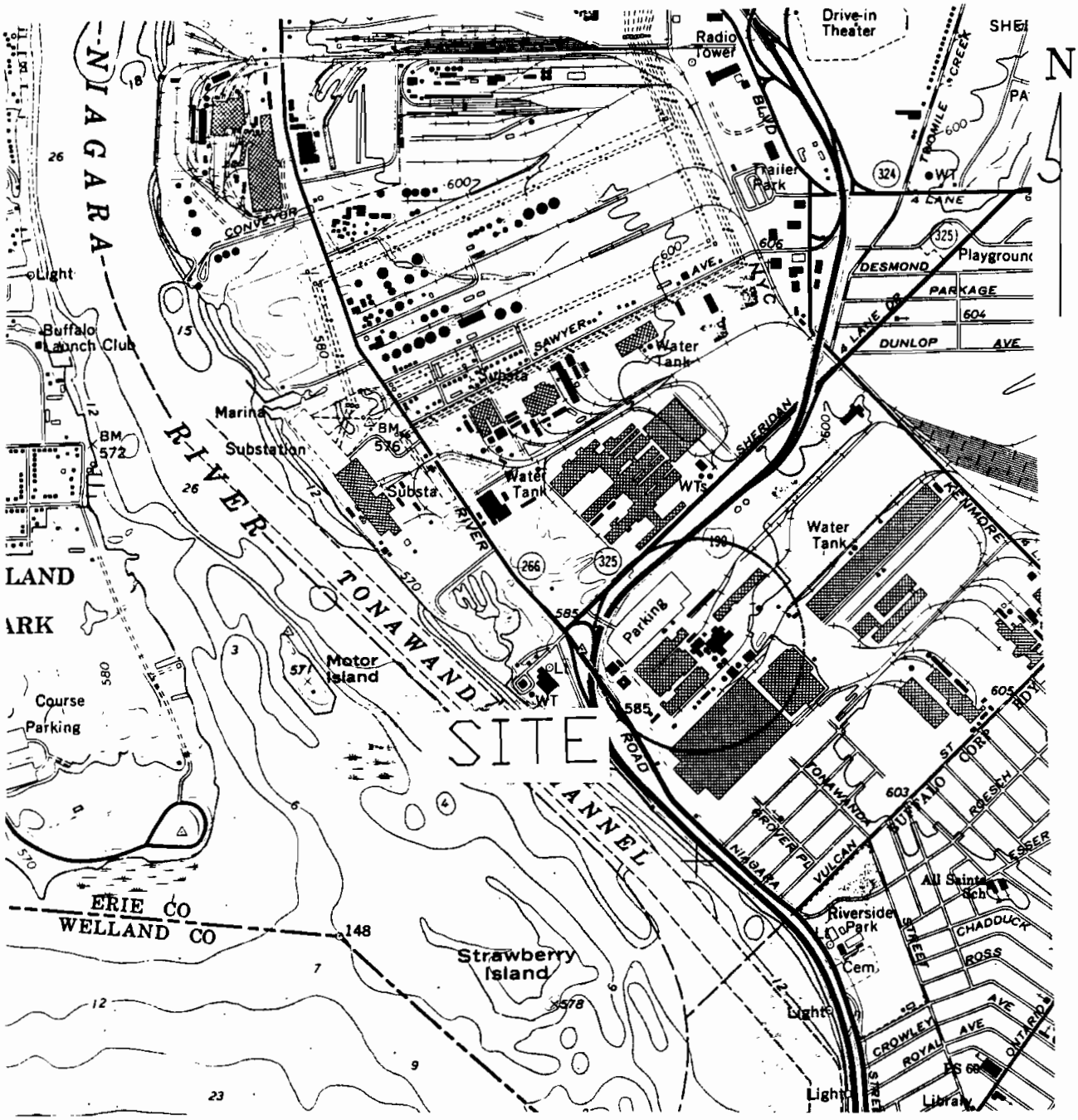
Notes:
J - Associated value is estimated.
U - Non-detected at the stated detection limit.

TABLE 4-10
DUPONT YERKES PHASE II
TAL METALS ANALYSES FOR WATER SAMPLES

Sample I.D.	DYF-1	DYF-2	DYF-3	DYF-3 Duplicate	DYF-4	DYF-5
Date Sampled	4/1/93	4/1/93	9/2/92	9/2/92	9/2/92	9/2/92
Units	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
TAL Metals						
Aluminum	1550	1940	10800	14200	810	480
Antimony	5.0U	5.0U	10.0U	100U	10.0U	10.0U
Arsenic	4.0U	4.0U	5.0U	5.0U	5.0U	5.0U
Barium	53.6B	43.6B	126B	151B	50.0U	65.0B
Beryllium	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
Cadmium	0.40B	0.70B	5.0U	5.0U	5.0U	5.0U
Calcium	186000	89300	132000	146000	260000	338000
Chromium	10.0U	10.0U	26	30	30	18
Cobalt	20.0U	20.0U	20.0U	20.0U	20.0U	20.0U
Copper	10	10.8B	18.0B	19.0B	10.0U	21.0B
Iron	4650	6110	15600	20300	1280	1480
Lead	3.0U	4	26.5	17	6	20.1
Magnesium	832000	349000	192000	20200	668000	61000
Manganese	151	307	594	716	310	560
Mercury	0.20U	0.20U	0.20U	0.20U	0.20U	0.20U
Nickel	30.0U	30.0U	51	38.0U	30.0U	30.0U
Potassium	14600	9000	11400	12100	17800	12700
Selenium	40.0U	4.0U	5.0U	5.0U	5.0U	5.0U
Silver	0.20U	0.20U	122	14	54	32.0J
Sodium	405000	168000	51300	51900	232000	85400
Thallium	5.0U	5.0U	5.0U	5.0U	5.0U	5.0U
Vanadium	20.0U	20.0U	20.0B	34.0B	20.0U	20.0U
Zinc	127	35.1	88	88	54	90.0J

Notes:
B - Analyte detected above the instrument detection limit but below the contract required detection limit.
J - Associated value is estimated.
U - Non-detected at the stated detection limit.

Figures



From U.S.G.S. Buffalo NW, N.Y.–Ont. Quadrangle
NW/4 Buffalo 15'
N4252.5–W7852.5/7.5

E.I. du Pont de Nemour and Company Inc.
Yerkes Facility ; Tonawanda, New York
Phase II Investigation

WOODWARD–CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

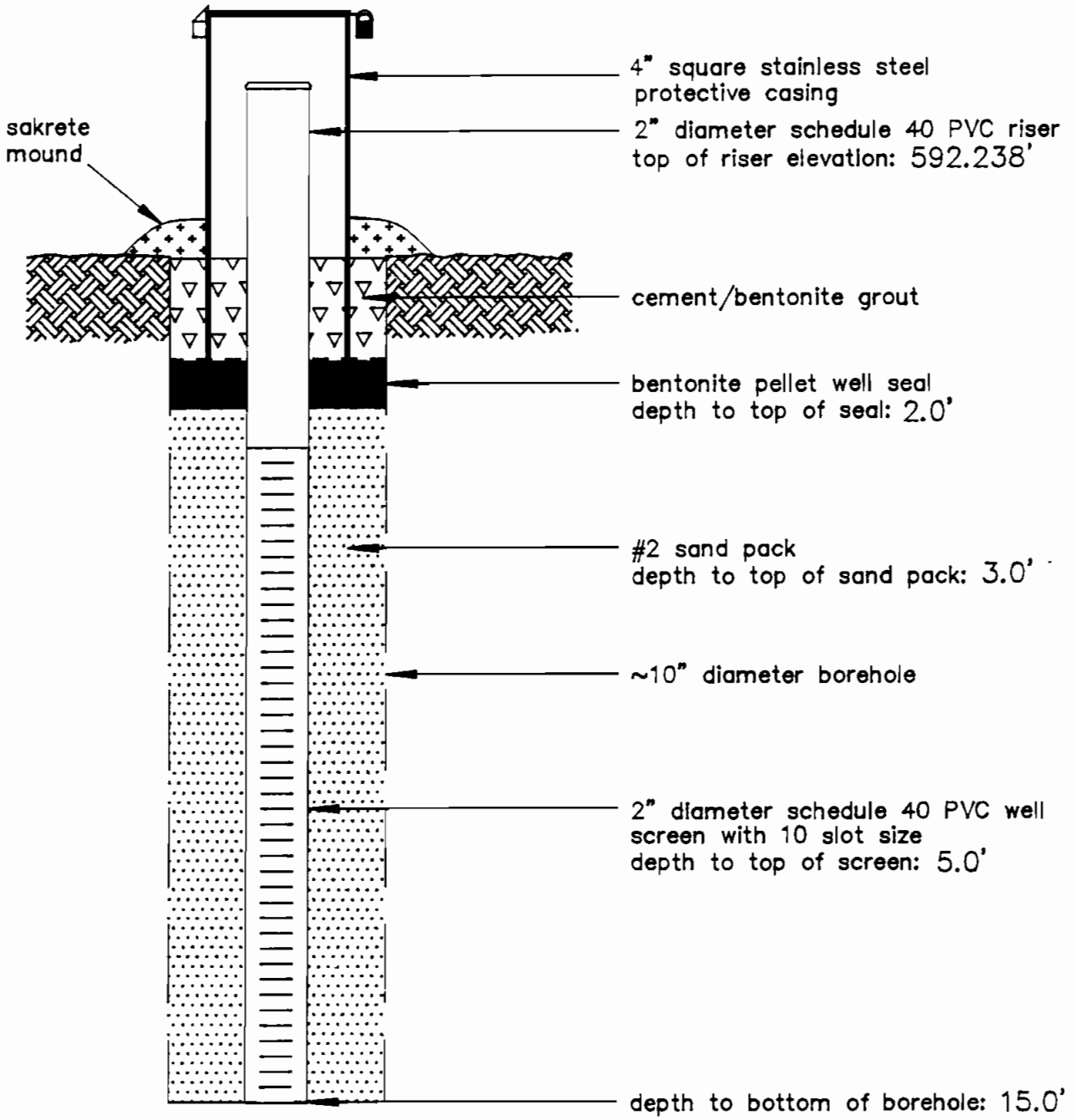
SITE LOCATION MAP

Job No.: 92C2284–1	Drawing No.	Date: 7–07–93
Checked by: KRM	Rev. No.:	Figure 1–1
Scale: 1"=2000'		

Appendix A

DUPONT YERKES FACILITY
PHASE II INVESTIGATION

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

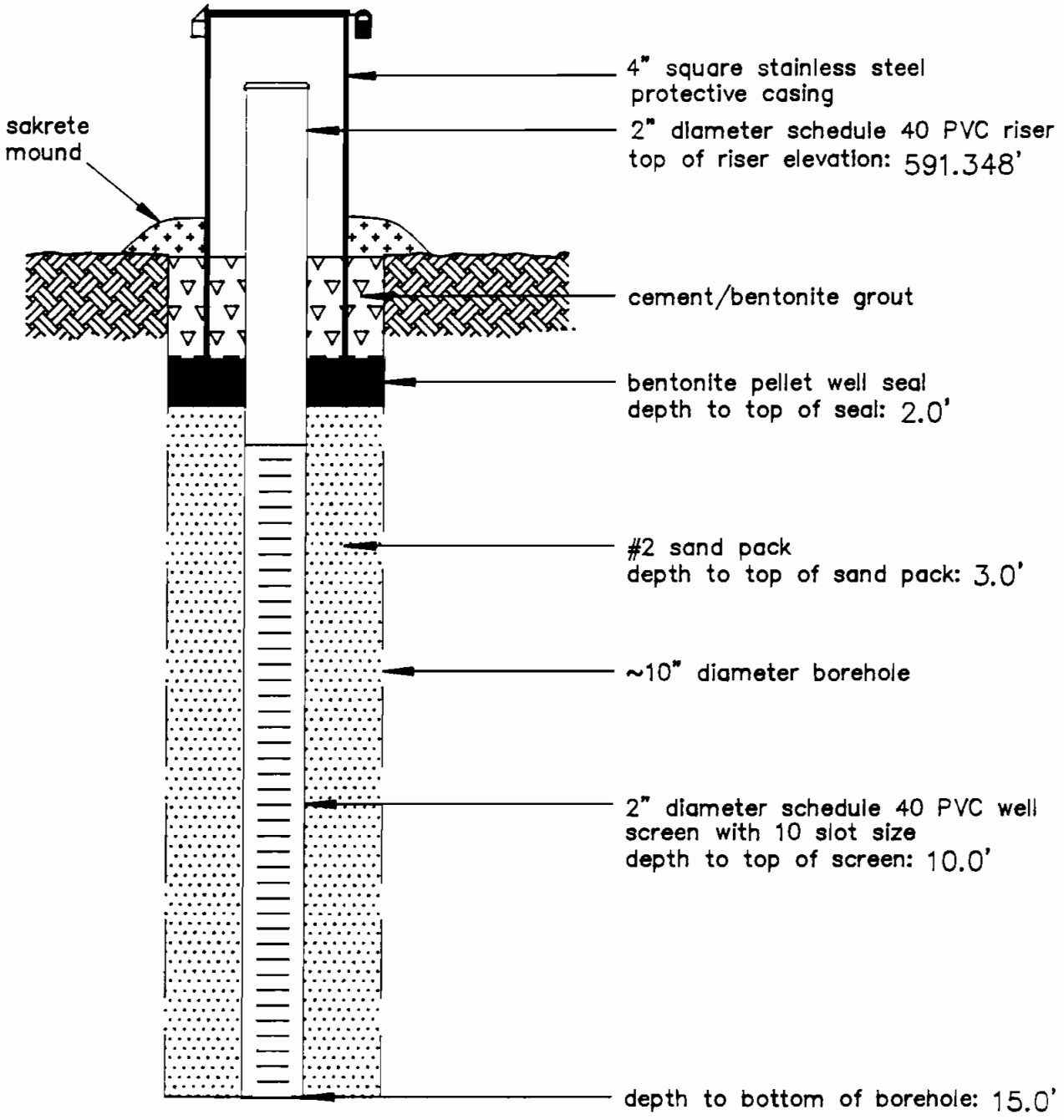


DYF-1

COORDINATES: Northing: 1189.63		Easting: 2280.93	
COMPLETION DATE: AUGUST 7, 1992		INSPECTED BY: Paul F. Mazierski	
DRAWN BY: FRG	CHECKED BY: KRM	PROJECT NO: 90C2331	DATE: 7-07-93	FIGURE NO:

DUPONT YERKES FACILITY
PHASE II INVESTIGATION

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

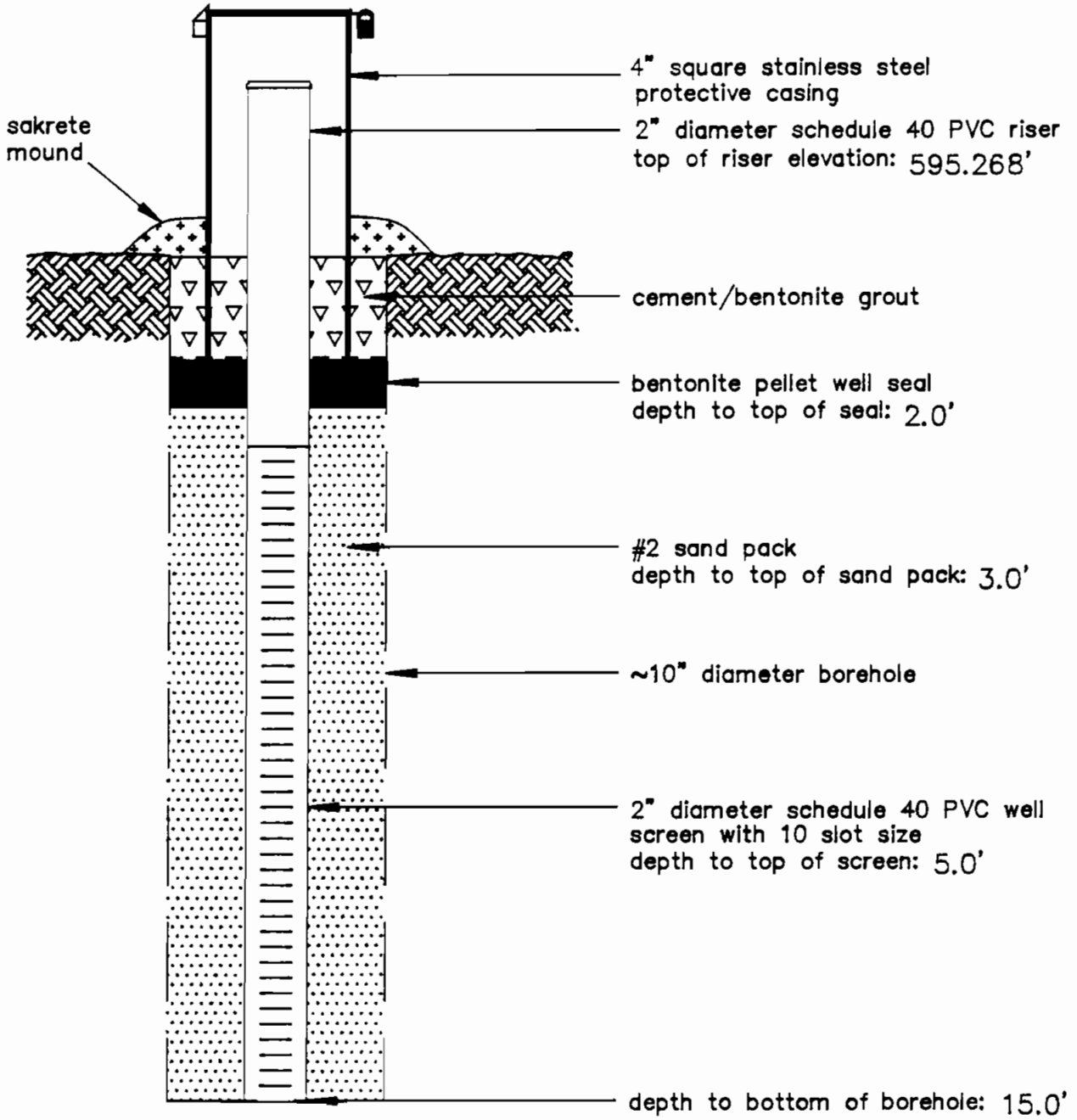


DYF-2

COORDINATES: Northing: 1842.54		Easting: 2462.64	
COMPLETION DATE: AUGUST 5, 1992		INSPECTED BY: Paul F. Mazierski	
DRAWN BY: FRG	CHECKED BY: KRM	PROJECT NO: 90C2331	DATE: 7-07-93	FIGURE NO:

DUPONT YERKES FACILITY
PHASE II INVESTIGATION

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

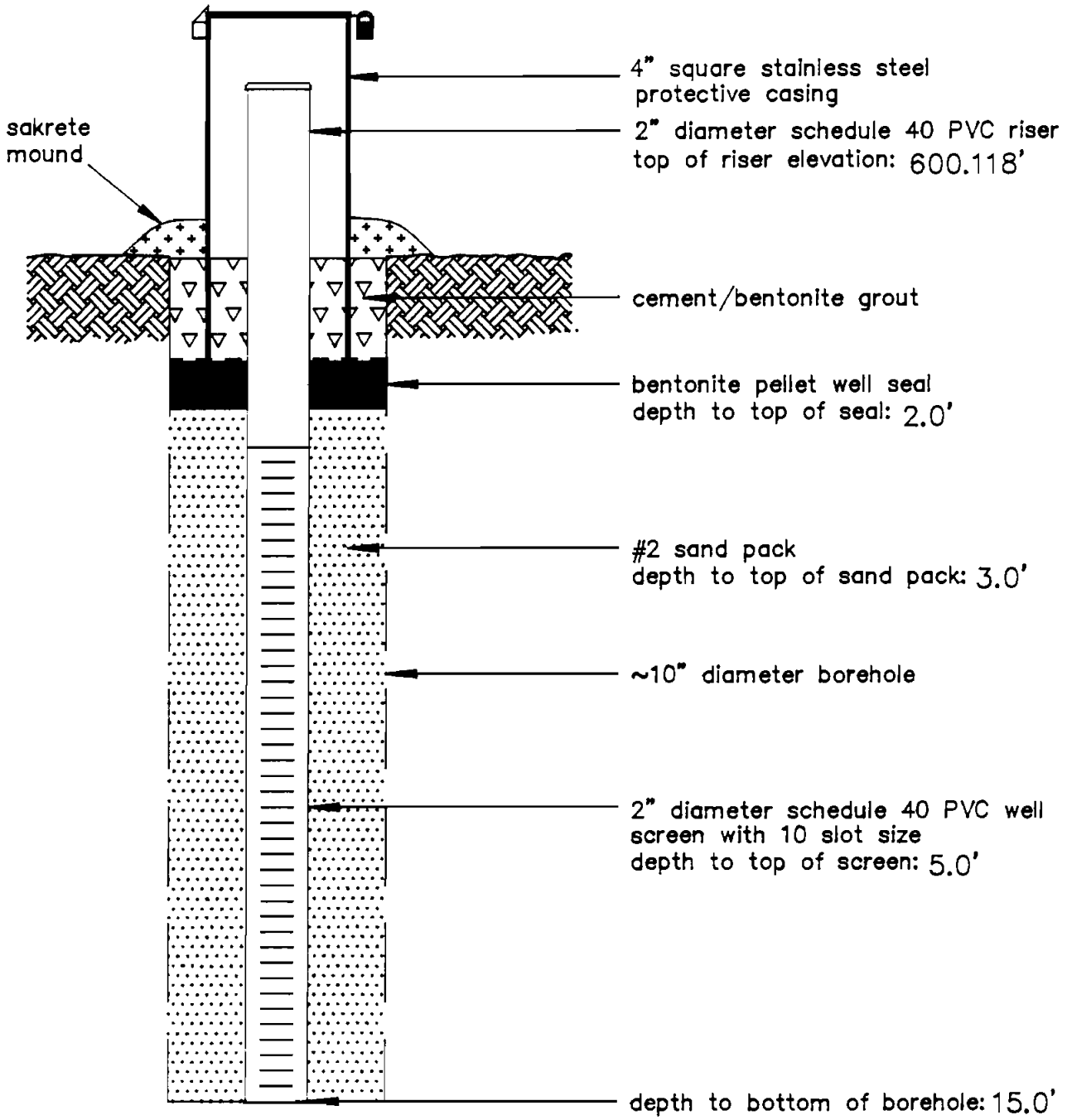


DYF-3

COORDINATES: Northing: 2302.25		Easting: 2898.36	
COMPLETION DATE: AUGUST 5, 1992		INSPECTED BY: Paul F. Mazierski	
DRAWN BY: FRG	CHECKED BY: KRM	PROJECT NO: 90C2331	DATE: 7-07-93	FIGURE NO:

DUPONT YERKES FACILITY
PHASE II INVESTIGATION

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

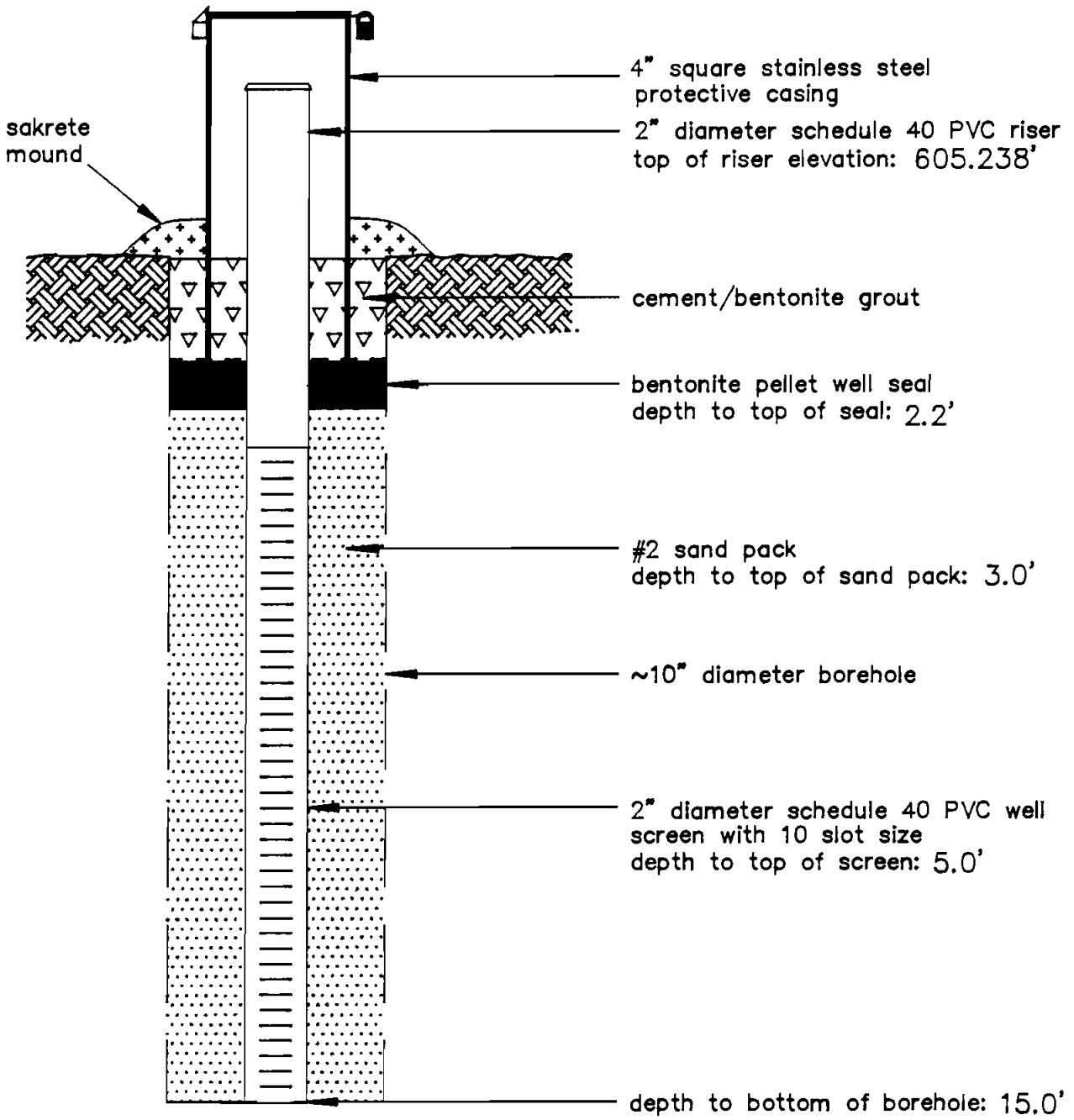


DYF-4

COORDINATES: Northing: 2336.79		Easting: 3937.24	
COMPLETION DATE: AUGUST 6, 1992		INSPECTED BY: Paul F. Mazierski	
DRAWN BY: FRG	CHECKED BY: KRM	PROJECT NO: 90C2331	DATE: 7-07-93	FIGURE NO:

DUPONT YERKES FACILITY
PHASE II INVESTIGATION

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists



DYF-5

COORDINATES: Northing: 2157.80		Easting: 5106.39	
COMPLETION DATE: AUGUST 6, 1992		INSPECTED BY: Paul F. Mazierski	
DRAWN BY: FRG	CHECKED BY: KRM	PROJECT NO: 90C2331	DATE: 7-07-93	FIGURE NO:

Appendix B

LOG of Boring No. DYF-1

DATE 8/7/92 SURFACE ELEVATION 0.0 LOCATION N 1189.63 E 2280.93

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0				Asphalt Pavement (0.5')	0.5		
		10	SS	Crushed stone sub-base	-0.9		
		12	SS	Firm to hard, red-brown with some gray to tan mottling, silty clay to fine to medium sandy silty clay			
		35	SS				
5		49	SS	- 6.0' With trace fine to coarse gravel			
		33	SS				
10		31	SS				
		25	SS		-14.0		
15							
20							
25							
30				Note: 1) Surface elevation assigned arbitrary datum 0.0.			
35							
40							

Completion Depth: 14.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

LOG of Boring No. DYF-2

DATE 8/5/92 SURFACE ELEVATION 0.0 LOCATION N 1842.54 E 2462.64

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		17	SS	Topsoil (0.5')	0.5		
		24	SS	Stiff to hard, red-brown with orange and brown mottling, silty clay, trace fine to coarse sand and fine gravel interbedded with fine to medium sandy silty clay			
5		39	SS	- 4.0' With some gray and tan mottling			
		41	SS				
		40	SS				
10		33	SS				
		15	SS	- 12.0' Decreasing sand content	-14.0		
15							
20							
25							
30				Note: 1) Surface elevation assigned arbitrary datum 0.0.			
35							
40							

Completion Depth: 14.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

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LOG of Boring No. DYF-3

DATE 8/4/92 SURFACE ELEVATION 0.0 LOCATION N 2302.25 E 2898.36

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0				Asphalt pavement over crushed stone sub-base	-2.0		
		24	SS	Stiff to hard, red-brown with gray stringers, silty clay to clay			
5		38	SS				
		35	SS				
		39	SS				
10		30	SS				
		47	SS		-14.0		
15							
20							
25							
30				Note: 1) Surface elevation assigned arbitrary datum 0.0.			
35							
40							

Completion Depth: 14.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

Woodward-Clyde Consultants

LOG of Boring No. DYF-4

Sheet 1 of 1

DATE 8/6/92 SURFACE ELEVATION 0.0 LOCATION N 2336.79 E 3937.24

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		19	SS	Dense, brown, silty fine to coarse gravelly fine to coarse sand	-1.1		
				Medium dense, dark gray, well-sorted, silty fine sand	-2.0		
		17	SS	Stiff to hard, red-brown with red and brown mottling, silty clay to fine to medium silty clay			
5		38	SS				
		77	SS				
		74	SS				
10		44	SS				
		34	SS		-14.0		
15							
20							
25							
30				Note: 1) Surface elevation assigned arbitrary datum 0.0.			
35							
40							

Completion Depth: 14.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

Woodward-Clyde Consultants

LOG of Boring No. DYF-5

Sheet 1 of 1

DATE 8/6/92 SURFACE ELEVATION 0.0 LOCATION N 2157.8 E 5106.39

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		11	SS	Firm, brown, coarse gravelly clayey silt with crushed stone and cinders grading to dense, silty clayey medium to coarse sand and gravel			
		40	SS		-4.4		
5		10	SS	Soft to firm, black organic clay	-4.8		
		34	SS	Firm to hard, red-brown with red and brown mottling, silty clay to clay, trace fine to coarse gravel			
		61	SS				
10		57	SS				
		53	SS		-14.0		
15							
20							
25							
30				Note: 1) Surface elevation assigned arbitrary datum 0.0.			
35							
40							

Completion Depth: 14.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

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Appendix C

LOG of Boring No. SB-1A

DATE 8/11/92 SURFACE ELEVATION 0.0 LOCATION N 1392.36 E 5474.18

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		149/7"	SS	Topsoil (0.4')	-0.4		
				Very dense, red-brown brick fragments and brown medium to coarse gravel	-1.0		
		29	SS				
5		14	SS	Soft to firm, red-brown to gray, coarse to fine sandy and gravelly clay; coarse fraction includes wood and brick fragments, dark gray fine sand, and white, synthetic fiberous material			
		3/18"	SS		-8.0		
		2	SS	Very loose to medium dense, white, blue and gray, well-sorted silty fine sand intermixed with white, synthetic fiberous material, Tedlar fragments, and plastic labels			1
10		12	SS				
		4	SS				0.5
		10	SS	FILL	-16.0		
15		32	SS	Medium stiff, black, organic clay	-16.5		
				Very stiff to hard, red-brown, clay	-18.0		
				LACUSTRINE DEPOSIT			
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon. Elevated readings noted over the boring ranged from 0 to 50 ppm.
3) Depth to saturated soil estimated at 6.0 feet.
4) Tedlar and Vexar noted wrapped around lead auger following removal from borehole.

Completion Depth: 18.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: _____ ft., After _____ hrs.
_____ ft., After _____ hrs.
_____ ft., After _____ hrs.
_____ ft., After _____ hrs.

LOG of Boring No. SB-1B

DATE 8/12/92 SURFACE ELEVATION 0.0 LOCATION N 1326.18 E 5513.91

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		16	SS	Medium dense to dense, red, clayey fine to coarse gravel; coarse fraction includes brick and asphalt pavement fragments			0
		100/6"	SS		-4.0		0
5		31	SS	Loose to medium dense, light brown to dark gray, silty fine to coarse gravelly well-sorted medium to fine sand; gravel includes concrete fragments			3
		3	SS		-7.0		5
		10	SS	- 6.5' Becoming clayey FILL			
10				Soft to firm, red-brown with gray mottling, clay LACUSTRINE DEPOSIT	-10.0		
15							
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil estimated at 6.0 feet.

Completion Depth: 10.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.

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LOG of Boring No. SB-2A1

DATE 8/7/92 SURFACE ELEVATION 0.0 LOCATION N 2188.62 E 4127.68

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		75	SS	Very dense, predominantly dark gray silty fine sand			
		26	SS	FILL	-4.0		
5		45	SS	Very stiff, brown clay LACUSTRINE DEPOSIT	-6.0		

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) No waste encountered.
3) OVA monitor unavailable during drilling of SB-2A1.
4) Saturated soil not encountered.

Completion Depth: 6.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft..After ____hrs.

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LOG of Boring No. SB-2A2

DATE 8/7/92 SURFACE ELEVATION 0.0 LOCATION N 2232.50 E 4028.63

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0				No samples collected 0 to 4 feet			
					-4.0		
5		13	SS	Pieces of Tedlar sheets			
				FILL	-6.0		
		80	SS	Hard, red-brown with tan and gray mottling, clay			
				LACUSTRINE DEPOSITS	-8.0		
		52	SS				
10							
15							
20							
25							
30							
35							
40							

Notes:
1) Location surface elevation assigned arbitrary datum 0.0.
2) OVA monitor unavailable during drilling of SB-2A2.
3) Saturated soil not encountered.

Completion Depth: 10.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.

LOG of Boring No. SB-2A3

DATE 8/10/92 SURFACE ELEVATION 0.0 LOCATION N 2249.06 E 4005.76

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		20	SS	Stiff to very stiff, brown, dark gray, and black, gravelly clay becoming medium to fine sandy clay; sand fraction is distinctive,			
		39	SS	dark gray, well-sorted medium to fine sand	-4.0		
5		9	SS	Loose to dense, dark gray, well-sorted silty fine sand to fine to medium sand with trace wood and Tedlar fragments			
		100/2"	SS				
		100/5"	SS	- 8' Becoming predominantly Tedlar fragments			
10		100/1"	SS				
				FILL	-12.2		
		44	SS	Very stiff, brown clay			
				LACUSTRINE DEPOSITS	-14.0		
15							
20							
25							
30							
35							
40							

Notes:
1) Location surface elevation assigned arbitrary datum 0.0.
2) OVA monitor unavailable during drilling of SB-2A3.
3) Depth to saturated soil estimated at 4.0 feet.

Completion Depth: 14.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft..After ____hrs.
____ft..After ____hrs.

LOG of Boring No. SB-2B1

DATE 8/7/92 SURFACE ELEVATION 0.0 LOCATION N 2190.23 E 4081.13

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		31	SS	Very stiff, brown, coarse to fine sandy silty clay	-1.6		
		15	SS	Loose to medium dense, well-sorted, dark gray to dark brown, silty medium to fine sand			
		3	SS				
5					-6.0		
		100/2"	SS	- 5.7' Fragment of packing material			
		100/2"	SS	Thin sheets of Tedlar with trace amounts of tan fiberous packing material			
10		63	SS				
				FILL	-12.0		
		48	SS	Soft to hard, brown, silty clay with trace fine to medium sand			
		46	SS				
15				LACUSTRINE DEPOSITS	-16.0		
20							
25							
30							
35							
40							

Notes:
1) Location surface elevation assigned arbitrary datum 0.0.
2) OVA monitor unavailable during drilling of SB-2B1.
3) Depth to saturated soil estimated at 2.0 feet.

Completion Depth: 16.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.

LOG of Boring No. SB-3A

DATE 8/13/92 SURFACE ELEVATION 0.0 LOCATION N 1525.74 E 5617.56

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		11	SS	Topsoil (0.1')	-0.2		0
		19	SS	Stiff to very stiff, red-brown, sandy to gravelly clay to silty clay; coarse fraction includes brick, Corian, and Tedlar fragments			0
		29	SS				0
5		11	SS				
		18	SS	Medium dense, red-brown, silty fine to coarse sand intermixed with Corian and Tedlar fragments	-8.0		0.5-1
10		107/10"	SS				2-10
		15	SS	- 12.0' with some Vexar netting			
		2	SS				1-10
15		8	SS	Very loose to medium dense, dark gray, well-sorted, silty fine to medium sand to fine gravelly silty fine to medium sand	-16.0		4-20
		5	SS	FILL	-20.0		5-30
20		31	SS	Very stiff, red-brown, silty clay to clay LACUSTRINE DEPOSITS	-22.0		0.5-1
25							
30							
35							
40							

Notes:
1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil estimated at 14.0 feet.

Completion Depth: 22.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

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LOG of Boring No. SB-3B

DATE 8/13/92 SURFACE ELEVATION 0.0 LOCATION N 1641.98 E 5700.83

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		24	SS	Firm to stiff, brown to black, silty clay with little brick fragments, gravel, and chips of an unidentified blue material			0
		16	SS				8-20
		42	SS		-4.9		4-12
5		13	SS	Medium dense to dense, dark gray, well-sorted silty fine to medium sand with brick, wood, and Tedlar fragments - clayey from 6.0 to 8.0 feet			10-> 1000
		11	SS				2-4
10		100/2"	SS				
		21	SS				2-10
		3	SS	- With Corian fragments and transluscent white beads from 14.0 feet			
15		5	SS				
					-18.0		
		16	SS	Very loose, dark gray to black, fine sandy silt FILL	~~18.5~~ -20.0		1-3
20				Very stiff, red-brown, silty clay LACUSTRINE DEPOSITS			
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil not noted.

Completion Depth: 20.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

LOG of Boring No. SB-4A

DATE 8/17/92 SURFACE ELEVATION 0.0 LOCATION N 1293.07 E 5211.37

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		12	SS	Topsoil (0.5')	0.5		0
		19	SS	Firm to stiff, red-brown, fine to coarse sandy silty clay with little to some dark gray, well-sorted silty fine sand			0
		4	SS				0-2
5					-6.0		
		34	SS	Very loose to dense, dark gray, well-sorted silty fine sand with little to some Corian and Tedlar fragments			0-0.5
		2	SS				0-10
10		45	SS	- 10.0' Becoming predominantly Corian fragments with little to some Tedlar and wood fragments, and dark gray silty fine sand			0-5
		17	SS	- 12.0' Trace pieces of red, cork-like material			0-40
		40	SS				5-10
15		100/3"	SS	- 16.0' With green transparent film			0
				FILL	-18.2		
		39	SS	Very stiff, red-brown with little gray, clay			0-0.3
20				LACUSTRINE DEPOSITS	-20.0		
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil estimated at 4.0 feet.

Completion Depth: 20.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

LOG of Boring No. SB-4B

Sheet 1 of 1

DATE 8/17/92 SURFACE ELEVATION 0.0 LOCATION N 1282.81 E 5258.12

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		16	SS	Firm to stiff, red-brown, fine to coarse gravelly clay to silty clay; coarse fraction includes brick and asphalt pavement fragments			0
		19	SS		-4.0		0
5		22	SS	Stiff, red-brown, fine to coarse gravelly fine sandy silty clay; gravel fraction includes Corian and Tedlar fragments, fine sand is dark gray, well-sorted fine sand			0-2
		9	SS	- Predominantly Corian and Tedlar fragments from 6.0 to 8.0 feet			1-10
		3	SS		-10.0		0
10		10	SS	Medium dense to very dense, multicolored, pieces of Corian, Tedlar, and Vexar intermixed with some dark gray, silty fine sand			0-1
		15	SS				1-4
15		54	SS				1-5
		12	SS	FILL	-18.0		0-1
		26	SS	Stiff to very stiff, red-brown, clay			0
20		38	SS				0
				LACUSTRINE DEPOSITS	-22.0		
25							
30							
35							
40							

Notes:
1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil estimated at 4.0.

Completion Depth: 22.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.

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LOG of Boring No. SB-5A

DATE 8/12/92 SURFACE ELEVATION 0.0 LOCATION N 1612.37 E 5477.68

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		7	SS	Soft to very stiff, red-brown becoming gray, fine to coarse gravelly clay; gravel includes brick fragments			1
		42	SS				0-7
		3	SS				
5					-6.0		
		1/24"	SS	Very loose, black, fine to coarse sandy fine to coarse gravel intermixed with Tedlar, cellophane, and Vexar			1-2
				FILL	-10.0		
10		3/18"	SS	Very soft, black, organic clay grading to soft becoming very stiff, red-brown, clay			0-1
		18	SS				
				LACUSTRINE DEPOSITS	-14.0		
15							
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil estimated at 4.0 feet, note sheen on water.
4) Tedlar and Vexar noted wrapped around the lead auger following removal from borehole.

Completion Depth: 14.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

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LOG of Boring No. SB-5B

DATE 8/12/92 SURFACE ELEVATION 0.0 LOCATION N 1556.61 E 5472.21

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		8	SS	Firm, red-brown, fine gravelly clay; gravel includes brick and asphalt pavement fragments			0
		13	SS		-3.0		0
				Firm, red-brown, silty clay with roots and organic material	-4.0		
		2	SS	Very soft to soft, black, clay to organic clay, little to trace fine gravel, plastic labels, and possible Tedlar			0.2
5		5	SS				0
		6	SS				0
				FILL	-10.0		
10		18	SS	Stiff to very stiff, red-brown with gray mottling, clay			0
		42	SS				0-5
				LACUSTRINE DEPOSITS	-14.0		
15							
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil estimated at 3.8 feet.
4) Tedlar noted wrapped around the lead auger following removal from borehole.

Completion Depth: 14.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.

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LOG of Boring No. SB-6A

DATE 8/14/92 SURFACE ELEVATION 0.0 LOCATION N 1666.95 E 5918.59

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		9	SS	Soft to firm, red-brown, clay	-0.8		0
		25	SS	Firm to hard, tan, red-brown, brown, and black, interbedded silty clay, sandy clay, and gravelly clay; coarse fraction includes some brick fragments			5-70
		108/8"	SS				4-8
5		37	SS	- Some white ash-like inclusions - Gravelly sand layer 7.1 to 7.8 feet			1-8
		11	SS				1-8
10		100/4"	SS	- 9.5' Gravelly clay with Corian fragments	-12.0		
		100/10"	SS	Very dense, white Corian fragments in a dark gray, well-sorted, silty fine sand matrix	-13.6		10-50
		100/1"	SS	FILL			
15							
20							
25							
30							
35							
40							

Notes:
1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil not noted.

Completion Depth: 13.6 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

LOG of Boring No. SB-6B

DATE 8/14/92 SURFACE ELEVATION 0.0 LOCATION N 1664.75 E 5995.22

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		7	SS.	Firm to very stiff, brown-black to red, coarse sandy to fine gravelly silty clay; coarse fraction includes brick fragments, slag, and Corian			
		18	SS				0
		16	SS				2-10
5		23	SS				2-14
					-8.0		
		33	SS	Loose to very dense, white Corian fragments in a dark gray, well-sorted, gravelly, silty fine to medium sand; gravel portion includes brick fragments, insulated copper wire, and pieces of polyvinyl alcohol film			0-0.5
10		100/1"	SS				
		100/1"	SS				
		8	SS.				
15		4	SS.				
		100/5"	SS				2-10
20		5	SS				
					-22.0		
		8/18"	SS	Very soft to firm, red-brown, coarse sandy to fine gravelly silty clay; coarse fraction includes Corian fragments	-24.0		
				FILL			
25							
30							
35							
40							

Notes:
1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil not noted.

Completion Depth: 24.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft..After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft..After ____hrs.

LOG of Boring No. SB-7A

Sheet 1 of 1

DATE 8/11/92 SURFACE ELEVATION 0.0 LOCATION N 1761.37 E 5637.68

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		12	SS	Topsoil (0.2')	-0.2		
		15	SS	Firm to stiff, red-brown, fine to coarse sandy to fine to coarse gravelly clay; coarse fraction includes brick fragments and dark gray fine sand	-4.0		0
5		100/4"	SS	Loose to very dense, white Corian fragments in a dark gray, well-sorted, silty fine sand matrix			3
		100/5"	SS				
		5	SS				
10		7	SS	- 10.0' Matrix becomes clayey fine to coarse gravel			
				FILL	-13.3		
15							
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil estimated at 3.0 feet.
4) Due to declination of auger string at depth 6.0 feet, offset boring 2.0' south and recontinue sampling at depth 6.0 feet. Bend split-spoon sampler attempting to collect sample at depth 10.0 feet, offset boring 4.0 feet south from original boring location and auger to depth 10.0 feet. Note augers drop through 2.0 feet interval from depths 8.0 to 10.0 feet and split-spoon sampler drops to depth 10.5 feet, when attempting to collect sample from 10.0 to 12.0 feet, indicating a possible 2.5 feet void. Auger refusal at 13.3 feet.

Completion Depth: 13.3 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: _____ ft., After _____ hrs.
_____ ft., After _____ hrs.
_____ ft., After _____ hrs.
_____ ft., After _____ hrs.

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LOG of Boring No. SB-7B

DATE 8/12/92 SURFACE ELEVATION 0.0 LOCATION N 1770.04 E 5709.01

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		13	SS	Firm, brown, gravelly clay	-1.5		
				Concrete obstruction	-2.5		
		14	SS	Dense, brown, clayey gravel with ash and cinders			0-1
5		25	SS		-5.5		0-5
		32	SS	White, woven, synthetic fiber	-6.0		0-0.5
		12	SS	Loose to very dense, white Corian fragments and pieces of Tedlar in a dark gray, well-sorted, silty fine sand matrix - 8.0' Becoming predominantly Corian and Tedlar			0.5-1
10		7	SS				6-40
		7	SS				1-3
15		6	SS				
		20	SS				10-30
		5	SS	FILL	-18.5		0.5
20		30	SS	Firm to very stiff, red-brown, clay			0-1
				LACUSTRINE DEPOSITS	-22.0		
25							
30							
35							
40							

Notes:
1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil estimated at 6.0.

Completion Depth: 22.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

LOG of Boring No. SB-8A

DATE 8/10/92 SURFACE ELEVATION 0.0 LOCATION N 1235.13 E 5964.92

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		19	SS	Topsoil (0.2')	-0.2		
				Medium dense, dark gray, well-sorted, fine to medium sand, trace silt	-2.0	2-5	
		11	SS				
5		7	SS	Medium dense, black, Tedlar fragments in a clayey fine to medium sand matrix			
				FILL	-6.2		
		56	SS	Very stiff to hard, brown, fine sandy silty clay to clay		3-5	
		77	SS				
10				LACUSTRINE DEPOSITS	-10.0		
15							
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "HNU READING" are range of HNU readings elevated above background levels noted over the sample in the split-spoon.
3) Saturated soil not encountered.

Completion Depth: 10.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.

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LOG of Boring No. SB-8B

DATE 8/10/92 SURFACE ELEVATION 0.0 LOCATION N 1321.05 E 6062.10

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		12	SS	Topsoil (0.2')	-0.2		
				Firm, brown, fine sandy silty clay with trace cinders	-2.0		
		81	SS	Loose to very dense, brown to dark gray, well-sorted, fine to medium sand, some brick fragments		0.0	
5		4	SS	FILL	-5.0	3-4	
					-5.5		
		44	SS	Soft, black, organic clay with trace peat			
				Stiff to hard, brown, fine sandy silty clay	-8.0		
				LACUSTRINE DEPOSITS			
10							
15							
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "HNU READING" are range of HNU readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil estimated at 2.0 feet.

Completion Depth: 8.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.

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LOG of Boring No. SB-9A

Sheet 1 of 1

DATE 8/17/92 SURFACE ELEVATION 0.0 LOCATION N 2049.64 E 4524.65

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		9	SS	Firm to stiff, red-brown, medium to coarse sandy fine to coarse gravelly clay; coarse fraction includes brick and asphalt pavement fragments			0
		24	SS				0
		14	SS				0-1
5		40	SS	- Dark gray 6.0 to 6.3 feet	-6.5		0-0.3
				FILL	-8.0		
				Very stiff, red-brown, clay			
				LACUSTRINE DEPOSITS			
10							
15							
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Saturated soil not encountered.

Completion Depth: 8.0 Ft.

Project No.: 92C2284

Project Name: DuPont Yerkes

Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.

____ft.,After ____hrs.

____ft.,After ____hrs.

____ft..After ____hrs.

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LOG of Boring No. SB-9B

DATE 8/18/92 SURFACE ELEVATION 0.0 LOCATION N 2069.04 E 4524.23

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		9	SS	Firm to stiff, red-brown, fine gravelly clay; gravel includes asphalt pavement fragments	-2.0		0
		22	SS	Firm, red-brown with dark gray fine sand, fine sandy clay			
		8	SS	-4.0' With asphaly pavement fragments			2-3
5				FILL	-6.0		
		41	SS	Soft to firm, black, organic clay, trace fine sand	-6.5		2-4
				Very stiff to hard, red-brown, clay	-8.0		
				LACUSTRINE DEPOSITS			
10							
15							
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil estimated at 4.0 feet.

Completion Depth: 8.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

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LOG of Boring No. SB-9C

DATE 8/18/92 SURFACE ELEVATION 0.0 LOCATION N 2056.61 E 4504.16

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		112/6"	SS	Medium dense to very dense, gray, fine to coarse gravelly clay; gravel fraction primarily construction debris of concrete and brick fragments	-2.0		0-1
		12	SS				
		13	SS	Firm to stiff, red-brown to gray, fine to coarse gravelly fine sandy clay; gravel includes brick fragments FILL	-5.5		1-4
5		48	SS	Stiff to hard, red-brown, clay LACUSTRINE DEPOSITS	-8.0		0
10							
15							
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Saturated soil not encountered.
4) Auger refusal at depth 1.0 foot, offset boring 2.0 feet north and encounter auger refusal at depth 1.2 feet, offset boring 2.0 feet northwest, auger to depth 2.0 feet and recontinue sampling.

Completion Depth: 8.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.

LOG of Boring No. SB-9D

DATE 8/18/92 SURFACE ELEVATION 0.0 LOCATION N 2043.08 E 4513.55

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		12	SS	Firm to stiff, red-brown, fine to coarse gravelly clay to fine to coarse gravelly fine sandy clay; fine sand is dark gray, gravel			0
		22	SS	includes brick, asphalt pavement, and wood fragments			0
		12	SS				0-1
5				FILL	-6.5		
		39	SS				1
				Very stiff to hard, red-brown, clay	-8.0		
				LACUSTRINE DEPOSITS			
10							
15							
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil estimated at 4.0 feet.

Completion Depth: 8.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft..After ____hrs.

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LOG of Boring No. SB-9E

DATE 8/18/92 SURFACE ELEVATION 0.0 LOCATION N 2052.23 E 4536.83

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		10	SS	Firm to very stiff, red-brown to gray, fine to coarse gravelly clay to fine to coarse gravelly fine sandy clay; fine sand is dark gray, gravel includes crushed stone, brick fragments, slag, and wood chips			0
		28	SS				0
		17	SS				0-4
5				FILL	-6.5		
		32	SS	Very stiff to hard, red-brown, clay			0-1
				LACUSTRINE DEPOSITS	-8.0		
10							
15							
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Saturated soil not encountered.

Completion Depth: 8.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

LOG of Boring No. SB-10A

DATE 8/14/92 SURFACE ELEVATION 0.0 LOCATION N 1435.78 E 4852.48

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		12	SS	Firm, red-brown to dark brown/black, fine to coarse gravelly silty clay, gravel includes brick fragments			0
		14	SS				0
				FILL	-4.0		
		21	SS	Stiff to hard, red-brown, silty clay			0
5				LACUSTRINE DEPOSITS	-6.0		
10							
15							
20							
25							
30							
35							
40							

Notes:
1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Saturated soil not encountered.

Completion Depth: 6.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.

LOG of Boring No. SB-10B

DATE 8/14/92 SURFACE ELEVATION 0.0 LOCATION N 1443.06 E 4854.36

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		25	SS	Stiff, red-brown to brown, silty clay to coarse sandy to fine gravelly silty clay; coarse fraction includes brick fragments and			0
		19	SS	gray, vitreous, manufactured sand			
				FILL	-4.0		
5		13	SS	Firm to stiff, red-brown, silty clay			0
				LACUSTRINE DEPOSITS	-6.0		

Notes:
1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Saturated soil not encountered.

Completion Depth: 6.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.

Woodward-Clyde Consultants

LOG of Boring No. SB-10C

DATE 8/14/92 SURFACE ELEVATION 0.0 LOCATION N 1452.58 E 4855.98

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		33	SS	Very dense, brown, silty fine to coarse sand, trace gravel, roots, leaves, and gray, vitreous, manufactured sand			0
		13	SS	Red, brick fragments			0-1.5
5		8	SS	Dense to very dense, brown to black, silty fine to coarse sand and fine gravel; gravel includes asphalt pavement fragments			0
		31	SS	Firm, red-brown to black, silty clay - 4.0' Interbedded with dark gray, well-sorted, silty fine sand FILL			0
10				Stiff to hard, red-brown, silty clay LACUSTRINE DEPOSITS			
15							
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Saturated soil not encountered.

Completion Depth: 8.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.

Woodward-Clyde Consultants

LOG of Boring No. SB-10D

DATE 8/17/92 SURFACE ELEVATION 0.0 LOCATION N 1379.26 E 4853.35

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		100/1"	SS	Topsoil (0.5')	-0.4		
				Concrete Slab	-0.6		
5							
10							
15							
20							
25							
30							
35							
40							

Notes:
1) Abandon location because of concrete slab obstruction.
2) Surface elevation assigned arbitrary datum 0.0.

Completion Depth: 0.6 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft..After ____hrs.

LOG of Boring No. SB-10E

DATE 8/17/92 SURFACE ELEVATION 0.0 LOCATION N 1372.46 E 4849.12

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		39	SS	Topsoil (0.5')	-0.5		
		17	SS	Firm to very stiff, red-brown, silty fine to medium sandy clay with trace fine to coarse gravel and brick fragments FILL	-4.0		
5		32	SS	Stiff to hard, red-brown, clay LACUSTRINE DEPOSITS	-6.0		
10							
15							
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Saturated soil not encountered.

Completion Depth: 6.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft..After ____hrs.

LOG of Boring No. SB-10F

Sheet 1 of 1

DATE 8/17/92 SURFACE ELEVATION 0.0 LOCATION N 1446.46 E 4884.61

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		16	SS	Topsoil (0.6')	-0.6		0
				Poor sample recovery; auger cuttings show red-brown, clayey fill			
		18	SS	FILL	-4.0		
5		54	SS	Very stiff to hard, red-brown, clay			0
				LACUSTRINE DEPOSITS	-6.0		

Notes:
1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Saturated soil not encountered.

Completion Depth: 6.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

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LOG of Boring No. SB-10G

DATE 8/17/92 SURFACE ELEVATION 0.0 LOCATION N 1434.97 E 4933.89

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		14	SS	Topsoil (0.5')	0.5		0
		19	SS	Firm to stiff, red-brown, fine to coarse gravelly fine to coarse sandy clay; coarse fraction includes brick fragments FILL	-4.0		0
5		35	SS	Stiff to hard, red-brown, clay LACUSTRINE DEPOSITS	-6.0		0
10							
15							
20							
25							
30							
35							
40							

Notes:
1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Saturated soil not encountered.

Completion Depth: 6.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ft.,After ____hrs.
____ft.,After ____hrs.
____ft.,After ____hrs.
____ft..After ____hrs.

Woodward-Clyde Consultants

LOG of Boring No. SB-10H

Sheet 1 of 1

DATE 8/18/92 SURFACE ELEVATION 0.0 LOCATION N 1432.99 E 4844.25

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	SAMPLE TYPE	DESCRIPTION	STRATUM ELEVATION	HNu READING (ppm)	OVA READING (ppm)
0		16	SS	Topsoil (0.5')	0.5		0-1.5
		3	SS	Loose to medium dense, orange-brown to orange, coarse gravelly fine to coarse sand; gravel and coarse sand includes brick fragments and coal	-4.0		0
5		2	SS	Soft to firm, red-brown to gray, silty clay to fine gravelly to coarse sandy clay with synthetic fibers; gravel and sand predominantly glass fragments			2-5
		6	SS				
		6	SS				> 1000
10		16	SS				100-300
		46	SS		-12.9		0
				Very stiff to hard, red-brown, clay LACUSTRINE DEPOSITS	-14.0		
15							
20							
25							
30							
35							
40							

Notes:

1) Location surface elevation assigned arbitrary datum 0.0.
2) Results under "OVA READING" are range of OVA readings elevated above background levels noted over the sample in the split-spoon.
3) Depth to saturated soil estimated at 4.0 feet.

Completion Depth: 14.0 Ft.
Project No.: 92C2284
Project Name: DuPont Yerkes
Drilling Method: H.S.A.

Water Depth: ____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.
____ ft., After ____ hrs.

Woodward-Clyde Consultants

Appendix D

3571 Niagara Falls Boulevard
North Tonawanda
New York 14120
(716) 692-7172
Fax (716) 692-1512

Woodward-Clyde Consultants

December 30, 1992
92C2284-3

Mr. William Ervin
E.I. du Pont de Nemours & Company, Inc.
Yerkes Plant
Sheridan Drive Station B
Buffalo, New York 14207

Re: Analytical Data Validation Report
Du Pont Yerkes Plant Phase II Investigation

Dear Mr. Ervin:

Woodward-Clyde Consultants (WCC) is pleased to submit this analytical data validation report for samples collected during the Phase II Investigation being conducted for the Yerkes Plant. For completeness, we have included the results of the Toxicity Characteristic Leaching Procedure (TCLP) analysis performed for selected samples in accordance with Addendum 1 (dated April 30, 1992) to the Phase II Investigation Work Plan (dated January 24, 1992).

If you have any questions or comments on this submittal, please contact the undersigned. We appreciate the opportunity to work with Du Pont on the Yerkes Phase II Investigation.

Sincerely,

Anthony J. Misercola
Assistant Project Chemist

Kelly R. McIntosh, P.E.
Associate
Project Manager

ANALYTICAL DATA VALIDATION
DU PONT YERKES FACILITY
PHASE II SITE INVESTIGATION
TONAWANDA, NEW YORK

Prepared for:
Yerkes Plant
Sheridan Drive Station B
Tonawanda, New York 14207
December 30, 1992

Woodward-Clyde Consultants
3571 Niagara Falls Boulevard
North Tonawanda, New York 14120
Project Number 92C2284-3

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1.0 INTRODUCTION

This report presents an analytical data validation of results for samples collected at the Du Pont Yerkes facility in Tonawanda, New York. Groundwater and soil samples were collected by Woodward-Clyde Consultants (WCC). Analytical services were provided by Recra Environmental, Incorporated of Amherst, New York. A summary of the number and type of samples collected and analyses performed is presented in Table 1.

Target Compound List (TCL) parameters and Target Analyte List (TAL) metals analyses were performed using New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocol (ASP), December 1991 methods. Chloride and sulfate analyses were performed using Methods 325.3 and 375.4, respectively. These methods are referenced from "Methods for Chemical Analysis of Water and Wastes, USEPA 500/4-79-020", March 1983.

The following documents were used as guidance for the data validation:

1. Phase II Investigation Work Plan, Prepared for E.I. du Pont de Nemours and Company, Inc., January 1992. Prepared by WCC.

2. "CLP Organics Data Review and Preliminary Review, SOP Number HW-6 Revision #8", January 1992. Prepared by USEPA Region II.

3. "Evaluation of Metals Data for the Contract Laboratory Program (CLP) based on SOW 3/90, SOP Revision XI", January 1992. Prepared by USEPA Region II.

In this report, document 1 will be referred to as the Work Plan and documents 2 and 3 will be referred to as the Region II Guidelines.

Assessment of analytical and field data was performed in accordance with the Work Plan and included a review of the following: holding times, surrogate spikes, matrix spikes,

method detection limits, field duplicates, equipment blanks, trip blanks, laboratory replicates, laboratory blanks, EPA check samples, and chain-of-custody forms.

During the initial analyses of some samples, several compounds exceeded instrument linear ranges and subsequently required dilutions. Results which exceeded instrument linear ranges in the initial analyses were flagged by the laboratory with the qualifier "E". For these compounds, only the diluted results are valid for use. In this report, sample identifications followed by the suffix DL refer to the diluted sample, and sample identifications followed by the suffix Re indicate a reanalyzed sample.

In accordance with the Work Plan, several soil samples were selected for Toxicity Characteristic Leaching Procedure (TCLP) analyses based on the results of the bulk analyses. The results of TCLP analyses are also included in this report (see Section 3).

The following sections present the results of the data validation.

2.0
ANALYTICAL DATA VALIDATION

2.1 SAMPLE HOLDING TIMES

Sample holding times as defined in the Work Plan are presented below:

Analysis	Holding Time Period
TCL VOCs	14 days from collection to analysis
TCL BNAs, Pesticides/PCBs	5 days from VTSR(1) to extraction 40 days from VTSR to analysis
TAL metals	180 days from VTSR to analysis
(mercury)	26 days from VTSR to analysis
chloride	26 days from VTSR to analysis
sulfate	26 days from VTSR to analysis

(1) VTSR - Verified time of sample receipt

Based on a review of the chain-of-custody forms and sample extraction and/or analysis dates, the following sample analyses exceeded their holding time criteria:

Sample I.D.	Analysis	Actual Holding Time
SB-1A	BNAs	15 days from VTSR to extraction
SB-1ADL	BNAs	15 days from VTSR to extraction
SB-1A Re	BNAs	15 days from VTSR to extraction

Sample SB-1A required re-analysis (SB-1A Re) because of outlying internal standards.

Due to the potential loss of analytes from holding time exceedances, these results are qualified as estimated (J for detects, UJ for non-detects). All remaining analyses were performed within holding time criteria. Qualification of sample data due to holding time exceedance is included in the data summary table (Table 2).

2.2 SURROGATE SPIKE RECOVERIES

Surrogate spike recoveries are used in VOC, BNA, and pesticide/PCB analyses to assess method performance on an individual sample basis. Due to the necessity for sample dilution, BNA surrogate compounds were not recoverable for the following samples:

SB-1C DL	SB-6B DL
SB-3B DL	SB-7B DL
SB-4A DL	SB-10H2 DL
SB-5A DL	

Pesticide/PCB surrogate compounds were also diluted out of samples SB-1A, SB-1C, SB-2A3 DL, SB-5A, SB-7B, SB-10H1 and SB-10H2. For samples having surrogate compounds diluted out of solution, the surrogate recoveries could not be evaluated with respect to the control limits.

For VOCs, qualification of sample data is required when one surrogate recovery is outside control limits. For BNAs, qualification of sample data is required if more than one surrogate recovery per fraction (base/neutral or acid) is outside control limits, or if any one surrogate recovery is less than 10 percent. For pesticide/PCB analyses, qualification is required if both (two surrogate compounds per sample) surrogate recoveries are outside control limits, or if one surrogate recovery is less than 10 percent. The samples requiring qualification due to outlying surrogate recoveries are listed below:

Sample ID	Analysis	Surrogate Compound	Percent Recovery	Percent Control Limits
SB-8B DL	BNAs (acid fraction)	2-fluorobiphenyl	118	30-115
		terphenyl-d_{14}	221	18-137

Sample ID	Analysis	Surrogate Compound	Percent Recovery	Percent Control Limits
SB-10H2	BNAs (acid fraction)	phenol-d_5	0	24-113
		2-fluorophenol	385	25-121
		2-chlorophenol	6	20-130
SB-10H2 Re	BNAs (acid fraction)	phenol-d_5	0	24-113
SB-3B	pesticides/PCBs	tetrachloro-meta-xylene 1	55	60-150
		tetrachloro-meta-xylene 2	54	60-150
		decachlorobiphenyl 1	320	60-150
		decachlorobiphenyl 2	52	60-150
DYF-3	pesticides/PCBs	tetrachloro-meta-xylene 2	50	60-150
		decachlorobiphenyl 1	40	60-150
		decachlorobiphenyl 2	36	60-150
QA-1 (Dup of DYF-3)	pesticides/PCBs	tetrachloro-meta-xylene 2	46	60-150
		decachlorobiphenyl 1	38	60-150
		decachlorobiphenyl 2	40	60-150

Qualification of sample data per the Region II Guidelines is performed as follows:

1. Recoveries outside control limits but greater than 10 percent

   Detected data - J (estimated)
   Non-detected data - UJ (estimated quantitation limit)

2. At least one recovery less than 10 percent

   Detected data - J (estimated)
   Non-detected data - R (unusable)

All remaining surrogate spike recoveries were acceptable. Qualification of sample data due to outlying surrogate recoveries is included in Table 2.

2.3 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES

Matrix spike (MS) and matrix spike duplicate (MSD) analyses are used to assess matrix effects on organic sample analyses. MS and lab duplicate analyses are performed for inorganics analyses. The ASP requirement of one MS/MSD sample and one MS/lab duplicate sample for each 20 samples collected was adhered to. Samples DYF-5, SB-4A, and SB-10H2 (VOCs only) were analyzed as MS/MSD and MS/lab duplicate samples.

The following MS/MSD organic analyses showed outlying spike recoveries and/or relative percent difference (RPD) values:

Sample ID	Analysis	Compound	Percent Recovery MS/MSD	Percent Control Limits	RPD	RPD Control Limit
SB-10H2	VOCs	trichloroethene	244/51	62-137	131	24
		benzene	--/63	66-142	47	21
		toluene	807/446	59-139	58	21
DYF-5	BNAs	1,2,4-trichlorobenzene	--/104	39-98	--	28
		4-chloro-3-methylphenol	104/106	23-97	--	42
		4-nitrophenol	118/125	10-80	--	50
		2,4-dinitrotoluene	104/114	24-96	--	38
		pentachlorophenol	143/156	9-103	--	50
		pyrene	--/128	26-127	--	35
SB-4A	BNAs	phenol	753/679	26-90	--	35
		n-nitroso-di-n-propylamine	291/311	41-126	--	38
		4-chloro-3-methylphenol	13/10	26-103	--	33
		acenaphthene	--/281	31-137	93	19
		4-nitrophenol	136/183	11-114	--	50
		2,4-dinitrotoluene	92/93	28-89	--	47
		pentachlorophenol	367/--	17-109	118	47
		pyrene	1069/4953	35-142	129	35
	pesticides/PCBs	gamma-BHC	164/--	46-127	--	50
		heptachlor	--/0	35-130	NC	31
		aldrin	--/8	34-132	156	43
		dieldrin	--/--	31-134	51	38
		endrin	180/408	42-139	78	45
		4,4'-DDT	160/--	23-134	62	50

The outlying VOC MS/MSD recoveries in sample SB-10H2 were caused by elevated concentrations of several VOCs.

All outlying BNA MS/MSD recoveries in sample SB-4A were caused by elevated concentrations of phenol, acenaphthene, and pyrene. Qualification of these two samples

due to outlying MS/MSD recoveries is therefore not required. Qualification of the remaining sample data is performed as follows:

1. Recoveries below control limits but equal to or greater than 10 percent; RPD outside control limits	detected data - J (estimated result) non-detected data - J (estimated quantitation limit)
2. Recoveries less than 10 percent	detected data - J (estimated result) non-detected data - R (unusable)
3. Recoveries above control limits	detected data - J (estimated result) non-detected data - no qualification required

Sample SB-4A yielded inorganic matrix spike recoveries outside the control limits as shown below:

Sample ID	Analyte	Percent MS Recovery	Percent MS Control Limits
SB-4A	arsenic	-113.8	75-125
	copper	125.9	75-125
	manganese	213.8	75-125

The above-mentioned results are qualified as estimated (J).

Inorganic laboratory duplicate sample results having RPD values in excess of 20 percent when both sample results exceed the Contract Required Detection Limit (CRDL-for inorganics), or having differences of $\pm$ the CRDL when one or both results are below the CRDL, are as follows:

Sample ID	Analyte	RPD	RPD Control Limit	Difference	Difference Control Limit
SB-4A	aluminum	144.5	20	---	---
	arsenic	164.5	20	---	---
	calcium	71.5	20	---	---
	chromium	---	---	6.4825 mg/kg	2.5 mg/kg
	copper	---	---	10.0125 mg/kg	6.1 mg/kg
	iron	96.5	20	---	---
	magnesium	---	---	2632.58 mg/kg	1226.5 mg/kg
	manganese	109.1	20	---	---
	lead	38.8	20	---	---
	mercury	---	---	0.2344 mg/kg	0.1 mg/kg
	zinc	57.1	20	---	---
DYF-5	silver	---	---	14 μg/l	10 μg/l
	zinc	53	20	---	---

Sample SB-4A was heterogeneous, it consisted mainly of plastic and wood chips. This accounts for the low reproducibility of duplicate data in sample SB-4A. Qualification of the above data as estimated (J) is required. Arsenic, copper, and manganese results for sample SB-4A have been previously qualified as estimated due to outlying MS recoveries. Further qualification is not required.

Qualification of data on the basis of outlying MS/MSD and MS/laboratory duplicate data is included in the data summary table (Table 2).

2.4 METHOD BLANK SAMPLES

Method blank samples are used to assess the potential for sample contamination from laboratory equipment and/or protocols. All method blank samples analyzed for pesticides/PCBs, chloride, and sulfate were non-detected. All initial calibration blank samples, continuing calibration blank samples, and preparatory blank samples were non-detected for TAL metals.

VOC and BNA compounds detected in method blank samples are listed in Table 3. For common laboratory contaminants, qualification of sample data due to method blank

sample contamination is performed if the sample concentration is less than 10 times the method blank sample concentration (accounting for dilution factors). If the sample concentration is less than 10 times the method blank sample concentration, the sample concentration is reported as non-detected (U) at the level detected in the sample. If the sample concentration is less than 10 times the method blank sample concentration and is also less than the contract required quantitation limit (CRQL-for organics), the sample concentration is reported as non-detected (U) at the CRQL. When sample results exceed 10 times the method blank concentrations, qualification as non-detected (U) is not required and the laboratory qualifier B (meaning-also present in the laboratory blank sample) is removed.

Detections of tentatively identified compounds (TICs) in method blank samples are also listed in Table 3. Qualification of TIC data as unusable (data qualifier R) is performed if the sample TIC concentration is less than 5 times the method blank sample TIC concentration (accounting for dilution factors).

Qualification of sample data due to method blank contamination is presented in Table 3, and is included in the data summary table (Table 2).

2.5 TRIP BLANK SAMPLE

The results of trip blank sample analyses are used to determine the extent of aqueous sample cross-contamination by VOCs. One trip blank sample was submitted with the water samples collected on September 2, 1992. Region II does not require trip blank samples to be submitted with non-aqueous samples. The trip blank had non-detected concentrations of all VOCs. This indicated that sample cross-contamination was not a factor for this sampling event.

2.6 RINSATE BLANK SAMPLES

Results of rinsate blank sample analyses are used to assess the sampling equipment decontamination protocol performed in the field. Two rinsate blank samples were collected and submitted for TCL/TAL analyses. The compounds detected in each rinsate blank sample are listed as follows:

Sample	Parameter	Compound	Concentration
RBSB-1	VOCs	acetone	12 µg/l
		chloroform	1J µg/l
		1,2-dichloropropane	1J µg/l
	BNAs	butylbenzylphthalate	0.8J µg/l
	TAL metals	calcium	760B µg/l
		iron	105 µg/l
		lead	55.9 µg/l
		sodium	877B µg/l
		zinc	20.0 µg/l
RBSB-2	VOCs	acetone	6J µg/l
		chloroform	1J µg/l
		1,2-dichloropropane	1J µg/l
	TAL metals	calcium	625B µg/l
		iron	36.6B µg/l
		lead	59.7 µg/l
		sodium	819B µg/l

J - Associated value is below the CRQL and is considered an estimated value
B - Value is above the instrument detection limit (IDL) but below the CRDL

For comparison purposes, the rinsate blank concentrations were converted to µg/kg for organics and mg/kg for metals. Qualification of sample data on the basis of rinsate blank sample contamination is performed when the sample concentration is less than 5 or 10 times the associated rinsate blank sample concentration, depending on the analyte. A factor of 10 is used for common laboratory contaminants (select VOCs and phthalates), and a factor of 5 is used for all other analytes. Only one sample result required qualification due to rinsate blank contamination. Acetone in sample SB-3B was qualified as non-detected (U) on the basis of rinsate blank contamination. Qualification of this datum is included in the data summary table (Table 2).

2.7 DETECTION LIMITS

The detection limits achieved by the laboratory were compared to the detection limits listed in the NYSDEC ASP, December 1991. The detection limits achieved by the laboratory were acceptable. Elevated detection limits were due to the sample matrix of some samples (plastic, wood chips).

2.8 CHAIN-OF-CUSTODY FORMS

All samples were transported to the laboratory accompanied by chain-of-custody documentation. Chain-of-custody forms included with the analytical data packages were reviewed for proper sample designations, requisite dates, signatures and preservatives added.

Sample DYF-3 was incorrectly labeled by the laboratory as sample DYF-2. This error was corrected by WCC and the correct sample identification is used in this report.

3.0
SUPPLEMENTAL ANALYTICAL WORK: TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) ANALYSES

In accordance with the Work Plan and Addendum 1 to the Work Plan (April 30, 1992), some soil samples were selected for Toxicity Characteristic Leaching Procedure (TCLP) on the basis of the reported concentrations of TCLP chemical parameters in the bulk sample analyses. The bulk sample analytical results were compared to TCLP regulatory limits as listed in 40 CFR Part 261.24. All samples for which TCLP chemical parameters were reported in the bulk sample analytical results at concentrations (mg/kg) exceeding 20 times the TCLP regulatory limit (mg/l) were analyzed using TCLP methodology for the indicated parameters. The samples were collected in duplicate to allow for this contingency. In accordance with Addendum 1 to the Work Plan holding time limits were waived for these analyses.

Table 4 shows the samples requiring TCLP analyses. Table 5 presents the results of the TCLP analyses and compares them to regulatory limits. The limits were exceeded for only one sample, SB-10H2, for chloroform, trichloroethene, benzene, and tetrachloroethene.

4.0
CONCLUSIONS

Based on the criteria outlined, it is recommended that the data be accepted for use. However, some data required qualification as noted. The reasons for qualification included laboratory contamination, holding time exceedances, and matrix effects resulting in some surrogate compound spike recoveries, matrix spike recoveries, and laboratory duplicate sample RPD values outside the specified control limits.

Tables

TABLE 1

SAMPLE SUMMARY
YERKES PHASE II

Sample Date	Sample ID	Matrix	Analyses Performed
8/10/92	SB-2A3	soil	TCL/TAL[(1)] metals
8/10/92	SB-8B	soil	TCL/TAL[(1)] metals
8/11/92	SB-1A	soil	TCL/TAL[(1)] metals
8/11/92	SB-1C (Dup. of SB-1A)	soil	TCL/TAL[(1)] metals
8/12/92	SB-5A	soil	TCL/TAL[(1)] metals
8/12/92	SB-7B	soil	TCL/TAL[(1)] metals
8/13/92	SB-3B	soil	TCL/TAL[(1)] metals
8/13/92	RBSB-1	water	TCL/TAL[(1)] metals
8/14/92	SB-6B	soil	TCL/TAL[(1)] metals
8/14/92	RBSB-2	water	TCL/TAL[(1)] metals
8/17/92	SB-4A	soil	TCL/TAL[(1)] metals
8/18/92	SB-9 BCDE	soil	TCL/TAL[(1)] metals
8/18/92	SB-9 FGHI (Dup. of SB-9BCDE)	soil	TCL/TAL[(1)] metals
8/18/92	SB-10H1	soil	TCL/TAL[(1)] metals
8/18/92	SB-10H2	soil	TCL/TAL[(1)] metals
9/2/92	DYF-1	water	TCL VOCs, TCL BNAs
9/2/92	DYF-3	water	TCL/TAL metals
9/2/92	QA-1 (Dup. of DYF-3)	water	TCL/TAL metals
9/2/92	DYF-4	water	TCL/TAL metals
9/2/92	DYF-5	water	TCL/TAL metals
9/2/92	Trip blank	water	TCL VOCs

(1) TCL/TAL - Target compound list/target analyte list

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	SB-1A	SB-1A DL	SB-1A Duplicate	SB-1A Duplicate DL	SB-2A3	SB-2A3 RE	SB-3B	SB-4A	SB-5A	SB-6B
Date Sampled	8/11/92	08/11/92	08/11/92	08/11/92	08/10/92	8/10/92	8/13/92	8/17/92	8/12/92	8/14/92
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Volatiles										
vinyl chloride	55U	1500U	47U	1600U	23U	24U	11U	13U	25J	13U
methylene chloride	7J	1500U	47U	1600U	6J	24U	11U	59	71U	48
acetone	1700E	4100	880	1900	360	24U	38U	140	270	180
carbon disulfide	1200E	13000J	650	4800	23U	24U	11U	13U	71U	13U
1,1-dichloroethene	42J	220J	100	320J	23U	24U	11U	13U	16J	13U
1,2-dichloroethene (total)	55U	1500U	47U	1600U	23U	24U	11U	13U	71U	13U
chloroform	55U	1500U	5J	1600U	23U	24U	11U	13U	71U	13U
1,2-dichloroethane	55U	1500U	47U	1600U	23U	24U	11U	13U	120	13U
2-butanone	6100E	5500	2900E	4300	23U	24U	11U	13U	500	13U
1,1,1-trichlorethane	55U	1500U	47U	1600U	23U	24U	11U	13U	71U	13U
carbon tetrachloride	55U	1500U	47U	1600U	23U	24U	11U	13U	71U	13U
1,2-dichloropropane	55U	1500U	47U	1600U	23U	24U	11U	13U	71U	13U
trichloroethene	13J	80J	75	150J	23U	24U	11U	1J	7J	13U
1,1,2-trichloroethane	55U	1500U	47U	1600U	23U	24U	11U	13U	10J	13U
benzene	74	430J	140	340J	10J	24U	11U	8J	110	3J
4-methyl-2-pentanone	46J	1500U	24J	1600U	23U	24U	11U	13U	48J	13U
tetrachloroethene	55U	1500U	47U	1600U	23U	24U	11U	13U	71U	13U
1,1,2,2-tetrachloroethane	55U	1500U	47U	1600U	23U	24U	11U	13U	71U	13U
toluene	490	3700	1000E	2800	28	24U	11U	11J	1100	3J
chlorobenzene	55U	1500U	47U	1600U	23U	24U	11U	2J	7J	13U
ethylbenzene	4J	150J	9J	1600U	6J	24U	11U	3J	27J	13U
total xylenes	75	1900	88	350J	310	60	11U	8J	350	13U

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	SB-7B	SB-8B	RBSB-1	RBSB-2	SB-9BCDE	SB-9BCDE Duplicate	SB-10H1	SB-10H1 DL	SB-10H2	SB-10H2 DL
Date Sampled	8/12/92	8/10/92	8/13/92	8/14/92	8/18/92	8/18/92	8/18/92	8/18/92	8/18/92	8/18/92
Units	ug/kg	ug/kg	ug/l	ug/l	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Volatiles										
vinyl chloride	17U	14U	10U	10U	13U	12U	11U	58U	3300J	73000U
methylene chloride	21	14U	10U	10U	13U	12U	6J	7J	35000	33000J
acetone	140	48	12	6J	52	52	22	53J	94000	130000
carbon disulfide	17U	14U	10U	10U	13U	12U	11U	58U	7300U	73000U
1,1-dichlorethene	17U	14U	10U	10U	13U	12U	10J	5J	2500J	73000U
1,2-dichloroethene (total)	17U	14U	10U	10U	13U	12U	40	31J	7600	73000U
chloroform	17U	14U	1J	1J	13U	12U	420E	240	290000E	250000
1,2-dichloroethane	17U	14U	10U	10U	13U	12U	110	55J	7300U	73000U
2-butanone	14J	14U	10U	10U	13U	11J	11U	55J	180000E	130000U
1,1,1-trichlorethane	17U	14U	10U	10U	13U	12U	6J	58U	7300U	73000U
carbon tetrachloride	17U	14U	10U	10U	13U	12U	16	6J	7300U	73000U
1,2-dichloropropane	17U	14U	1J	1J	13U	12U	11U	58U	7300U	73000U
trichloroethene	17U	2J	10U	10U	13U	12U	640E	560	390000E	440000
1,1,2-trichloroethane	17U	14U	10U	10U	13U	12U	1100E	660	210000E	190000
benzene	2J	13J	10U	10U	13U	12U	17	21J	140000	110000
4-methyl-2-pentanone	17U	14U	10U	10U	13U	12U	11U	58U	24000	16000J
tetrachloroethene	17U	3J	10U	10U	13U	12U	360E	410	1000000E	2600000E
1,1,2,2-tetrachloroethane	17U	14U	10U	10U	13U	12U	440E	270	370000E	360000
toluene	17U	11J	10U	10U	13U	12U	310E	550	1500000E	4700000E
chlorobenzene	17U	14U	10U	10U	13U	12U	3J	58U	32000	25000J
ethylbenzene	17U	14U	10U	10U	13U	12U	7J	16J	76000	58000J
total xylenes	17U	14U	10U	10U	13U	12U	35	77	260000	230000

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	SB-10H2 DL2	DYF-1	DYF-3	DYF-3 Dup.	DYF-4	DYF-5	Trip blank
Date Sampled	8/18/92	9/2/92	9/2/92	9/2/92	9/2/92	9/2/92	9/2/92
Units	ug/kg	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Volatiles							
vinyl chloride	730000U	10U	10U	10U	10U	10U	10U
methylene chloride	730000U	10U	10U	10U	10U	10U	10U
acetone	730000U	10U	10U	10U	10U	10U	10U
carbon disulfide	730000U	10U	10U	10U	10U	10U	10U
1,1-dichlorethene	730000U	10U	10U	10U	10U	10U	10U
1,2-dichloroethene (total)	730000U	10U	10U	10U	10U	10U	10U
chloroform	230000J	10U	10U	10U	10U	10U	10U
1,2-dichloroethane	730000U	10U	10U	10U	10U	10U	10U
2-butanone	730000U	10U	10U	10U	10U	10U	10U
1,1,1-trichlorethane	730000U	10U	10U	10U	10U	10U	10U
carbon tetrachloride	730000U	10U	10U	10U	10U	10U	10U
1,2-dichloropropane	730000U	10U	10U	10U	10U	10U	10U
trichloroethene	370000J	10U	10U	10U	10U	10U	10U
1,1,2-trichloroethane	170000J	10U	10U	10U	10U	10U	10U
benzene	93000J	10U	10U	10U	10U	10U	10U
4-methyl-2-pentanone	730000U	10U	10U	10U	10U	10U	10U
tetrachloroethene	2600000	10U	10U	10U	10U	10U	10U
1,1,2,2-tetrachloroethane	350000J	10U	10U	10U	10U	10U	10U
toluene	3800000	10U	10U	10U	10U	10U	10U
chlorobenzene	730000U	10U	10U	10U	10U	10U	10U
ethylbenzene	46000J	10U	10U	10U	10U	10U	10U
total xylenes	140000J	10U	10U	10U	10U	10U	10U

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	SB-1A	SB-1A DL	SB-1A Re	SB-1A Duplicate	SB-1A Duplicate DL	SB-1A Duplicate Re	SB-2A3	SB-3B	SB-3B DL	SB-3B Re
Date Sampled	8/11/92	08/11/92	08/11/92	08/11/92	08/11/92	8/10/92	8/10/92	8/13/92	8/13/92	8/13/92
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Semi-Volatiles										
phenol	310J	8900UJ	270J	510	43000U	550	320J	430U	43000U	430U
1,4-dichlorobenzene	440UJ	8900UJ	440UJ	430U	43000U	430U	320U	430U	43000U	430U
1,2-dichlorobenzene	440UJ	8900UJ	440UJ	430U	43000U	430U	320U	430U	43000U	430U
2-methylphenol	63J	8900UJ	46J	85J	43000U	88J	320U	130J	43000U	100J
4-methylphenol	130J	8900UJ	110J	740	43000U	760	100J	300J	43000U	270J
2,4-dimethylphenol	440UJ	8900UJ	440UJ	84J	43000U	57J	63J	270J	43000U	270J
1,2,4-trichlorobenzene	440UJ	8900UJ	440UJ	430U	43000U	430U	320U	430U	43000U	430U
naphthalene	2100J	2700J	2000J	7900E	18000J	7700E	74J	13000E	14000J	12000E
hexachlorobutadiene	440UJ	8900UJ	440UJ	430U	43000U	430U	320U	430U	43000U	430U
4-chloro-3-methylphenol	440UJ	8900UJ	440UJ	430U	43000U	430U	320U	430U	43000U	430U
2-methylnaphthalene	670J	710J	650J	2200	43000U	2100	79J	7200E	6200J	6400E
2-chloronaphthalene	440UJ	8900UJ	440UJ	430U	43000U	430U	320U	430U	43000U	430U
dimethyl phthalate	440UJ	8900UJ	440UJ	430U	43000U	430U	320U	430U	43000U	430U
acenaphthylene	370J	8900UJ	330J	890	43000U	1100	320U	570	43000U	410J
acenaphthene	1500J	2100J	1500J	7100E	20000J	9100E	30J	7200E	7700J	4900E
dibenzofuran	1200J	1500J	1200J	5500E	13000J	6200E	28J	6300E	5400J	4300E
diethylphthalate	440UJ	8900UJ	440UJ	430U	43000U	430U	320U	430U	43000U	430U
fluorene	1800J	2500J	1800	8700E	24000J	10000E	42J	8300E	8400J	6100E
n-nitrosodiphenylamine	440UJ	8900UJ	440U	430U	43000U	430U	320U	430U	43000U	430U
phenanthrene	9600E	15000J	10000E	73000E	150000	70000E	290J	29000E	33000J	23000E
anthracene	2800J	4300J	2900J	21000E	42000J	41000E	64J	7900E	7300J	6500E
carbazole	1400J	1800J	1500J	14000E	18000J	15000E	30J	5400E	3200J	5600E
di-n-butylphthalate	810J	900J	810J	3600E	4700J	3900E	110J	430U	43000U	430U
fluoranthene	7800E	14000J	8500E	26000E	150000	64000E	310J	35000E	26000J	21000E

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	SB-1A	SB-1A DL	SB-1A Re	SB-1A Duplicate	SB-1A Duplicate DL	SB-1A Duplicate Re	SB-2A3	SB-3B	SB-3B DL	SB-3B Re
Date Sampled	8/11/92	08/11/92	08/11/92	08/11/92	08/11/92	8/10/92	8/10/92	8/13/92	8/13/92	8/13/92
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Semi-Volatiles (continued)										
pyrene	14000E	11000J	14000E	94000E	120000	110000E	280J	24000E	19000J	25000E
butylbenzylphthalate	440UJ	8900U	440UJ	430U	43000U	430U	320U	150J	43000U	160J
benzo(a)anthracene	6300E	5700J	5500E	34000E	55000	42000E	100J	17000E	16000J	15000E
chrysene	5400E	6200J	5100E	28000E	67000	32000E	160J	1800	1200J	1400
bis(2-ethylhexyl)phthalate	2600J	1900U	2500J	9500E	3200J	3200	1800	9300E	5100J	8200E
di-n-octyl phthalate	440UJ	8900U	440U	430U	43000U	430U	320U	430U	43000U	430U
benzo(b)fluoranthene	7100E	6000J	7400E	41000E	65000	27000E	180J	10000E	7200J	8300E
benzo(k)fluoranthene	3700E	5400J	3500J	5500E	33000J	22000E	100J	3700E	2700J	2600
benzo(a)pyrene	4500E	5000J	4600E	24000E	52000	15000E	130J	5700E	5100J	4900E
indeno(1,2,3-cd)pyrene	2000J	2400J	1800J	12000E	28000J	7800E	320U	1500	43000U	1700
dibenz(a,h)anthracene	400J	590J	430J	3900E	4900J	1900	320U	450	43000U	100J
benzo(g,h,i)perylene	1200J	1700J	1300J	8900E	21000J	6500E	31J	1300	43000U	1500

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	SB-4A	SB-4A DL	SB-5A	SB-5A DL	SB-6B	SB-6B DL	SB-6B Re	SB-7B	SB-7B DL	SB-8B
Date Sampled	8/17/92	8/17/92	8/12/92	8/12/92	8/14/92	8/14/92	8/14/92	8/12/92	8/12/92	8/10/92
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Semi-Volatiles										
phenol	9500E	7700J	480U	48000U	420U	42000U	420U	400U	400000U	460U
1,4-dichlorobenzene	330U	33000U	480U	48000U	420U	42000U	420U	400U	400000U	170J
1,2-dichlorobenzene	330U	33000U	480U	48000U	420U	42000U	420U	400U	400000U	460U
2-methylphenol	330U	33000U	480U	48000U	420U	42000U	420U	400U	400000U	460U
4-methylphenol	180J	33000U	480U	48000U	420U	42000U	420U	400U	400000U	300J
2,4-dimethylphenol	120J	33000U	480U	48000U	29J	42000U	18J	400U	400000U	460U
1,2,4-trichlorobenzene	250J	33000U	480U	48000U	420U	42000U	420U	400U	400000U	460U
naphthalene	6400E	6400J	520	48000U	55J	42000U	55J	71J	400000U	1000
hexachlorobutadiene	330U	33000U	480U	48000U	420U	42000U	420U	400U	400000U	460U
4-chloro-3-methylphenol	330U	33000U	480U	48000U	420U	42000U	420U	400U	400000U	460U
2-methylnaphthalene	2600	33000U	290J	48000U	65J	42000U	65J	94J	400000U	820
2-chloronaphthalene	330U	33000U	480U	48000U	420U	42000U	420U	400U	400000U	460U
dimethyl phthalate	42J	33000U	480U	48000U	420U	42000U	420U	400U	400000U	460U
acenaphthylene	48J	33000U	480U	48000U	14J	42000U	16J	400U	400000U	130J
acenaphthene	3500E	3100J	170J	48000U	21J	42000U	19J	400U	400000U	850
dibenzofuran	3700E	3000J	480U	48000U	23J	42000U	23J	44J	400000U	950
diethylphthalate	460	33000U	480U	48000U	420U	42000U	420U	400U	400000U	460U
fluorene	4100E	33000U	250J	48000U	26J	42000U	24J	55J	400000U	1400
n-nitrosodiphenylamine	300U	33000U	270J	48000U	420J	42000U	420U	400U	400000U	460U
phenanthrene	160J	21000J	1100	48000U	190J	42000U	180J	370J	400000U	5200E
anthracene	18000E	3900J	210J	48000U	46J	42000U	49J	400U	400000U	4900E
carbazole	360	33000U	130J	48000U	22J	42000U	27J	400U	400000U	1300
di-n-butylphthalate	2500	170000	11000E	13000J	300J	42000U	290J	540	400000U	6000E
fluoranthene	120J	13000J	910	48000U	260J	42000U	290J	460	400000U	6900E

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	SB-4A	SB-4A DL	SB-5A	SB-5A DL	SB-6B	SB-6B DL	SB-6B Re	SB-7B	SB-7B DL	SB-8B
Date Sampled	8/17/92	8/17/92	8/12/92	8/12/92	8/14/92	8/14/92	8/14/92	8/12/92	8/12/92	8/10/92
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Semi-Volatiles (continued)										
pyrene	21000E	14000J	1200	48000U	330J	42000U	390J	410	400000U	18000E
butylbenzylphthalate	56000E	28000J	480U	48000U	66000E	110000	68000E	93000E	690000	460U
benzo(a)anthracene	6600E	33000U	520	48000U	420U	42000U	420U	250J	400000U	6700E
chrysene	7700E	33000U	550	48000U	260J	42000U	210J	230J	400000U	9100E
bis(2-ethylhexyl)phthalate	5900E	33000U	2600	3100J	71000E	170000	77000E	31000E	180000J	21000E
di-n-octyl phthalate	330U	33000U	480U	48000U	520	42000U	560	1200	400000U	460U
benzo(b)fluoranthene	8500E	33000U	560	48000U	340J	42000U	450	400U	400000U	3500
benzo(k)fluoranthene	3300E	33000U	330J	48000U	180J	42000U	56J	350J	400000U	10000E
benzo(a)pyrene	3100E	33000U	480U	48000U	220J	42000U	220J	180J	400000U	5700E
indeno(1,2,3-cd)pyrene	950	33000U	480U	48000U	420U	42000U	420U	86J	400000U	460U
dibenz(a,h)anthracene	390	33000U	480U	48000U	420U	42000U	420U	20J	400000U	460U
benzo(g,h,i)perylene	800	33000U	480U	48000U	70J	42000U	64J	51J	400000U	460U

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	SB-8B DL	SB-8B Re	RBSB-1	RBSB-2	SB-9BCDE	SB-9BCDE Duplicate	SB-9BCDE Duplicate DL	SB-9BCDE Duplicate Re	SB-10H1
Date Sampled	8/10/92	8/10/92	8/13/92	9/2/92	8/18/92	8/18/92	8/18/92	8/18/92	8/18/92
Units	ug/kg	ug/kg	ug/l	ug/l	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Semi-Volatiles									
phenol	4600U	460U	10U	10U	390U	390U	3900U	110J	380U
1,4-dichlorobenzene	4600UJ	150J	10U	10U	390U	390U	3900U	390U	380U
1,2-dichlorobenzene	4600UJ	460U	10U	10U	390U	390U	3900U	390U	380U
2-methylphenol	4600U	460U	10U	10U	390U	390U	3900U	390U	380U
4-methylphenol	4600U	260J	10U	10U	390U	390U	3900U	390U	380U
2,4-dimethylphenol	4600U	460U	10U	10U	390U	390U	3900U	390U	380U
1,2,4-trichlorobenzene	4600UJ	460U	10U	10U	390U	390U	3900U	390U	380U
naphthalene	1200J	1100	10U	10U	390U	610	640J	670	750
hexachlorobutadiene	4600UJ	460U	10U	10U	390U	390U	390U	390U	380U
4-chloro-3-methylphenol	4600U	460U	10U	10U	390U	390U	3900U	390U	380U
2-methylnaphthalene	4600UJ	820	10U	10U	390U	430	3900U	440	960
2-chloronaphthalene	4600UJ	460U	10U	10U	390U	390U	390U	390U	380U
dimethyl phthalate	4600UJ	460U	10U	10U	390U	390U	3900U	390U	43J
acenaphthylene	4600UJ	110J	10U	10U	390U	390U	3900U	390U	380U
acenaphthene	970J	880	10U	10U	110J	2600	2800J	3100	200J
dibenzofuran	4600UJ	950	10U	10U	70J	1300	3900U	1400	350J
diethylphthalate	4600UJ	460U	10U	10U	390U	390U	3900U	390U	70J
fluorene	4600UJ	1400	10U	10U	110J	2000	2200J	2200	250J
n-nitrosodiphenylamine	4600UJ	460U	10U	10U	390U	390U	3900U	390U	380U
phenanthrene	9800J	7000E	10U	10U	910	14000E	14000	12000E	2400
anthracene	3100J	2300	10U	10U	290J	4500E	4900	4300E	360J
carbazole	1500J	1200	10U	10U	85J	1400	1400J	1400	260J
di-n-butylphthalate	5800J	5000E	10U	10U	390U	390U	3900U	390U	140J
fluoranthene	12000J	5100E	10U	10U	1500	11000E	14000	9800E	2100

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	SB-8B DL	SB-8B Re	RBSB-1	RBSB-2	SB-9BCDE	SB-9BCDE Duplicate	SB-9BCDE Duplicate DL	SB-9BCDE Duplicate Re	SB-10H1
Date Sampled	8/10/92	8/10/92	8/13/92	9/2/92	8/18/92	8/18/92	8/18/92	8/18/92	8/18/92
Units	ug/kg	ug/kg	ug/l	ug/l	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Semi-Volatiles (continued)									
pyrene	29000J	28000E	10U	10U	1400	16000E	13000	24000E	2600
butylbenzylphthalate	4600UJ	460U	0.8J	10U	390U	390U	3900U	390U	49J
benzo(a)anthracene	9900J	7100E	10U	10U	940	9000E	9100	7500E	1700
chrysene	11000J	7700E	10U	10U	1000	6200E	8000	8400E	1900
bis(2-ethylhexyl)phthalate	3700J	24000E	10U	10U	2000	940	3900U	780	5200E
di-n-octyl phthalate	4600UJ	460U	10U	10U	390U	390U	3900U	390U	380U
benzo(b)fluoranthene	15000J	12000E	10U	10U	980	12000E	8300	12000E	2600
benzo(k)fluoranthene	9300J	9400E	10U	10U	430	4200E	4700	4900E	860
benzo(a)pyrene	12000J	9900E	10U	10U	680	3500E	3000J	7500E	1200
indeno(1,2,3-cd)pyrene	4600UJ	3200	10U	10U	180J	1200	1900J	2100	230J
dibenz(a,h)anthracene	4600UJ	460U	10U	10U	64J	55J	3900U	390U	380U
benzo(g,h,i)perylene	4600UJ	460U	10U	10U	200J	1200	1600J	1500	250J

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	SB-10H1 DL	SB-10H1 Re	SB-10H2	SB-10H2 DL Re	SB-10H2 Re	DYF-1	DYF-3	DYF-3 Re	DYF-3 Duplicate	DYF-3 Duplicate Re
Date Sampled	8/18/92	8/18/92	8/18/92	8/18/92	8/18/92	9/2/92	9/2/92	9/2/92	9/2/92	9/2/92
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l	ug/l	ug/l	ug/l	ug/l
Semi-Volatiles										
phenol	3800U	380U	73000E	1000000U	31000E	14U	10U	10U	10U	10U
1,4-dichlorobenzene	3800U	380U	1000U	1000000U	1000U	14U	10U	10U	10U	10U
1,2-dichlorobenzene	3800U	380U	1000J	1000000U	230J	14U	10U	10U	10U	10U
2-methylphenol	3800U	380U	1000UR	1000000U	1000UR	14U	10U	10U	10U	10U
4-methylphenol	3800U	380U	6900J	1000000U	580J	14U	10U	10U	10U	10U
2,4-dimethylphenol	3800U	380U	1000UR	1000000U	1000UR	14U	10U	10U	10U	10U
1,2,4-trichlorobenzene	3800U	380U	210J	1000000U	81J	14U	10U	10U	10U	10U
naphthalene	3800U	710	1800	1000000U	490J	14U	10U	10U	10U	10U
hexachlorobutadiene	3800U	380U	120J	1000000U	67J	14U	10U	10U	10U	10U
4-chloro-3-methylphenol	3800U	380U	1000UR	1000000U	1000UR	14U	10U	10U	10U	10U
2-methylnaphthalene	3800U	890	1100	1000000U	110J	14U	10U	10U	10U	10U
2-chloronaphthalene	3800U	380U	1900	1000000U	540J	14U	10U	10U	10U	10U
dimethyl phthalate	3800U	28J	83000E	1000000U	23000E	14U	10U	10U	10U	10U
acenaphthylene	3800U	380U	1000U	1000000U	1000U	14U	10U	10U	10U	10U
acenaphthene	3800U	190J	1000U	1000000U	1000U	14U	10U	10U	10U	10U
dibenzofuran	3800U	360J	1000U	1000000U	1000U	14U	10U	10U	10U	10U
diethylphthalate	3800U	52J	7400000E	370000J	170000E	14U	10U	10U	10U	10U
fluorene	3800U	220J	1000U	1000000U	1000U	14U	10U	10U	10U	10U
n-nitrosodiphenylamine	3800U	380U	1000U	1000000U	1000U	14U	10U	10U	10U	10U
phenanthrene	1100J	2400	7300	1000000U	150J	14U	10U	10U	10U	10U
anthracene	180J	410	840J	1000000U	120J	14U	10U	10U	10U	10U
carbazole	3800U	260J	1000U	1000000U	1000U	14U	10U	10U	10U	10U
di-n-butylphthalate	3800U	130J	5500000E	2500000	440000E	14U	10U	10U	10U	10U
fluoranthene	1100J	2200	1000U	1000000U	1000U	14U	10U	10U	10U	10U

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	SB-10H1 DL	SB-10H1 Re	SB-10H2	SB-10H2 DL Re	SB-10H2 Re	DYF-1	DYF-3	DYF-3 Re	DYF-3 Duplicate	DYF-3 Duplicate Re
Date Sampled	8/18/92	8/18/92	8/18/92	8/18/92	8/18/92	9/2/92	9/2/92	9/2/92	9/2/92	9/2/92
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l	ug/l	ug/l	ug/l	ug/l
Semi-Volatiles (continued)										
pyrene	1200J	2600	1000U	1000000U	1000U	14U	10U	10U	10U	10U
butylbenzylphthalate	3800U	61J	4200	1000000U	1500	14U	10U	10U	10U	10U
benzo(a)anthracene	3800U	1700	1000U	1000000U	1000U	14U	10U	10U	10U	10U
chrysene	3800U	2000	1000U	1000000U	1000U	14U	10U	10U	10U	10U
bis(2-ethylhexyl)phthalate	1800J	4700E	42000E	1000000U	11000E	10J	10U	10U	10U	10U
di-n-octyl phthalate	3800U	380U	1000U	1000000U	1000U	14U	10U	10U	10U	10U
benzo(b)fluoranthene	1100J	3000	1000U	1000000U	1000U	14U	10U	10U	10U	10U
benzo(k)fluoranthene	3800U	1600	1000U	1000000U	1000U	14U	10U	10U	10U	10U
benzo(a)pyrene	3800U	1500	1000U	1000000U	1000U	14U	10U	10U	10U	10U
indeno(1,2,3-cd)pyrene	3800U	100J	1000U	1000000U	1000U	14U	10U	10U	10U	10U
dibenz(a,h)anthracene	3800U	380U	1000U	1000000U	1000U	14U	10U	10U	10U	10U
benzo(g,h,i)perylene	3800U	76J	1000U	1000000U	1000U	14U	10U	10U	10U	10U

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	DYF-4	DYF-4 Re	DYF-5
Date Sampled	9/2/92	9/2/92	9/2/92
Units	ug/l	ug/l	ug/l
Semi-Volatiles			
phenol	10U	10U	10U
1,4-dichlorobenzene	10U	10U	10U
1,2-dichlorobenzene	10U	10U	10U
2-methylphenol	10U	10U	10U
4-methylphenol	10U	10U	10U
2,4-dimethylphenol	10U	10U	10U
1,2,4-trichlorobenzene	10U	10U	10U
naphthalene	10U	10U	10U
hexachlorobutadiene	10U	10U	10U
4-chloro-3-methylphenol	10U	10U	10U
2-methylnaphthalene	10U	10U	10U
2-chloronaphthalene	10U	10U	10U
dimethyl phthalate	10U	10U	10U
acenaphthylene	10U	10U	10U
acenaphthene	10U	10U	10U
dibenzofuran	10U	10U	10U
diethylphthalate	10U	10U	10U
fluorene	10U	10U	10U
n-nitrosodiphenylamine	10U	10U	10U
phenanthrene	10U	10U	10U
anthracene	10U	10U	10U
carbazole	10U	10U	10U
di-n-butylphthalate	10U	10U	10U
fluoranthene	10U	10U	10U

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	DYF-4	DYF-4 Re	DYF-5
Date Sampled	9/2/92	9/2/92	9/2/92
Units	ug/l	ug/l	ug/l
Semi-Volatiles (continued)			
pyrene	10U	10U	10U
butylbenzylphthalate	10U	10U	10U
benzo(a)anthracene	10U	10U	10U
chrysene	10U	10U	10U
bis(2-ethylhexyl)phthalate	10U	10U	10U
di-n-octyl phthalate	10U	10U	10U
benzo(b)fluoranthene	10U	10U	10U
benzo(k)fluoranthene	10U	10U	10U
benzo(a)pyrene	10U	10U	10U
indeno(1,2,3-cd)pyrene	10U	10U	10U
dibenz(a,h)anthracene	10U	10U	10U
benzo(g,h,i)perylene	10U	10U	10U

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	SB-1A	SB-1A Duplicate	SB-2A3	SB-2A3 DL	SB-3B	SB-4A	SB-5A	SB-6B	SB-7B
Date Sampled	8/11/92	08/11/92	08/10/92	08/11/92	08/13/92	8/17/92	8/12/92	8/14/92	8/12/92
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Pesticides/PCBs									
gamma-BHC	23U	22U	3.4U	34U	2.4J	6.8U	25U	8.7U	21U
heptachlor	23U	22U	3.4U	34U	9.1UJ	6.8UR	25U	8.7U	21U
endosulfan II	44U	43U	6.6U	66U	2.7J	4.9J	48U	17U	40U
4,4'-DDD	44U	43U	6.6U	66U	18UJ	13U	48U	17U	40U
4,4'-DDT	44U	43U	6.6U	66U	18UJ	12J	48U	17U	40U
methoxychlor	230U	220U	34U	340U	91UJ	16J	250U	87U	210U
endrin ketone	44U	43U	6.6U	66U	18UJ	13U	48U	17U	40U
endrin aldeyde	44U	43U	6.6U	66U	18UJ	22	48U	17U	40U
alpha-chlordane	23U	22U	3.4U	34U	9.1UJ	3.1J	25U	8.7U	21U
gamma-chlordane	23U	22U	3.4U	34U	2.0J	6.8U	25U	8.7U	21U
Aroclor 1242	440U	430U	66U	660U	180UJ	130U	480U	170U	4800
Aroclor 1248	1000	720	3300	3900	180UJ	130U	480U	180	400U
Aroclor 1254	440U	430U	66U	660U	180UJ	130U	720	170U	590
Aroclor 1260	440U	430U	66U	660U	180UJ	130U	480U	130J	400
Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	SB-8B	RBSB-1	RBSB-2	SB-9BCDE	SB-9BCDE Duplicate	SB-10H1	SB-10H1 DL	SB-10H2	DYF-3	DYF-3 Duplicate
Date Sampled	8/10/92	8/13/92	8/14/92	8/18/92	8/18/92	8/18/92	8/18/92	8/18/92	9/2/92	9/2/92
Units	ug/kg	ug/l	ug/l	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l	ug/l
Pesticides/PCBs										
gamma-BHC	12U	0.050U	0.050U	2.0U	2.1U	20U	200U	1.4J	0.051UJ	0.050UJ
heptachlor	12U	0.050U	0.050U	2.0U	2.1U	20U	200U	4.9	0.051UJ	0.050UJ
endosulfan II	23U	0.10U	0.10U	4.0U	4.0U	39U	390U	9.3	0.10UJ	0.10UJ
4,4'-DDD	23U	0.10U	0.10U	4.0U	0.88J	39U	390U	5.1U	0.10UJ	0.10UJ
4,4'-DDT	23U	0.10U	0.10U	4.0U	4.0U	39U	390U	10	0.10UJ	0.10UJ
methoxychlor	120U	0.50U	0.50U	20U	21U	200U	2000U	26U	0.51UJ	0.50UJ
endrin ketone	23U	0.10U	0.10U	4.0U	4.0U	39U	390U	20	0.10UJ	0.10UJ
endrin aldeyde	23U	0.10U	0.10U	4.0U	4.0U	39U	390U	5.1U	0.10UJ	0.10UJ
alpha-chlordane	12U	0.050U	0.050U	2.0U	2.1U	20U	200U	3.7	0.051UJ	0.050UJ
gamma-chlordane	12U	0.050U	0.050U	2.0U	2.1U	20U	200U	2.6U	0.051UJ	0.050UJ
Aroclor 1242	230U	1.0U	1.0U	40U	40U	390U	3900U	51U	1.0UJ	1.0UJ
Aroclor 1248	360	1.0U	1.0U	40U	40U	390U	3900U	51U	1.0UJ	1.0UJ
Aroclor 1254	620	1.0U	1.0U	40U	40U	3400	3700J	51U	1.0UJ	1.0UJ
Aroclor 1260	230U	1.0U	1.0U	40U	40U	390U	3900U	51U	1.0UJ	1.0UJ
Chloride	NA	NA	NA	NA	NA	NA	NA	NA	116 mg/l	144 mg/l
Sulfate	NA	NA	NA	NA	NA	NA	NA	NA	413 mg/l	418 mg/l

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	DYF-4	DYF-5
Date Sampled	9/2/92	9/2/92
Units	ug/l	ug/l
Pesticides/PCBs		
gamma-BHC	0.050U	0.056U
heptachlor	0.050U	0.056U
endosulfan II	0.10U	0.11U
4,4'-DDD	0.10U	0.11U
4,4'-DDT	0.10U	0.11U
methoxychlor	0.50U	0.56U
endrin ketone	0.10U	0.11U
endrin aldeyde	0.10U	0.11U
alpha-chlordane	0.050U	0.056U
gamma-chlordane	0.050U	0.056U
Aroclor 1242	1.0U	1.1U
Aroclor 1248	1.0U	1.1U
Aroclor 1254	1.0U	1.1U
Aroclor 1260	1.0U	1.1U
Chloride	22.0 mg/l	24.2 mg/l
Sulfate	3520 mg/l	800 mg/l

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	SB-1A	SB-1A Duplicate	SB-2A3	SB-3B	SB-4A	SB-5A	SB-6B	SB-7B	SB-8B
Date Sampled	8/11/92	08/11/92	08/10/92	08/13/92	8/17/92	8/12/92	8/14/92	8/12/92	8/10/92
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
TAL Metals									
Aluminum	10400	11300	7400	7850	2820J	9960	12300	21400	15700
Antimony	1.3U	2.2B	2.4U	1.2U	1.3U	1.4B	1.3U	3.3B	1.8B
Arsenic	13.3	10.8	6.8	8.1	24.6J	4.3	6.3	23.3	27.8
Barium	136	240	76.6	165	27.2B	180	87.3	304	385
Beryllium	1.2U	1.3U	2.4U	1.2U	1.2U	1.4U	1.3U	1.8U	1.5U
Cadmium	1.2U	1.3U	2.4U	1.2U	1.2U	1.4U	1.3U	1.8U	1.5U
Calcium	23300	46800	21000	54300	10400J	32900	120000	27300	14100
Chromium	22.4	35.6	55.5	15.5	3.4J	18.7	18.6	31.4	45.4
Cobalt	10.8B	9.3B	9.6U	9.4B	4.9UJ	7.1B	6.6B	14.0B	14.8
Copper	62.3	163	83.3	43.1	9.6J	59.7	29.2	50.6	155
Iron	26900	35100	33200	17600	6250J	19700	15800	37700	48800
Lead	169	334	174	53.4	54.2J	115	197	178	628
Magnesium	7770	8520	4780	16000	2070J	7530	44300	7610	3740
Manganese	432	903	968	536	125J	594	580	695	504
Mercury	0.84	0.23	0.46	0.22	0.12UJ	0.58	0.21	0.23	1.9
Nickel	28	35.2	37.5	33.9	7.4U	23.5	12.4	31.5	40.9
Potassium	1740	1560	1250B	1180B	229B	1170B	961B	1800	1820
Selenium	1.3	1.4U	2.4U	1.2U	1.3U	1.4U	1.3U	1.8U	1.5U
Silver	0.10B	1.5B	0.58B	0.07U	0.21B	0.09U	0.08U	0.18B	0.23B
Sodium	3560	3550	2110B	1090B	1310	2610	1330	1530B	1570
Thallium	1.3U	1.4U	2.4U	1.2U	1.3U	1.4U	1.3U	1.8U	1.5U
Vanadium	24.7	20	14.5B	65.6	4.9U	19.2	16.7	38.1	41.7
Zinc	181	516	632	112	44.6J	152	123	265	736

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	RBSB-1	RBSB-2	SB-9BCDE	SB-9BCDE Duplicate	SB-10H1	SB-10H2	DYF-3	DYF-3 Duplicate	DYF-4
Date Sampled	8/13/92	8/14/92	8/18/92	8/18/92	8/18/92	8/18/92	9/2/92	9/2/92	9/2/92
Units	ug/l	ug/l	mg/kg	mg/kg	mg/kg	mg/kg	ug/l	ug/l	ug/l
TAL Metals									
Aluminum	60.0U	60.0U	11600	14800	5890	11300	10800	14200	810
Antimony	5.0U	5.0U	64.6	63.6	90.4	59.5	10.0U	100U	10.0U
Arsenic	5.0U	5.0U	5.9	5.4	60.6	15.4	5.0U	5.0U	5.0U
Barium	50.0U	50.0U	133	116	240	137	126B	151B	50.0U
Beryllium	5.0U	5.0U	1.3U	1.3U	1.2U	1.5U	5.0U	5.0U	5.0U
Cadmium	5.0U	5.0U	1.3U	1.3U	1.2U	11.6	5.0U	5.0U	5.0U
Calcium	760B	625B	118000	58900	17100	35300	132000	146000	260000
Chromium	10.0U	10.0U	19.7	23.7	25.3	63.5	26	30	30
Cobalt	20.0U	20.0U	9.0B	12.1B	4.7U	12.0B	20.0U	20.0U	20.0U
Copper	10.0U	10.0U	27.2	26.9	30.3	1340	18.0B	19.0B	10.0U
Iron	105	36.6B	21000	24400	83100	22400	15600	20300	1280
Lead	55.9	59.7	148	22.3	63.2	94.4	26.5	17	6
Magnesium	400U	400U	54700	19600	2650	10300	192000	202000	668000
Manganese	10.0U	10.0U	1060	631	268	494	594	716	310
Mercury	0.20U	0.20U	0.12U	0.11U	99.5	4010	0.20U	0.20U	0.20U
Nickel	30.0U	30.0U	33.6	33.5	7.1U	29.4	51	38.0B	30.0U
Potassium	600U	600U	1640	2660	1770	1640	11400	12100	17800
Selenium	5.0U	5.0U	1.3U	1.2U	4.9	1.6U	5.0U	5.0U	5.0U
Silver	0.30U	0.30U	2.7U	2.6U	2.4U	54.5	122	14	54
Sodium	877B	819B	617B	582B	641B	660B	51300	51900	232000
Thallium	5.0U	5.0U	1.3U	1.2U	7.5	1.6U	5.0U	5.0U	5.0U
Vanadium	20.0U	20.0U	21.4	27.8	45.0B	23	20.0B	34.0B	20.0U
Zinc	20	20.0U	155	92.8	95.6	283	88	88	54

TABLE 2
DUPONT YERKES PHASE II
TCL/TAL ANALYSES
DETECTED COMPOUNDS

Sample I.D.	DYF-5
Date Sampled	9/2/92
Units	ug/l

TAL Metals

Aluminum	480
Antimony	10.0U
Arsenic	5.0U
Barium	65.0B
Beryllium	5.0U
Cadmium	5.0U
Calcium	338000
Chromium	18
Cobalt	20.0U
Copper	21.0B
Iron	1480
Lead	20.1
Magnesium	61000
Manganese	560
Mercury	0.20U
Nickel	30.0U
Potassium	12700
Selenium	5.0U
Silver	32.0J
Sodium	85400
Thallium	5.0U
Vanadium	20.0U
Zinc	90.0J

11/30/92

Notes:
B - Analyte detected above the instrument detection limit but below the contract required detection limit.
E - Concentration exceeded the instrument's linear calibration range, and is considered an estimated value.
J - Associated value is estimated.
U - Non-detected at the stated detection limit.
R - Associated value is unusable.

By:tmv
Chk:dpf
11/24/92

TABLE 3

QUALIFIED DATA DUE TO METHOD BLANK SAMPLE CONCENTRATION
DU PONT YERKES PHASE II

Sample ID	Compound	Dilution Factor	Concentration	Qualified Sample Conc.
VOCs				
1. **VBLK11 (8/19/92)**	2-butanone	1	300J µg/kg	
Associated Samples				
SB-10H2	2-butanone	4	180000BE µg/kg	180000E µg/kg(1)
2. **VBLK15 (8/21/92)**	2-butanone	1	390J µg/kg	
Associated Samples				
SB-10H2 DL	2-butanone	100	130000B µg/kg	130000U µg/kg
3. **VBLK16 (8/21/92)**	2-butanone toluene TIC 23.70 aromatic derivative	1	960J µg/kg 74J µg/kg 1300J µg/kg	
Associated Samples				
SB-10H2 DL2	TIC 23.75 aromatic derivative	400	510000BJ µg/kg	510000R µg/kg
BNAs				
1. **SBLK87 (8/18/92)**	bis(2-ethylhexyl)phthalate	1	0.6J µg/l	
Associated Samples				
RBSB-1	bis(2-ethylhexyl)phthalate	1	3BJ µg/l	10U µg/l
RBSB-2	bis(2-ethylhexyl)phthalate	1	0.4BJ µg/l	10U µg/l
2. **SBLK02 (8/26/92)**	bis(2-ethylhexyl)phthalate TIC 6.77 unknown TIC 33.87 unknown	1	180J µg/kg 210J µg/kg 170J µg/kg	
Associated Samples				
SB-1A	bis(2-ethylhexyl)phthalate	1	2600B µg/kg	2600(1) µg/kg
SB-1A DL	bis(2-ethylhexyl)phthalate	20	1900BJ µg/kg	1900U µg/kg
SB-1A RE	bis(2-ethylhexyl)phthalate	1	2500B µg/kg	2500(1) µg/kg

TABLE 3 (continued)

QUALIFIED DATA DUE TO METHOD BLANK SAMPLE CONCENTRATION
DU PONT YERKES PHASE II

Sample ID	Compound	Dilution Factor	Concentration	Qualified Sample Conc.
BNAs (continued)				
3. **SBLK27 (8/21/92)**	TIC 7.70 unknown TIC 13.73 unknown TIC 32.73 unknown	1	1200J µg/kg 430J µg/kg 180 µg/kg	
Associated Samples				
SB-10H1 DL	TIC 7.70 1,1,2,2-tetrachloroethane	10	6700BJ µg/kg	6700R µg/kg
SB-9BCDE	TIC 7.73 unknown	1	1400BJ µg/kg	1400R µg/kg
4. **SBLK32 (9/4/92)**	TIC 6.72 oxygenated compound	1	4J µg/l	
Associated Samples				
DYF-5	TIC 6.73 methylcyclopentanol isomer	1	8BJ µg/l	8R µg/l
QA-1 RE (Dup. of DYF-3)	TIC 6.73 methylcyclopentanol isomer	1	8BJ µg/l	8R µg/l
5. **SBLK36 (9/8/92)**	TIC 6.70 unknown TIC 7.67 2-cyclohexen-1-one TIC 7.98 chlorinated hydrocarbon TIC 10.57 alkyl substituted compound TIC 10.83 unknown TIC 12.43 oxygenated compound TIC 25.50 unknown acid TIC 27.63 unknown hydrocarbon TIC 27.70 unknown TIC 27.98 unknown	1	47J µg/l 28J µg/l 4J µg/l 17J µg/l 5J µg/l 6J µg/l 3J µg/l 4J µg/l 3J µg/l 3J µg/l	
Associated Samples				
DYF-1	TIC 6.70 unknown TIC 7.72 2-cyclohexen-1-one TIC 27.75 unknown hydrocarbon	1	7BJ µg/l 5 BJ µg/l 3BJ µg/l	7R µg/l 5R µg/l 3R µg/l

TABLE 3 (continued)

QUALIFIED DATA DUE TO METHOD BLANK SAMPLE CONCENTRATION
DU PONT YERKES PHASE II

Notes:

(1) Qualification not required, sample result is greater than 5 or 10 times the method blank sample result, accounting for dilution factors
B Compound detected in associated laboratory blank
E Concentration exceeded the instrument's linear calibration range, and is considered estimated
J Estimated value
U Non-detected at the stated detection limit

TABLE 4

SAMPLES REQUIRING TCLP ANALYSES BASED ON TCL/TAL RESULTS
EXCEEDING THE TCLP REGULATORY LEVEL BY A FACTOR OF 20 OR MORE
DU PONT YERKES PHASE II INVESTIGATION

Sample ID	Chemical	Total Concentration (mg/kg)	TCLP Regulatory Limit[1] (mg/l)	Exceedance Factor[2]
Volatile Fraction:				
SB-10H2	Chloroform	250	6.0	42
	Trichloroethylene	440	0.5	880
	Benzene	140	0.5	280
	Tetrachloroethylene	2,600	0.7	3,700
Metals:				
SB-1A	Lead	169	5.0	34
SB-1A Dup	Lead	334	5.0	67
SB-2A-3	Lead	174	5.0	35
SB-5A	Lead	115	5.0	23
SB-6B	Lead	197	5.0	39
SB-7B	Lead	178	5.0	36
SB-8B	Lead	628	5.0	126
SB-98BCDE	Lead	148.2	5.0	30
SB-10H1	Mercury	99.5	0.2	498
SB-10H2	Mercury	4,010	0.2	20,000

(1) 40 CFR Part 261.24
(2) Total concentration in mg/kg divided by the TCLP Regulatory Limit in mg/l.

TABLE 5

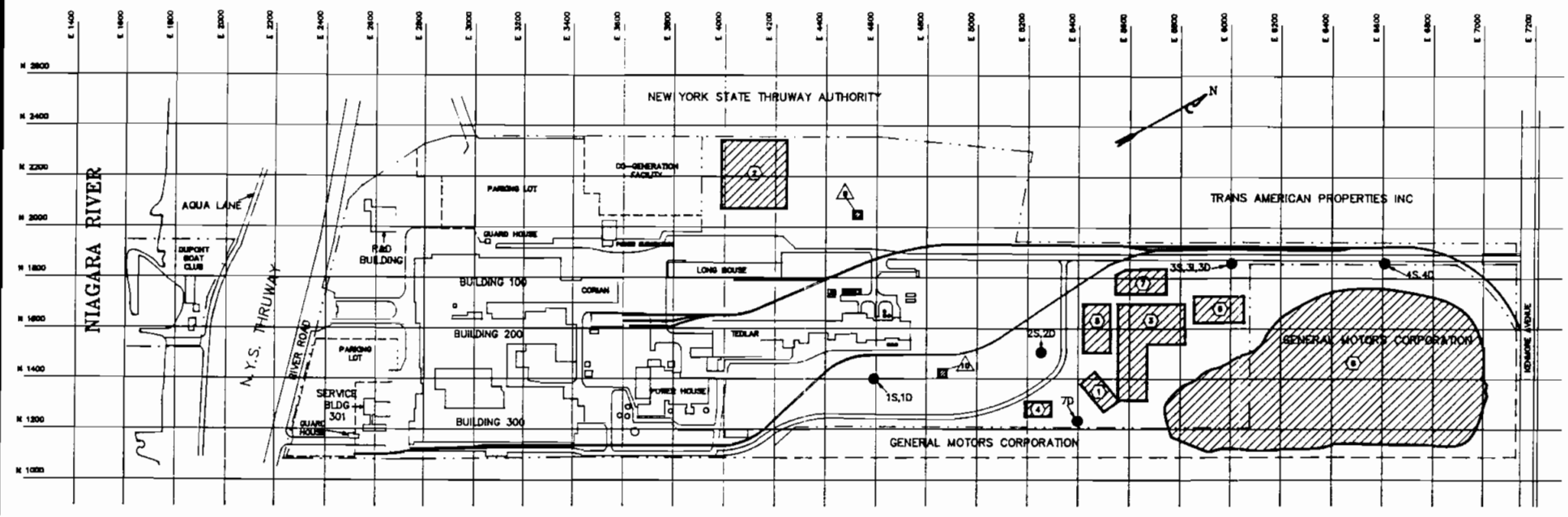
TOXICITY CHARACTERISTIC LEACHING PROCEDURE ANALYTICAL RESULTS
DU PONT YERKES PHASE II INVESTIGATION

Sample ID	Chemical	TCLP Concentration (mg/l)	TCLP Regulatory Limit[1] (mg/l)
Volatile Fraction:			
SB-10H2	Vinyl chloride	0.031J	0.2
	1,1-Dichloroethene	0.033J	0.7
	Chloroform	6.2	6.0
	1,2-Dichloroethane	0.1U	0.5
	2-Butanone	3.1	200
	Carbon tetrachloride	0.1U	0.5
	Trichloroethene	7.9	0.5
	Benzene	2.7	0.5
	Tetrachloroethene	17.0	0.7
	Chlorobenzene	0.39	100
Metals:			
SB-1A	Lead	0.003U	5.0
SB-2A-3	Lead	0.166	5.0
SB-5A	Lead	0.003U	5.0
SB-6B	Lead	0.0653	5.0
SB-7B	Lead	0.0043	5.0
SB-8B	Lead	0.550	5.0
SB-9BCDE	Lead	0.003U	5.0
SB-10H1	Mercury	0.0002U	0.2
SB-10H2	Mercury	0.0037	0.2

Notes:

(1) 40 CFR Part 261.24
U Non-detected at the stated detection limit
J Estimated value

Appendix E



LEGEND

- PROPERTY BOUNDARY/FENCE LINE
- OLD PROPERTY BOUNDARY
- FENCE LINE
- (4) DISPOSAL AREAS
- 1S,1D EXISTING MONITORING WELL LOCATION

UNIT	WASTE CLASSIFICATION	APPROXIMATE LENGTH	APPROXIMATE WIDTH	APPROXIMATE DEPTH	DATE EXCAVATED
1	GENERAL WASTE	150'	80'	12'	1960
2	TEDLAR WASTE	250'	250'	20'	1962
3	GENERAL WASTE	380/160'	110/285'	30'	1963
4	GENERAL WASTE	125'	65'	15'	3/74
5	GENERAL WASTE	200'	100'	15'	10/74
6	GENERAL WASTE	200'	100'	15'	10/75
7	GENERAL WASTE	200'	100'	15'	10/76
8	GENERAL WASTE	ORIGINALLY A TOPOGRAPHIC LOW – NO EXCAVATION FILLED 4' TO 5' AND COVERED			
9	R&D WASTE	25'	25'	10'	1956
10	R&D WASTE	25'	25'	10'	1957

E. du Pont de Nemour and Company Inc.
Yerkes Facility: Tonawanda, New York
Phase II Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

LOCATION OF WASTE DISPOSAL PITS AND EXISTING MONITORING WELLS

Job No.: 90C2331-1	Drawing No.	Date:
Checked by:	Rev. No.:	Figure 2
Scale: 0' 200' 400' 600'		

DS-4

DATE
STARTED 8/1/79
FINISHED 8/8/79
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-1D
SURF. ELEV.
G. W. DEPTH See Note

PROJECT Groundwater Contamination Study
E.I. DuPont

LOCATION Buffalo, New York

DEPTH IN FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18 IN.	N	BLOWS ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		1	2	7				FILL-CINDERS, BRICK, SLAG, FLYASH	NOTE: Ground WATER at 27.5 feet 15.5 hours after completion of test boring.
			15	24		22		FILL-SILT & CLAY w/FLYASH & CINDERS	
		2	26	12					
			10	12		22		Grey Organic SILT & CLAY (moist-medium)	
		3	3	4					
5			6	7		10			
		4	11	14				Brown SILT, little Clay with grey Clay lenses, trace embedded fine to coarse sand & fine gravel, trace roots (damp)	NOTE; Installed 4" groundwater monitoring well to 72.0' with a 2' stickup-well screen set from 62' to 72'.
			20	23		34			
		5	10	22					
			30	41		52			
10		6	16	24					
			26	30		50			
		7	48	48					
			62	72		110			
		8	16	15					
15			20	25		35			
		9	38	40					
			40	45		80			
		10	12	16					
			18	20		34		Moisture content increases slightly below 18 feet	
20		11	12	18					
			20	21		38			
		12	6	12					
			16	21		28			
		13	7	8					
25			8	9		16			
		14	10	10				(damp to moist-firm to very compact)	
			12	14		22			
		15	5	6				Brown & grey varved SILT & CLAY with numerous fine sand partings (moist-medium)	
			8	7		14			
30		16	SHELBY TUBE						
		17	2	2					
			3	4		5		Red-brown & grey varved CLAY, little Silt, trace fine sand partings (saturated-soft)	
		18	1	2					
35			3	2		5			
		19	1	1					
			2	2		3			
		20	1	1					
40			2	2		3			

N = No. blows to drive 2 "spoon 12 "with 140 lb. pin wt. falling 30 "per blow.
C = No. blows to drive ____ "casing ____ "with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

DS-4

DATE
STARTED 8/1/79
FINISHED 8/8/79
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-1D (con't.)
SURF. ELEV.
G. W. DEPTH

PROJECT Groundwater Contamination Study
E.I. DuPont

LOCATION Buffalo, New York

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18 IN.	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		21	1	1				Red & grey varved CLAY, little Silt, trace fine sand (saturated-soft)	
			2	2		3			
		22	2	2					
			3	2		5			
		23	2	2					
45			3	3		5			
		24	6	5					
			5	5		10			
		25	Dropped Rods 2.0 feet						
50		26	1	1				Trace fine gravel recovered in sample 25	
			2	3		3			
		27	4	5					
			5	5		10			
		28	WOH/1.0					Stratum contains seams of grey silt below 54 feet	
55			4	4					
		29	WOH/3						
			3	4					
		30	2	2					
60			1	2		3		(saturated-soft)	
		31	5	7					
			26	30		33		Grey fine to coarse SAND & SILT, some fine Gravel (moist) Seam of wet Sand & Gravel in sample 32 (moist to wet-compact)	
		32	10	13					
			20	20		33			
65		33	30	44					
			125/.3						
		34	100/00						
								Refusal at 66.7'	NOTE: Advanced hole to 72' with a 5-5/8" roller bit
70									
								Boring Complete at 72.0 feet.	

N = No. blows to drive 2 "spoon 12 "with 140 lb. pin wt. falling 30 "per blow.
C = No. blows to drive ____ "casing ____ "with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

DS-4

DATE
STARTED 8/9/79
FINISHED 8/9/79
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-2D
SURF. ELEV.
G. W. DEPTH See Note

PROJECT Groundwater Contamination Study
E.I. Dupont

LOCATION Buffalo, New York

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		1	7	9				FILL-SAND, CINDERS, SLAG, SILT (damp-firm)	NOTE: Ground WATER first encountered in sample 27.
			11	9		20			
		2	9	11				Brown SILT, little Clay, trace fine to coarse sand & embedded fine gravel (damp)	
			14	18		25			
5		3	9	10					NOTE: WATER monitoring well installed to 76'. Screen 66' to 76'.
			14	14		24			
		4	18	20					
			39	40		59		Stratum contains occasional grey Clay lenses	
		5	12	25					
			28	33		53			
10		6	10	12					
			18	24		30			
		7	24	30					
			30	48		60			
		8	9	11				Moisture content increases below 14 feet	
15			12	15		23			
		9	16	16					
			18	18		34			
		10	7	10					
			8	8		18			
20		11	4	5				Brown SILT, some Clay, slightly varved, trace fine to coarse sand & embedded fine gravel	
			6	6		11			
		12	5	7					
			6	7		13			
		13	5	7					
25			9	10		16			
		14	12	18				(damp to moist-firm to very compact)	
			10	12		28			
		15	3	3				Grey-brown CLAY, little Silt, trace fine sand with occasional silt seams & red-brown clay seams	
			4	3		7			
30		16	SHELBY TUBE						
		17	1	2					
			1	1		3			
		18	1	2				Color grades to brown & stratum contains trace embedded coarse sand from 34'-40'	
35			2	2		4			
		19	2	1					
			2	2		3			
		20	1	2					
			3	5		5			
40									

N = No. blows to drive 2 "spoon 12 "with 140 lb. pin wt. falling 30 "per blow.
C = No. blows to drive ____ "casing ____ "with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

DS-4

DATE
STARTED 8/9/79
FINISHED 8/9/79
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-2D (con't.)
SURF. ELEV.
G. W. DEPTH

PROJECT Groundwater Contamination Study
E.I. Dupont

LOCATION Buffalo, New York

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0"/6"	6"/12"	12"/18"	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		21	WOH/1.0'						
			2	2		2		Grey-brown CLAY, little Silt, trace fine sand with occasional grey silt seams & red-brown clay seams	
		22	3	4					
			4	3		8			
		23	1	1					
45			2	2		3			
		24	2	1					
			2	4		3			
		25	4	1					
			1	3		2			
50		26	1	1					
			1	5		2			
		27	2	4				(very moist-medium to very soft)	
			4	5		8		Grey CLAY, some fine to coarse Sand, little Silt (saturated-medium)	
		28	4	7					
55			11	30		18		GLACIAL TILL-Grey fine to coarse SAND, some Silt & fine Gravel	
		29	30	60					
			60	75		120		Bottom of sample 29 was wet	
		30	58	60					
			60	75		120			
60									
		31	100/.5'						
65									
		32	50/.0'						
								(moist to wet-very compact)	
70		33	160/.5'						
								Boring Refusal at 70.5 feet. BEDROCK Drilled 5-5/8" hole to 76'	Well Screen 66' to 76'
								Boring Complete at 76.0 feet.	

N = No. blows to drive 2 "spoon 12 "with 140 lb. pin wt. falling 30 "per blow.
C = No blows to drive "casing "with lb. weight falling "per blow.

CLASSIFICATION Visual by Geologist

ASTM Specifications

DS-4

DATE
STARTED 8/16/79
FINISHED 8/16/79
SHEET 1 OF 3

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-3D
SURF. ELEV.
G. W. DEPTH See Note

PROJECT Groundwater Contamination Study
E.I. DuPont

LOCATION Buffalo, New York

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		1	12	15				Gravelly TOPSOIL-6"	NOTE: Ground WATER first encountered in sample 11.
			14	15		29		FILL-SILT, CLAY, trace cinders	
		2	12	14					
			11	9		25		Cinder Fill at 3 feet	
		3	1	2					
5			4	2		6		Clay Fill at 4 feet, Fill has trace flyash (moist to wet-firm to loose)	NOTE: 4" water monitoring well installed to 84.0'. Rock at 79.0'-Screen 74' to 84'.
		4	12	14					
			20	22		34			
		5	17	20				Brown CLAY & SILT, trace fine sand with grey clay lenses and brown fine sandy silt seams (damp)	
			25	35		45			
10		6	18	24					
			30	37		54		Stratum contains trace fine to coarse sand & fine gravel below 11 feet	
		7	20	24					
			30	40		54			
		8	10	12					
15			21	26		33			
		9	18	24					
			28	30		52			
		10	14	18					
			18	22		36			
20		11	14	18				Grey-brown varved CLAY & SILT, trace fine to coarse sand (moist)	
			18	20		36			
		12	9	11				Seams of wet brown fine sandy silt and clayey silt recovered in sample 11	
			12	16		23			
		13	8	8					
25			8	9		16			
		14	10	12					
			14	18		26			
		15	6	8					
			10	12		18			
30		16	SHELBY TUBE					Moisture content increases slightly and clay becomes softer below 32 feet	
		17	4	4					
			8	11		12			
		18	4	3				Brown CLAY, some Silt, trace fine sand with red clay seams (saturated)	
35			4	5		7			
		19	4	4					
			3	2		7			
		20	2	2					
			3	2		5			
40									

N = No. blows to drive 2 "spoon 12 "with 140 lb. pin wt. falling 30 "per blow.
C = No. blows to drive ____ "casing ____ "with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

DS-4

DATE
STARTED 8/16/79
FINISHED 8/16/79
SHEET 2 OF 3

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-3D (con't.)
SURF. ELEV.
G. W. DEPTH

PROJECT Groundwater Contamination Study
E.I. DuPont

LOCATION Buffalo, New York

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		21	3	2					
			2	2		4		Brown CLAY, some Silt, trace fine sand with red clay seams (saturated)	
		22	4	3					
			2	2		5			
		23	4	3					
45			4	3		7		Stratum is occasionally varved	
		24	4	5					
			4	4		9			
		25	3	3					
			3	4		6			
50		26	3	4					
			4	3		8			
		27	4	5					
			5	7		10			
		28	4	5					
55			3	4		8			
		29	3	4					
			5	5		9			
		30	4	4					
			5	5		9			
60		31	4	5					
			4	5		9		Sample 32 contains a grey silt seam and a trace fine gravel	
		32	3	5					
			5	5		10			
		33	3	4					
65			5	3		9		(moist to saturated-hard to medium)	
		34	5	6					
			5	6		11			
		35	5	7				Grey fine to coarse SAND & SILT, some fine Gravel, trace clay	
			8	9		15			
70		36	6	9				(wet-firm)	
			12	13		21			
								Boring Refusal at 79.0 feet.	

N = No. blows to drive 2 "spoon 12 "with 140 lb. pin wt. falling 30 "per blow.
C = No blows to drive ____ "casing ____ "with ____ lb. weight falling ____ "per blow.
ASTM Specifications

CLASSIFICATION Visual by Geologist

DS-4

DATE
STARTED 8/16/79
FINISHED 8/16/79
SHEET 3 OF 3

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-3D (con't.)
SURF. ELEV.
G. W. DEPTH

PROJECT Groundwater Contamination Study
E.I. Dupont

LOCATION Buffalo, New York

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
								Drilled in ROCK 79.0' to 84.0' w/ 5-5/8" roller bit	Well Screen 74' to 84'
85								Boring Complete at 84.0 feet.	

N = No. blows to drive 2 " spoon 12 " with 140 lb pin wt. falling 30 "per blow.

C = No. blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

METHOD OF INVESTIGATION: ASTM Specifications

CLASSIFICATION Visual by Geologist

DS-4

DATE
STARTED 8/22/79
FINISHED 8/22/79
SHEET 1 OF 3

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO B-4D
SURF. ELEV
G. W. DEPTH See Note

PROJECT Groundwater Contamination Study
E.I. DuPont

LOCATION Buffalo, New York

DEPTH IN FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18 IN.	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		1	5	10				FILL-SILT, SAND, FLYASH, CINDERS	NOTE: Ground WATER first encountered in sample 15.
			6	8		16			
		2	4	4				(moist-firm to loose)	
			5	5		9			
		3	6	8				Brown SILT, some Clay, trace fine sand & fine gravel, with grey silt lenses (damp)	
5			10	15		18			NOTE: 4" monitoring well to 84', screen 74' to 84'.
		4	12	13					
			15	15		28			
		5	15	18				Grey silt lenses contain organic fibers	
			24	27		42			
10		6	12	17					
			23	25		40			
		7	13	18					
			22	29		40			
		8	10	12					
15			14	19		26		Stratum becomes moist below 14 feet	
		9	7	7					
			10	15		17			
		10	7	9					
			11	16		20			
20		11	10	10					
			12	15		22			
		12	8	12				Brown SILT, some Clay, trace fine to coarse sand & fine gravel	
			20	27		32			
		13	10	15					
25			22	27		37			
		14	7	8				(damp to moist-hard to stiff)	
			12	15		20			
		15	4	4				Brown CLAY & SILT, trace fine to coarse sand	
			10	10		14			
30		16	SHELBY TUBE						
		17	5	7					
			8	10		15		(moist-medium)	
35		18	3	4				Red & grey varved CLAY, some Silt, trace fine sand in silt varves (saturated-medium)	
			4	5		8			
								Grey CLAY, some Silt, trace coarse sand w/occasional red clay seams	
40									

N = No. blows to drive 2 "spoon 12 "with 140 lb. pin wt. falling 30 "per blow.
C = No. blows to drive ____ "casing ____ "with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

DS-4

DATE
STARTED 8/22/79
FINISHED 8/22/79
SHEET 2 OF 3

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-4D(con't.)
SURF. ELEV
G. W. DEPTH

PROJECT Groundwater Contamination Study
E.I. DuPont

LOCATION Buffalo, New York

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		19	2	3					
			4	4		7		Grey CLAY, some Silt, trace coarse sand with occasional red clay seams	
45		20	1	2					
			4	4		6			
50		21	2	3					
			2	3		5			
55		22	1	3					
			2	3		5			
60		23	3	4					
			3	4		7			
65		24	1	3					
			4	3		7			
70		25	3	4					
			4	3		8			
75		26	4	8				Color grades to red-brown in sample 26 (moist to saturated-medium to soft)	
			12	10		20			
								Grey fine to coarse SAND & fine GRAVEL, little Silt (wet-very compact	
80		27	100/.5	50/00				Boring Refusal at 79.0 feet.	

N = No. blows to drive 2 "spoon 12 "with 140 lb. pin wt. falling 30 "per blow.
C = No blows to drive ____ "casing ____ "with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

DS-4

DATE
STARTED 8/22/79
FINISHED 8/22/79
SHEET 3 OF 3

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-4D (con't.)
SURF ELEV.
G. W DEPTH

PROJECT Groundwater Contamination Study
E.I. Dupont

LOCATION Buffalo, New York

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
								Drilled into BEDROCK 79' to 84' w/5-5/8" roller bit	
85								Boring Complete at 84.0 feet.	

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow

C = No. blows to drive _____ " casing _____ " with _____ lb weight falling _____ "per blow

CLASSIFICATION Visual by Geologist

ASTM Specifications

DS-4

DATE
STARTED 3/18/80
FINISHED 3/21/80
SHEET 1 OF 3

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-5D
SURF ELEV
G. W. DEPTH See Note

PROJECT Groundwater Contamination Study
E.I. Dupont

LOCATION Buffalo, New York

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING, C	SOIL OR ROCK CLASSIFICATION	NOTES
								0.0'-0.2' BITUMIN 0.2'-2.0' Crushed STONE, SAND & BRICK (fill)	NOTE: Perched WATER encountered at 2.0'-4.0'.
		1	12	14				Moist brown compact fine BRICK, SILT & SAND (fill)	
			18	24		32			
5		2	7	8					
			15	16		23		Moist reddish-brown firm Clayey SILT, trace gravel & sand	
		3	18	38					
			45	48		83		Sample 5, grades to very compact	
		4	18	25					
10			39	43		64			
		5	15	25					
			35	45		60			
		6	17	21					
			25	29		46			
15		7	16	18					
			20	24		38		Moist reddish-brown hard Silty CLAY, trace gravel	
		8	15	17					
			20	20		37			
		9	7	10					
			12	12		22		Sample 9, grades to stiff	
20		10	8	10					
			15	15		25			
		11	12	13					
			15	13		28		Sample 12, becomes wet, medium	
		12	8	7					
25			7	8		14			
		13	4	5					
			7	7		12			
		14	2	2				Wet reddish-brown soft CLAY, trace silt & gravel	
			3	2		5			
30		15	SHELBY TUBE						NOTE: 30.0'-Shelby Tube pushed 2.0' w/ 200 psi pressured, 90% recovery.
35		16	1	2					
			1	2		3			
40									

N = No blows to drive 2 spoon 12 " with 140 lb pin wt falling 30 "per blow

C = No blows to drive _____ " casing _____ " with _____ lb weight falling _____ "per blow

CLASSIFICATION Visual by Geoscientist

DATE
STARTED 3/18/80
FINISHED 3/21/80
SHEET 2 OF 3

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-5D (cont.)
SURF. ELEV.
G. W. DEPTH

PROJECT Groundwater Contamination Study
E.I. Dupont

LOCATION Buffalo, New York

DEPTH	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		17	3	3				Wet reddish-brown soft CLAY, trace silt & gravel	
			2	3		5			
45		18	3	3				Sample 18, grades to grey & reddish-brown	
			3	3		6			
50		19	3	4					
			3	3		7			
55		20	19	35				Wet brown compact SILT & fine SAND, some Rock Fragments & fine Gravel	
			40	50		75			
60		21	38	60					
			50	55		110			
65		22	38	50				Sample 22, becomes moist	NOTE: After sample 22, WATER encountered at 44.0 feet.
			38	49		88			
70		23	18	20					
			23	24		43			
75		24	36	50				Moist brown-grey very compact SILT & fine SAND, trace gravel & clay	
			48	59		98			
80									

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 "per blow

C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow

CLASSIFICATION Visual by Geoscientist

METHOD OF INVESTIGATION ASTM Specifications

DS-4

DATE
STARTED 3/18/80
FINISHED 3/21/80
SHEET 3 OF 3

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-5D (cont.)
SURF. ELEV
G. W. DEPTH

PROJECT Groundwater Contamination Study
E.I. Dupont

LOCATION Buffalo, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		25	130/.5					Moist brown-grey SILT & fine SAND, some fine Gravel & Rock Fragments Sample 26, no recovery	
		26	100/0						Rock reamed from 82.0 to 87.0' w/5-5/8" roller bit.
85									
								Boring Complete at 87.0 feet.	NOTE: Installed 4" diameter monitoring well to 84.5'*. Slotted PVC well screen 74.0'-75.5'. -Sand pack 71.0'-84.5' -Bentonite Seal 68.0'-71.0' -Grout 0.0'-68.0' -Curb box installed at surface WATER at 41.0 feet after well was installed. * Observation well installed 84.5' deep, due to collapse of hole.

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 "per blow

C = No blows to drive ____ " casing ____ " with ____ lb weight falling ____ "per blow

CLASSIFICATION Visual by Geoscientist

ASTM Specifications

DS-4

DATE
STARTED 4/7/80
FINISHED 4/8/80
SHEET 1 OF 3

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-6
SURF ELEV
G. W. DEPTH

PROJECT Groundwater Contamination Study
E.I. Dupont

LOCATION Buffalo, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		1		3				0.5' STONE	
			5	7		8		Damp brown firm SILT, some Rock Frag. & fine GRAVEL, little fine Sand, trace clay (Fill)	
		2	5	5				Moist brown-black firm organic	
			7	10		12		Clayey SILT, little fine Sand	
		3	4	5				Damp brown firm SILT, some Clay,	
5			6	10		11		trace sand	
		4	11	19				Sample 4, same w/little fine Gravel,	
			26	36		45		grades to compact & becomes varved	
		5	12	14				Sample 7, same w/decrease in fine	
			16	26		30		Gravel	
10		6	10	16					
			20	26		36			
		7	8	12					
			17	24		29		Decrease in density to firm	
		8	5	9					
15			14	18		23			
		9	7	11					
			14	16		25			
		10	6	8					
			11	13		19			
20		11	3	5				Sample 11, becomes moist	
			6	7		11			
		12	3	4					
			6	7		10			
		13	2	3				Moist brown firm SILT & CLAY, trace	
25			5	6		8		sand & gravel	
		14	2	2					
			3	4		5			
		15	2	3					
			4	5		7			
30		TUBE #1, REC 24"							
		16	2	4					
			5	5		9			
35		17	3	3					
			4	4		7		Moist brown medium vraved CLAY &	
								SILT, trace sand	
		18	3	3					
40			3	4		6			

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 " per blow

C = No blows to drive _____ " casing _____ " with _____ lb weight falling _____ " per blow

CLASSIFICATION Visual by Geoscientist

ASTM Specifications

DS-4

DATE
STARTED 4/7/80
FINISHED 4/7/80
SHEET 2 OF 3

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-6
SURF. ELEV.
G. W. DEPTH

PROJECT Groundwater Contamination Study
E.I. Dupont

LOCATION Buffalo, New York

DEPTH ft	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		19	1	1					
			2	3		3			
		20	2	2					
45			4	4		6		Moist brown-grey soft varved CLAY & SILT, trace sand & gravel w/brown silt partings	
		21	2	3					
			4	5		8			
50		22	2	3					
			4	6		7			
		23	4	6					
			7	7		13			
55		24	2	3					
			4	5		7			
		25	2	3					
60			4	6		7			
		26	2	4					
			6	6		10			
65		27	2	3					
			4	4		7		Moist brown-grey medium varved CLAY & SILT, trace sand w/grey silt partings	
		28	2	3					
			4	4		7			
70		29	WOR	2					
			3	5		5		Wet brown soft CLAY & SILT, trace sand	
		30	4	5					
75			6	6		11			
		31	15	18					
			16	19		34		Wet grey-brown compact weathered ROCK Fragments, little Silt & Clay	
80									

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt. falling 30 " per blow

C = No blows to drive ____ " casing ____ " with ____ lb weight falling ____ " per blow

METHOD OF INVESTIGATION ASTM Specifications

CLASSIFICATION Visual by Geoscientist

DS-4

DATE
STARTED 5/7/80
FINISHED 5/8/80
SHEET 3 OF 3

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-6
SURF. ELEV.
G. W. DEPTH

PROJECT Groundwater Contamination Study
E.I. Dupont

LOCATION Buffalo, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		32	112					Wet gr weathered ROCK, SILT & SAND	
									Rock cored to 85.5' using a 5½" roller bit.
85								Boring Complete at 85.5 feet.	
									NOTE: Installed 4" diameter monitoring well to 85.5 feet. -Sand pack 70.0 feet -Bentonite Seal 70.0-69.0 feet. -Grout 69.0 feet to surface. -Installed curb box.

N = No. blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 "per blow

C = No blows to drive ____ " casing ____ " with ____ lb weight falling ____ "per blow

CLASSIFICATION Visual by Geoscientist

ASTM Specifications

DATE
STARTED 8/24/79
FINISHED 8/24/79
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-7D
SURF ELEV.
G.W DEPTH

PROJECT Groundwater Contamination Study
E.I. Dupont

LOCATION Buffalo, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		1	8	29					
			19	7		48		FILL-FLYASH, CINDERS, SILT, SAND	
		2	7	12					
			7	7		19		FILL-PLASTIC, INDUSTRIAL WASTE (moist to wet-compact to firm)	
		3	1	2					
5			1	2		3			
		4	7	10					NOTE: Installed 4" water monitoring well to 77.5'; screen 67.5' to 77.5'.
			15	25		25		Brown CLAY & SILT, trace fine sand & fine gravel w/grey clay lenses w/trace fibers	
		5	16	19					
			24	30		43		(moist - hard)	
10		6	11	21					
			33	39		54			
		7	11	17					
			19	27		36		Brown SILT & CLAY, trace fine to coarse sand & fine gravel	
15		8	10	17					
			20	22		37			
		9	9	13					
			20	29		33			
		10	10	15					
			21	38		36			
20		11	10	14					
			20	24		34			
		12	6	8					
			8	10		16			
		13	6	8				Moisture content increases in sample 13 (moist - hard to stiff)	
25			8	14		16			
		14	7	8					
			8	7		16			
		15	5	7					
			8	11		15		Brown varved CLAY & SILT Color grades to grey-brown at 29' (moist)	
30									
		17	2	3					
			4	3		7		Reddish-brown varved CLAY & SILT, trace fine to coarse sand w/ occasional grey fine sandy silt partings (saturated)	
35		18	3	4					
			4	4		8			
40									

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.
C = No. blows to drive ____ " casing ____ " with ____ lb weight falling ____ "per blow

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION ASTM Specifications

DS-4

DATE
STARTED 8/24/79
FINISHED 8/24/79
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS, INC.

SUBSURFACE LOG

HOLE NO. B-7D
SURF. ELEV.
G. W DEPTH

PROJECT Groundwater Contamination Study
E.I. Dupont

LOCATION Buffalo, New York

DEPTH	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		19	3	3				Reddish-brown varved CLAY & SILT, trace fine to coarse sand w/ occasional grey fine sandy silt partings	
			5	5		8			
45		20	3	5					
			3	7		8		(moist to saturated - medium)	
								Brown moist SILT, SAND & GRAVEL	
50		21	19	23					
			27	30		50			
55		22	12	17	21	38			
		23	3	3	14	17		Grey wet SAND	
60								Grey wet SAND & GRAVEL	
		24	14	18	23	41			
								Grey moist SILT, SAND & GRAVEL	
65		25	16	17	23	40			
		26	16	21	27	48			
70									
		27	19	26	58	84			
								Drilled in ROCK 72.5' to 77.5' w/5-5/8" roller bit	
75									
								Boring Complete at 77.5 feet.	
80									

N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow

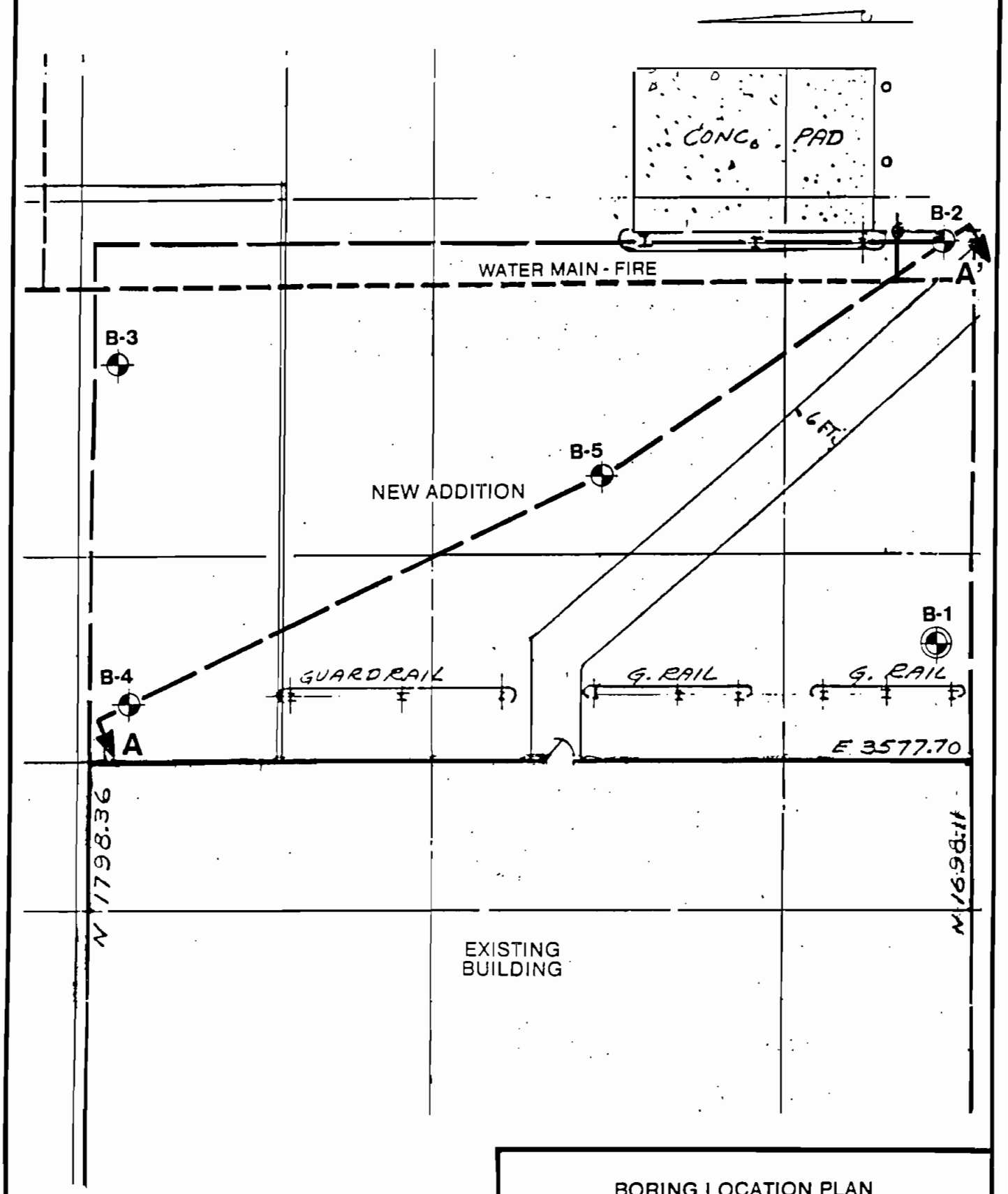
C = No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION ASTM Specifications

Woodward-Clyde Consultants

513472



LEGEND:

BORING LOCATION

OBSERVATION WELL

BORING LOCATION PLAN
DuPONT YERKES WORKS

Drawn by J.C.	SCALE IN FEET 0 16	Date 6 / 5 / 89
Checked by R.D.P.		Job 89C2628

LOG of BORING No. B-1

DATE 4/25/89 SURFACE ELEVATION 100.7 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0			4" Bituminous Pavement	100.4				
		13	Dense, dark gray, silty sand and gravel moist (FILL)	98.7				PPR 1.5 - 2.0
		12	Firm to stiff, olive-gray to gray, silty clay, moist (FILL)	96.7				
5		29						4.0 - 4.5
		39	Very stiff to hard, red-brown, silty clay with trace medium to fine sand. Occasional fine gravel and gray partings which are presumed to be biogenic, moist					+4.5
		43						+4.5
10								
		23						3.5 - +4.5
15								
20			becoming firm to very soft					
		12						1.5 - 2.25
25		9						.75 - 1.25
30		3	moist to wet (LACUSTRINE)	68.7				≤.5
35			Notes: 1. PPR = Pocket Penetrometer Resistance in tons per square foot, an indication of unconfined compressive strength 2. Elevations based on DuPont plant datum 3. Boring augered to elevation 35.7 to set observation well. Well screened from elevation 36.8 to 46.8					

Completion Depth 65.0 Feet Water Depth 32.6 Feet Date 5/4/89

Project Name Corian Manufacturing Building Project Number 89C2628

LOG of BORING No. B-2

DATE 4/21-22/89 SURFACE ELEVATION 100.7 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0			2" Bituminous Pavement	100.5				
		20	Dense to very dense, brown, coarse to fine sandy coarse to fine gravel, moist					
		29						
5		17	hard, red-brown, silty clay layer					
		68	-wet (FILL)	92.7				PPR
		40	Hard, red-brown, silty clay with trace medium to fine sand. Occasional fine gravel and gray partings which are presumed to be biogenic, moist					+4.5
10		35						+4.5
		P						
15		23						+4.5
		P						C,M
					17.5	31	17	+4.5
		21						+4.5
20								
25			becoming stiff to very soft					
		17						1.0 - 1.5
30		6						≦.5
35		P	-wet samples below this depth		37.3	42	21	C,M ≦.5
40		5						≦.5
			Continued on Page 2 of 2					

Completion Depth 81.1 Feet Water Depth 22 Feet Date 4/24/89

Project Name Corian Manufacturing Building Project Number 89C2628

LOG of BORING No. B-2

DATE 4/21-22/89 SURFACE ELEVATION 100.7 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
45		3	Very soft to soft, red-brown to red-gray, silty clay with trace medium to fine sand. Occasional fine gravel					PPR ≤.5
50		P			35.4	32	19	C,M
55		2	with little sand and gravel					≤.5
			(LACUSTRINE)	40.7				
60		10	Very stiff to hard, red-brown to red-gray fine gravelly silty clay, wet					
			(TILL)	35.7				
65		65	Very dense, red-brown, silty fine sand, wet (TILL)	34.4				
70		100/5"	Very dense, dark gray with multi-colored gravel, angular to subrounded, fine gravelly, silty, coarse to fine sand, wet (TILL)	27.5				RQD
75		NX 66	Badly weathered to weathered, gray, fine grained, massive, dolostone. 73.2' to 77' in core is badly broken					20%
80			small dark inclusions (AKRON FORMATION)	19.6				
85			Notes: 1. PPR = Pocket Penetrometer Resistance in tons per square foot, an indication of unconfined compressive strength 2. Elevations based on DuPont plant datum 3. Water first noted in boring at 5.0' on 4/21/89					

Completion Depth 81.1 Feet Water Depth 22 Feet Date 4/24/89

Project Name Corian Manufacturing Building Project Number 89C2628

LOG of BORING No. B-3

DATE 4/26/89 SURFACE ELEVATION 100.8 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0		137/6"	3" Bituminous Pavement	100.5	•			
			Very dense, gray to brown, silty sand and gravel (FILL)	99.3				
		4	Concrete obstruction	98.3				PPR
5		10	Firm to hard, dark gray becoming red-brown, silty clay with trace of medium					1.0 - 4.5
		31	to fine sand. Occasional fine gravel and gray partings which are presumed to					3.25 + 4.5
		27	be biogenic, moist					+ 3.5
10		26						+ 4.5
		P						+ 4.0
		28						+ 4.0
15		23						+ 4.5
20		20	-becoming firm to stiff					1.5 - 4.5
25		P						
		16						.50 - 2.0
30		6	-becoming very soft to soft (LACUSTRINE)	68.8				≤.5
35			Notes: 1. PPR = Pocket Penetrometer Resistance in tons per square foot, an indication of unconfined compressive strength 2. Elevations based on DuPont plant datum					

Completion Depth 32.0 Feet Water Depth Dry Feet Date 4/26/89

Project Name Corian Manufacturing Building Project Number 89C2628

LOG of BORING No. B-4

DATE 4/26/89 SURFACE ELEVATION 100.7 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0			3" Bituminous Pavement	100.4				
		45	Dense to very dense, light gray to light brown coarse to fine sandy coarse to fine gravel, dry to moist -wet (FILL)	95.7	9.4			M
		14						PPR
5		23	Very stiff to hard, red-brown, silty clay with trace medium to fine sand, occasional fine gravel and gray partings which are resumed to be biogenic, moist to wet					+4.5
		37						+4.5
		34						+4.5
10		29						+3.5
		26						+3.25
15		15	becoming stiff		21.8	35	19	1.5-+4.5
20		13	-wet below this depth					1.0-2.0
25		6	becoming very soft					≤.5
30		3		68.7	38.2	47	26	≤.5
35			Note: 1. PPR = Pocket Penetrometer Resistance in tons per square foot, an indication of unconfined compressive strength 2. Elevations based on DuPont plant datum					

Completion Depth 32.0 Feet Water Depth 26 Feet Date 4/26/89

Project Name Corian Manufacturing Building Project Number 89C2628

LOG of BORING No. B-5

DATE 4/20-21/89 SURFACE ELEVATION 100.5 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
0				100.2				
			4" Bituminous Pavement	99.4				
		8	10" brown, gravelly sand (FILL)	98.5				PPR 2.5 - 4.5
		17	Stiff, brown, silty clay, moist (FILL)		24.3			
5		32	Stiff becoming hard, red-brown, silty clay with trace medium to fine sand, occasional fine gravel and gray partings which are presumed to be biogenic, dry		19.1			+4.5
		39			17.7			+4.5
		41	-trace coarse sand		17.3			+4.5
10		34			16.5			4.0 - +4.5
		30			18.3			4.0 - +4.5
15		25			18.1			3.25 - 4.5
		24	-moist to wet		18.4			3.5 - 4.5
		17			19.1			3.5 - 4.5
20								
25		7	-becoming firm to very soft and red-brown to red-gray		23.4			.75 - 1.0
30		5			39.0			≤.5
35		See Note 1)			35.5			≤.5
40		4			33.5			≤.5
45								

Continued on Page 2 of 2

Completion Depth 75.3 Feet Water Depth 11.1 Feet Date 4/21/89

Project Name Corian Manufacturing Building Project Number 89C2628

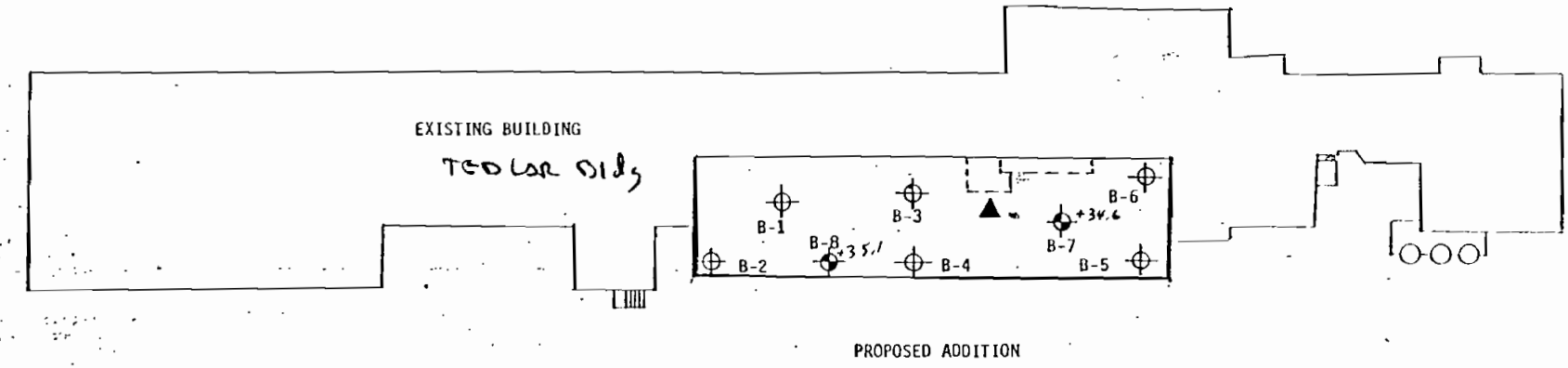
LOG of BORING No. B-5

DATE 4/20-21/89 SURFACE ELEVATION 100.5 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	WATER CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	OTHER TESTS
45		2	Soft to very soft, red-brown to red-gray, silty clay with trace medium to fine sand, occasional fine gravel		36.2			PPR ≤.5
50		2			36.2			≤.5
55		11/6"	(LACUSTRINE)	44.5				
		See Note 2	Medium dense, red-gray, gravelly silty clayey fine to medium sand, wet					≤.5
			(TILL)	40.5				
60		27	Medium dense to very dense, gray, angular to subrounded fine gravelly silty coarse to fine sand, wet		13.4			M
65		100/4"	gravelly silty clay (3")					
			(TILL)	34.3				RQD
		NX 20	Badly weathered to fresh, gray, fine grained massive dolostone with solution pits, styolites, and dark gray shale lenses. Drilled through fracture at elevation 33.0 and 32.2					0
70		NX 63						39
			(AKRON FORMATION)	25.2				
75			Notes: 1. Split spoon sampler driven with hydraulics due to driller's error 2. Split spoon sampler driven with hydraulics first 12" due to driller's error 3. PPR = Pocket Penetrometer Resistance in tons per square foot, an indication of unconfined compressive strength 4. Elevations based on DuPont plant datum					
80								

Completion Depth 75.3 Feet Water Depth 11.1 Feet Date 4/21/89

Project Name Corian Manufacturing Building Project Number 89C2628



LEGEND

Test Boring Location: BD-88-123A
Boring completed October 5 — 7, 1988

Benchmark Location: Floor slab of existing building - Established elevation of 102.75

Test Boring Location: Previous borings BD-88-123
August 30 - September 3, 1988

EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE INVESTIGATION PLAN

Proposed Building Addition
Test Boring Location Plan
Dupont-Yerkes Plant

DR.BY:	-	SCALE: 1"=60'	PROJ. NO. BD-88-123A
CK'D.BY:	FRM	DATE: 10/17/88	DRWG.NO. 1

DATE
STARTED 9-2-88
FINISHED 9-2-88
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE LOG

HOLE NO. B-1
SURF. ELEV. 102.0
G. W. DEPTH see note

PROJECT Proposed Building Expansion

LOCATION Dupont-Yerkes Plant
Tonawanda, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0			AUGER						
		1	10	10				Black CINDERS, and f-c Sand (moist-wet, FILL)	
			15	18		25			
		2	20	20					
			10	10		30			
5		3	6	10				Red & Brn. mottled Clayey SILT, tr. sand (moist, stiff)	
			10	14		20			
		4	14	16					
			18	20		34		(hard)	
		5	10	20					
10			27	29		47		Becomes brn.	
15		6	7	8	9	17		Brn. Silty CLAY, little f-c Sand (moist, stiff)	
20		7	5	7	7	14		(medium)	
25		8	5	6	6	12		Becomes brn.-grey, contains tr. sand (moist-wet)	
30		9	1	3	3	6		(wet)	
35		10	1	1	1	2		(soft)	
40									

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No. blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

CLASSIFICATION Visual by Geologist

DATE
STARTED 9-2-88
FINISHED 9-2-88
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-1
SURF. ELEV. 102.0
G. W. DEPTH see note

PROJECT Proposed Building Expansion

LOCATION Dupont-Yerkes Plant
Tonawanda, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
40		11	WOR	1	1	2		Becomes grey	WOR=weight of rods
45		12	WOR	1	2	3		Becomes brn.-grey	
50		13	WOR	WOH	1	1		(very soft)	WOH=weight of hammer & rods
55		14	3	2	2	4		(soft)	
60		15	WOR	WOH/1.0		WOH		(very soft)	Driller notes change at 63.0'
65		16	19	25	100/0.4			Grey f-c SAND, some Silt, little f-c Gravel (moist, very compact)	
70								Boring Complete with sample spoon refusal at 66.4'	No free standing water encountered at Boring Completion

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No. blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

CLASSIFICATION Visual by Geologist

ASTM D-1586 URBAN HOLLOW STEM

DATE
STARTED 9-2-88
FINISHED 9-2-88
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS INC. **SUBSURFACE LOG**

HOLE NO. B-2
SURF. ELEV. 102.2
G. W. DEPTH see note

PROJECT Proposed Building Expansion

LOCATION Dupont-Yerkes Plant
Tonawanda, New York

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0			AUGER					Concrete	
		1	10	10				Brn. f-c GRAVEL, and f-c Sand, some Silt (moist, FILL)	
			11	6		21			
		2	8	6				Brn. f-c SAND, some Silt, some f-c Gravel, (moist, FILL)	
5			6	8		12			
		3	3	4				Black CINDERS and Slag (moist, FILL)	
			3	8		7			
		4	2	3				Brn. f-c SAND, some Silt, some f-c Gravel, (moist,FILL)	
			6	10		9			
10		5	2	3					
			3	4		6			
		6	3	4				Brn. f-c GRAVEL, and f-c Sand, tr. silt (wet,FILL)	
			4	6		8			
15		7	3	4					
			4	6		8		Brn. f-c SAND, some f-m, Gravel, tr. silt (wet,FILL)	Driller notes encountering concrete at 18.5'
20		8	6	7	8	15		Brn. laminated Silty CLAY, little f-c Sand (moist, medium)	
25		9	6	6	8	14		Contains tr. sand	
30		10	4	4	6	10		Becomes red-brn. (wet)	
35		11	1	2	3	5		(soft)	
40									

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt. falling 30 "per blow.

C = No blows to drive ____ " casing ____ " with ____ lb weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

ASTM D 1586 USING HOLLOW STEM AUGERS

DATE
STARTED 9-2-88
FINISHED 9-2-88
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS INC **SUBSURFACE LOG**

HOLE NO. B-2
SURF. ELEV. 102.1
G. W. DEPTH see note

PROJECT Proposed Building Expansion
LOCATION Dupont-Yerkes Plant, Tonawanda, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
40		12	WOR	WOH	1	1		(very soft)	WOR=weight of rods WOH=weight of hammer and rods
45		13	WOH	1	2	3		Becomes brn. (soft)	
50		14	WOH	1.5		WOH		(very soft)	
55		15	WOR	WOH	1.0	WOH		Becomes red-brn. & grey, contains occ. Silt seams	
60		16	WOH	1.5		WOH			
								Grey f-c SAND, some Silt, some f-m Gravel (moist)	Driller notes change at 63.0'
65		17	25	100	0.2			Boring Complete with sample spoon refusal at 65.7'	No free standing water encountered at Boring Completion

N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt falling 30 "per blow.
C = No blows to drive ____ " casing ____ " with ____ lb weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

DATE STARTED 9-1-88 FINISHED 9-1-88 SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. B-3 SURF. ELEV. 102.1 G. W. DEPTH see note

PROJECT Proposed Building Expansion

LOCATION Dupont-Yerkes Plant, Tonawanda, New York

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0			AUGER					Asphaltic Concrete	
		1	18	10				Black f-c SAND, and Cinders, tr. brick, tr. gravel (moist, FILL)	
			15	16		25			
		2	14	11				Black Silty CLAY, little Cinders (moist, FILL)	
5			4	5		15			
		3	4	6				Brn. & Olive Clayey SILT, little f-c Sand, tr. gravel (moist, medium)	
			7	10		13			
		4	14	16					
			18	21		34		Becomes red-brn. (hard)	
10		5	6	16					
			15	20		31			
15		6	7	13	15	28			
20		7	4	5	7	12		Brn.-Grey Silty CLAY, tr. sand (moist, medium)	
25		8	3	4	4	8		Becomes red-brn.	
30		9	1	2	3	5		Becomes red-brn. & grey, contains occ. Silt seams (wet, soft)	
35		10	1	2	2	4			
40									

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 " per blow. CLASSIFICATION Visual by Geologist

C = No. blows to drive ____ " casing ____ " with ____ lb. weight falling ____ " per blow.

ASTM D 1586 USING HOLLOW STEM AUGERS

DATE STARTED 9-1-88 FINISHED 9-1-88 SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. B-3 SURF. ELEV. 102.1 G. W. DEPTH see note

PROJECT Proposed Building Expansion LOCATION Dupont-Yerkes Plant, Tonawanda, New York

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
40		11	1	3	4	7		(medium)	
45		12	1	2	3	5		Becomes grey (soft)	
50		13	WOR	1	2	3		Becomes brn.	WOR=weight of rods
55		14	WOR	1	2	3			
60		15	WOR	1	1	2			Driller notes change at 63.0'
65		16	8	19	100/0.4			Grey f-c SAND, some Silt, little f-c Gravel (wet, very compact)	
70								Boring Complete with sample spoon refusal at 66.4'	Free standing water recorded at 60.0' at Boring Completion Free standing water recorded at 28.6' on 9-2-88

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt. falling 30 "per blow. CLASSIFICATION Visual by Geologist

C = No blows to drive ____ " casing ____ " with ____ lb weight falling ____ "per blow.

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

DATE
STARTED 9-2-88
FINISHED 9-2-88
SHEET 1 OF 2.

EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE LOG

HOLE NO. B-5
SURF. ELEV. 101.9
C. W. DEPTH see note

PROJECT Proposed Building Expansion
LOCATION Dupont-Yerkes Plant, Tonawanda, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0			AUGER					Concrete	
		1	20	12				Brn. f-c GRAVEL, and f-c Sand, some Silt (moist, FILL)	
			16	17		28			
		2	20	20				Becomes black & brn., contains "and" Cinders	
5			10	15		30			
		3	18	14				Contains tr. cinders, tr. concrete	No recovery sample #4 due to stone lodged in shoe of spoon
			11	15		25			
		4	22	27					
			37	57		64			
		5	12	14		.		Red-Brn. Clayey SILT, tr. sand (moist, hard)	
10			18	27		32			
15		6	12	15	20	35		Contains little f-c Sand	
20		7	6	7	12	19		Brn.-Grey Silty CLAY, tr.-little f-c Sand (moist, stiff)	
25		8	3	3	5	8		Becomes brn., contains tr. sand (wet, medium)	
30		9	2	6	6	12		Becomes red-brn.	
35		10	3	4	5	9			
40									

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 " per blow. CLASSIFICATION Visual by Geologist

DATE
STARTED 9-2-88
FINISHED 9-2-88
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE LOG

HOLE NO. B-5
SURF. ELEV.
G. W. DEPTH

PROJECT Proposed Building Expansion

LOCATION Dupont-Yerkes Plant
Tonawanda, New York

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
40		11	3	5	4	9		Becomes grey	
45		12	2	3	2	5		(soft)	
50		13	1	2	2	4		Becomes brn.-grey	
55		14	1	3	2	5			
60		15	2	3	6	9		Becomes red-brn. & grey (medium)	
65		16	4	12	16	28		Grey f-c Sand, and Clayey Silt, little f-c Gravel (moist, firm)	
70								Boring Complete with auger refusal at 67.9'	Free standing water recorded at 40.2' at Boring Completion

N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

CLASSIFICATION Visual by Geologist

DATE
STARTED 9-2-88
FINISHED 9-2-88
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE LOG

HOLE NO. B-4
SURF. ELEV. 101.5
G. W. DEPTH see note

PROJECT Proposed Building Expansion
LOCATION Dupont-Yerkes Plant
Tonawanda, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0			AUGER					Asphaltic Concrete	
		1	16	8				Black & Grey CINDERS, and f-c Slag, tr. brick (moist, FILL)	
			5	8		13			
		2	4	4				Red-Brn. laminated Clayey SILT, tr. sand, tr. gravel (moist, medium)	
5			6	12		10			
		3	8	12					
			23	32		30		(hard)	
		4	27	36					
			47	48		83			
10									
15		5	6	8	13	21		Brn. Silty CLAY, tr. sand, tr. gravel (moist, stiff)	
20		6	6	9	11	20		Becomes red-brn.	
25		7	3	6	8	14		(medium)	
30		8	3	4	5	9		Becomes brn. (moist-wet)	
35		9	3	6	4	10		Becomes red-brn.	
40									

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.
C = No. blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

DATE
STARTED 9-2-88
FINISHED 9-2-88
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. B-4
SURF. ELEV. 101.5
G. W. DEPTH see note

PROJECT Proposed Building Expansion

LOCATION Dupont-Yerkes Plant
Tonawanda, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
40		10	6	6	6	12		Becomes brn.-grey	
45		11	5	5	5	10		(wet)	
50		12	7	7	6	13		Becomes brn.	
55		13	6	7	6	13			
60		14	3	5	5	10		Becomes red-brn. & grey	
65		15	7	50/0.4				Grey f-c SAND, some Silt, some f-m Gravel (moist)	
70								Boring Complete with sample spoon and auger refusal at 66.7'	Free standing water recorded at 30.4' at Boring Completion

N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No blows to drive _____ " casing _____ " with _____ lb weight falling _____ "per blow.

CLASSIFICATION Visual by Geologist

DATE
STARTED 8-30-88
FINISHED 8-30-88
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. B-6
SURF. ELEV. 101.8
G. W. DEPTH see note

PROJECT Proposed Building Expansion
LOCATION Dupont-Yerkes Plant, Tonawanda, New York

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0			AUGER					Concrete	
		1	16	9				Brn. f-c SAND, and f-c Gravel, some Silt (moist, FILL)	
			10	19		19			
		2	9	14					
			16	17		30			
5		3	4	3					
			2	6		5			
		4	20	33				Grey f-c GRAVEL, and f-c Sand, little Silt (moist, FILL)	
			33	40		66			
10		5	23	11				Becomes brn. (wet)	
			11	10		22			
15		6	9	16	21	37		Brn. laminated Silty CLAY, tr. sand, tr. gravel (moist, hard)	
20		7	5	10				(stiff)	
			12	17		22			
25		8	6	7	9	16		Becomes red-brn.	
30		9	4	3	4	7		Becomes grey (wet, medium)	
35		10	1	2	2	4		Becomes red-brn. (soft)	
40									

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 "per blow.
C = No blows to drive ____ " casing ____ " with ____ lb weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

DATE
STARTED 8-30-88
FINISHED 8-30-88
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. B-6
SURF. ELEV. 101.8
G. W. DEPTH see note

PROJECT Proposed Building Expansion
LOCATION Dupons-Yerkes Plant, Tonawanda, New York

DEPTH	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
40		11	2	3	4	7		(medium)	
45		12	2	2	2	4		(soft)	
50		13	1	1	2	3		Becomes brn.-grey	
55		14	WOR	WOH	2	2			WOR=weight of rods WOH=weight of hammer and rods
60		15	WOH	2	4	6		Becomes red-brn. (medium)	
65		16	WOH	15				Grey f-c SAND, and Fractured Rock Fragments, some Silt (moist, very compact)	
			58	23		73			
70								Light Grey SHALE Rock, medium hard, slightly weathered, laminated to thinly bedded, occ. Gypsum lenses, Void noted by driller from 69.7' to 70.5'	NQ '2' size rock core Run #1 68.4' to 73.2' Rec. 62.5%
75								Boring Complete at 73.2'	Free standing water recorded at 10.4' prior to coring

N = No. blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 " per blow CLASSIFICATION Visual by Geologist

C = No. blows to drive _____ " casing _____ " with _____ lb weight falling _____ " per blow

DATE STARTED 10/5/88
FINISHED 10/7/88
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS INC. — SUBSURFACE LOG

HOLE NO. B-7
SURF. ELEV. 102.1
G. W. DEPTH see note

PROJECT Proposed Building Expansion

LOCATION DuPont-Yerkes Plant, Tonawanda, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0									
		AUGER						CONCRETE	
		1	23	24		47		GRAVEL (FILL)	
		2	49	44				Brn f-c GRAVEL, and f-c Sand, some Silt (moist, FILL)	Auger refusal encountered at 4.5'. Boring moved 5.0' South. Refusal encountered at 4.5'. Boring moved 7.0' more South. Auger refusal at 4.5'. Boring moved 5.0' more to South. Missed obstruction. Sampling resumed at 4.0'
			56	58		100		Gray f-c SLAG (moist, FILL)	
5		3	4	7					
			7	2		14			
		4	13	27				Red-Brn laminated Clayey SILT, tr. sand (moist, hard)	
			28	35		55			
		5	13	14					
10			18	21		32		(moist-wet)	
		6	10	12	13	25		Red-Brn laminated Silty CLAY, little f-c Sand, tr. gravel (moist, stiff)	No recovery sample #3 due to stone lodged in shoe of spoon
15									
		7	6	7	7	14		Becomes brn, contains tr. sand (medium)	
20									
		8	5	5	6	11		(moist-wet)	
25									
		9	4	4	4	8		Becomes varved red-brn and gray (wet)	
30									
		10	WOH	1	2	3		(soft)	WOH=Weight of hammer and rods
35									
		11	1	2	2	4		Becomes gray	
40									

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 "per blow. CLASSIFICATION Visual by Geologist

C = No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

DATE
STARTED 10/5/88
FINISHED 10/7/88
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-7
SURF. ELEV. 102.1
G. W. DEPTH see note

PROJECT Proposed Building Expansion
LOCATION DuPont-Yerkes Plant, Tonawanda, New York

DEPTH	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
40									
		12	2	1	2	3		Becomes varved red-brn and gray	
45									
		13	1	2	2	4		Becomes brn-gray	
50									
		14	1	2	1	3		Becomes red-brn	
55									
		15	2	2	4	6		Contains occasional Silt seams (medium)	
60									
		16	15	24	30	54		Gray weathered SHALE Rock (wet)	
65									
								Gray SHALE Rock, medium hard, slightly weathered, thinly bedded to bedded, fractured, occasional gypsum nodules	NQ'2' Size Rock Core Run #1 67.5'-72.5' Rec=58%
70									
								Boring Complete at 72.5'	Free standing water at 44.0' prior to coring Free standing water recorded at 50.0' after coring
75									

N = No. blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 "per blow
C = No. blows to drive _____ " casing _____ " with _____ lb weight falling _____ "per blow

CLASSIFICATION Visual by Geologist

DATE
STARTED 10/5/88
FINISHED 10/5/88
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-8
SURF. ELEV. 101.6
G. W. DEPTH see note

PROJECT Proposed Building Expansion

LOCATION DuPont-Yerkes Plant
Tonawanda, New York

DEPTH	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0		AUGER						ASPHALTIC CONCRETE GRAVEL (FILL)	
		1	23	34		57		Black Cinders, and Slag, tr. brick (moist, FILL)	
		2	6	4					
			3	3		7			
		3	3	5				Red-Brn Clayey SILT, tr. sand (moist, medium)	
5			9	14		14			
		4	26	22				Becomes brn, contains tr. gravel (hard)	
			29	33		51			
		5	15	27					
			35	29		62			
10									
		6	10	16	25	41		Brn laminated Silty CLAY, little f-c Sand, tr. gravel (moist, hard)	
15									
		7	8	10	12	22		(stiff)	
20									
		8	5	7	7	14		Contains tr. sand (moist-wet, medium)	
25									
		9	2	2	3	5		Becomes red-brn and gray (wet, soft)	
30									
		10	2	2	2	4			
35									
		11	WOH	1	2	3		Becomes gray-brn	WOH-weight of hammer and rods
40									

N = No. blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 " per blow

C = No. blows to drive " casing " with lb weight falling " per blow

CLASSIFICATION Visual by Geologist

DATE
STARTED 10/5/88
FINISHED 10/5/88
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS INC — SUBSURFACE LOG

HOLE NO. B-8
SURF ELEV. 101.6
G. W. DEPTH see note

PROJECT Proposed Building Expansion

LOCATION DuPont- erkes Plant
Tonawanda, New York

DEPTH	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING	SOIL OR ROCK CLASSIFICATION	NOTES
40									
		12	2	2	2	4		Becomes red-brn	
45									
		13	1	2	2	4			
50									
		14	1	1	2	3			
55									
		15	2	3	9	12		Gray f-c SAND, and Clayey Silt, little f-c Gravel (wet, firm)	
60									
		16	25	31	34	65		Gray weathered SHALE Rock Fragments (wet)	
65									
								Gray SHALE Rock, medium hard, sound thinly bedded to bedded Gypsum nodule noted at 71.3'	NQ'2' size Rock Core Run #1 66.5'-71.5' Rec=83%
70								Boring Complete at 71.5'	No voids noted while coring by driller. No water return noted by driller during coring. Free standing water recorded at 28.0' prior to coring.
75									

N = No. blows to drive 2" spoon 12" with 140 lb pin wt falling 30" per blow CLASSIFICATION Visual by Geologist

C = No. blows to drive ____ casing ____ with ____ lb weight falling ____ per blow

Appendix F

SECTION F-1
ANALYTICAL RESULTS FOR STORM SEWER WATER SAMPLE

E I DUPONT DE NEMOURS

METHOD 8240 - VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Surface W
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AS040959	Sample Date:	08/05/93
Client Sample ID:	SW-1	Analysis Date:	08/05/93

Parameter	Units = UG/L	Result	Q
Acetone		10	U
Benzene		5	U
Bromodichloromethane		5	U
Bromoform		5	U
Bromomethane		10	U
2-Butanone		10	U
Carbon Disulfide		5	U
Carbon Tetrachloride		5	U
Chlorobenzene		5	U
Chloroethane		10	U
Chloroform		5	U
Chloromethane		10	U
Dibromochloromethane		5	U
1,1-Dichloroethane		5	U
1,2-Dichloroethane		5	U
1,1-Dichloroethene		5	U
1,2-Dichloroethene (Total)		5	U
1,2-Dichloropropane		5	U
cis-1,3-Dichloropropene		5	U
trans-1,3-Dichloropropene		5	U
Ethyl benzene		5	U
2-Hexanone		10	U
Methylene chloride		5	U
4-Methyl-2-pentanone		10	U
Styrene		5	U
1,1,2,2-Tetrachloroethane		5	U
Tetrachloroethene		5	U
Toluene		5	U
1,1,1-Trichloroethane		5	U
1,1,2-Trichloroethane		5	U
Trichloroethene		5	U
Vinyl acetate		10	U
Vinyl chloride		10	U
Total Xylenes		5	U

E I DUPONT DE NEMOURS

METHOD 8240 - VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Surface W
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AS040959	Sample Date:	08/05/93
Client Sample ID:	SW-1	Analysis Date:	08/05/93

Parameter	Units = UG/L	Result	Q
Methyl methacrylate		10	U

E I DUPONT DE NEMOURS

METHOD 8270 - TCL SEMI-VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Surface W
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AS040959	Sample Date:	08/05/93
Client Sample ID:	SW-1	Analysis Date:	08/10/93
		Extraction Date:	08/09/93

Parameter	Units = UG/L	Result	Q
Acenaphthene		10	U
Acenaphthylene		10	U
Anthracene		10	U
Benzo(a)anthracene		10	U
Benzo(b)fluoranthene		10	U
Benzo(k)fluoranthene		10	U
Benzo(ghi)perylene		10	U
Benzo(a)pyrene		10	U
Benzoic acid		50	U
Benzyl alcohol		10	U
Bis(2-chloroethoxy) methane		10	U
Bis(2-chloroethyl) ether		10	U
Bis(2-chloroisopropyl) ether		10	U
Bis(2-ethylhexyl) phthalate		10	U
4-Bromophenyl phenyl ether		10	U
Butyl benzyl phthalate		10	U
4-Chloroaniline		10	U
4-Chloro-3-methylphenol		10	U
2-Chloronaphthalene		10	U
2-Chlorophenol		10	U
4-Chlorodiphenylether		10	U
Chrysene		10	U
Dibenzo(a,h)anthracene		10	U
Dibenzofuran		10	U
Di-n-butyl phthalate		10	U
1,2-Dichlorobenzene		10	U
1,3-Dichlorobenzene		10	U
1,4-Dichlorobenzene		10	U
3,3'-Dichlorobenzidine		20	U
2,4-Dichlorophenol		10	U
Diethyl phthalate		10	U
2,4-Dimethylphenol		10	U
Dimethyl phthalate		10	U
4,6-Dinitro-2-methylphenol		50	U

E I DUPONT DE NEMOURS

METHOD 8270 - TCL SEMI-VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Surface W
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AS040959	Sample Date:	08/05/93
Client Sample ID:	SW-1	Analysis Date:	08/10/93
		Extraction Date:	08/09/93

Parameter	Units = UG/L	Result	Q
2,4-Dinitrophenol		50	U
2,4-Dinitrotoluene		10	U
2,6-Dinitrotoluene		10	U
Di-n-octyl phthalate		10	U
Fluoranthene		10	U
Fluorene		10	U
Hexachlorobenzene		10	U
Hexachlorobutadiene		10	U
Hexachlorocyclopentadiene		10	U
Hexachloroethane		10	U
Indeno(1,2,3-cd)pyrene		10	U
Isophorone		10	U
2-Methylnaphthalene		10	U
2-Methylphenol		10	U
4-Methylphenol		10	U
Naphthalene		10	U
2-Nitroaniline		50	U
3-Nitroaniline		50	U
4-Nitroaniline		50	U
Nitrobenzene		10	U
2-Nitrophenol		10	U
4-Nitrophenol		50	U
N-nitrosodiphenylamine		10	U
N-Nitroso-Di-n-propylamine		10	U
Pentachlorophenol		50	U
Phenanthrene		10	U
Phenol		10	U
Pyrene		10	U
1,2,4-Trichlorobenzene		10	U
2,4,5-Trichlorophenol		50	U
2,4,6-Trichlorophenol		10	U

E I DUPONT DE NEMOURS

METHOD 8080 - TCL PESTICIDES/PCBS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Surface W
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AS040959	Sample Date:	08/05/93
Client Sample ID:	SW-1	Analysis Date:	08/12/93
		Extraction Date:	08/09/93

Parameter	Units = UG/L	Result	Q
Aldrin		0.071	U
alpha-BHC		0.071	U
beta-BHC		0.071	U
gamma-BHC (Lindane)		0.071	U
delta-BHC		0.071	U
Chlordane		0.71	U
4,4'-DDD		0.14	U
4,4'-DDE		0.14	U
4,4'-DDT		0.14	U
Dieldrin		0.14	U
Endosulfan I		0.14	U
Endosulfan II		0.14	U
Endosulfan Sulfate		0.14	U
Endrin		0.14	U
Endrin ketone		0.14	U
Heptachlor		0.071	U
Heptachlor epoxide		0.071	U
Methoxychlor		0.71	U
Toxaphene		1.4	U
Aroclor 1016		0.71	U
Aroclor 1221		1.4	U
Aroclor 1232		0.71	U
Aroclor 1242		0.71	U
Aroclor 1248		0.71	U
Aroclor 1254		0.71	U
Aroclor 1260		0.71	U

E I DUPONT DE NEMOURS

Total Metals Analysis

boratory: Recra Environmental, Inc. - RECNY
b Job No: A93-2436
b Sample ID: AS040959
ient Sample ID: SW-1

Matrix: Surface W
Sample Date: 08/05/93

Dilution Factor: 1

Parameter	Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
luminum - Total		200.7	08/06/93	08/07/93	2.0	
ntimony - Total		204.2	08/06/93	08/08/93	0.0080	
rsenic - Total		206.2	08/06/93	08/07/93	0.0080	
arium - Total		200.7	08/06/93	08/07/93	0.12	
eryllium - Total		200.7	08/06/33	08/07/93	0.0030	U
admium - Total		200.7	08/06/93	08/07/93	0.016	U
alcium - Total		200.7	08/06/93	08/07/93	101	
hromium - Total		200.7	08/06/93	08/07/93	0.016	
obalt - Total		200.7	08/06/93	08/07/93	0.020	U
opper - Total		200.7	08/06/93	08/07/93	0.015	
ron - Total		200.7	08/06/93	08/07/93	4.8	
ead - Total		239.2	08/06/93	08/07/93	0.041	
agnesium - Total		200.7	08/06/93	08/07/93	22.0	
anganese - Total		200.7	08/06/93	08/07/93	0.26	
ercury - Total		245.1	08/06/93	08/10/93	0.0011	
ickel - Total		200.7	08/06/93	08/07/93	0.030	U
otassium - Total		200.7	08/06/93	08/07/93	6.0	
elenium - Total		270.2	08/06/93	08/07/93	0.0030	
ilver - Total		272.2	08/06/93	08/08/93	0.010	U
odium - Total		200.7	08/06/93	08/07/93	72.0	
hallium - Total		279.2	08/06/93	08/07/93	0.0040	U
anadium - Total		200.7	08/06/93	08/07/93	0.020	U
inc - Total		200.7	08/06/93	08/07/93	0.098	

E I DUPONT DE NEMOURS

Wet Chemistry Analysis

boratory: Recra Environmental, Inc.- RECNY
b Job No: A93-2436
b Sample ID: AS040959
ient Sample ID: SW-1

Matrix: Surface Water
Sample Date: 08/05/93

Dilution Factor: 1

Parameter	Units of Measure	Method	Analysis Date	Result	Q
Biochemical Oxygen Demand	MG/L	405.1	08/10/93	2.0	
Chemical Oxygen Demand	MG/L	410.1	08/06/93	102	
Cyanide - Total	MG/L	335.2	08/11/93	0.011	
Nitrate	MG/L	353.2	08/10/93	11.0	
Nitrite	MG/L	353.2	08/10/93	0.050	U
Non-Filterable Residue (103°C)	MG/L	160.2	08/09/93	171	
Total Kjeldahl Nitrogen	MG/L	351.3	08/09/93	1.5	
Total Phosphorous	MG P/L	365.2	08/12/93	0.44	
Total Recoverable Oil & Grease	MG/L	413.1	08/09/93	5.0	U

SECTION F-2
ANALYTICAL RESULTS FOR CATCH BASIN SEDIMENT SAMPLE

E I DUPONT DE NEMOURS

METHOD 8240 - VOLATILE ORGANICS

aboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Sediment
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AS040958	Sample Date:	08/05/93
lient Sample ID:	SED-1	Analysis Date:	08/05/93
		% Dry Weight:	67.20

Parameter	Units = UG/KG	Result	Q
Acetone		14	U
Benzene		7	U
Bromodichloromethane		7	U
Bromoform		7	U
Bromomethane		14	U
2-Butanone		14	U
Carbon Disulfide		7	U
Carbon Tetrachloride		7	U
Chlorobenzene		1	BJ
Chloroethane		14	U
Chloroform		7	U
Chloromethane		14	U
Dibromochloromethane		7	U
1,1-Dichloroethane		7	U
1,2-Dichloroethane		7	U
1,1-Dichloroethene		7	U
1,2-Dichloroethene (Total)		7	U
1,2-Dichloropropane		7	U
cis-1,3-Dichloropropene		7	U
trans-1,3-Dichloropropene		7	U
Ethyl benzene		7	U
2-Hexanone		14	U
Methylene chloride		7	U
4-Methyl-2-pentanone		14	U
Styrene		7	U
1,1,2,2-Tetrachloroethane		7	U
Tetrachloroethene		7	U
Toluene		1	BJ
1,1,1-Trichloroethane		7	U
1,1,2-Trichloroethane		7	U
Trichloroethene		7	U
Vinyl acetate		14	U
Vinyl chloride		14	U
Total Xylenes		7	U

E I DUPONT DE NEMOURS

METHOD 8240 - VOLATILE ORGANICS

aboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Sediment
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AS040958	Sample Date:	08/05/93
lient Sample ID:	SED-1	Analysis Date:	08/05/93
		% Dry Weight:	67.20

Parameter	Units = UG/KG	Result	Q
Methyl methacrylate		14	U

E I DUPONT DE NEMOURS

METHOD 8270 - TCL SEMI-VOLATILE ORGANICS

aboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2436
ab Sample ID: AS040958
lient Sample ID: SED-1

Matrix: Sediment
Dilution Factor: 1
Sample Date: 08/05/93
Analysis Date: 08/11/93
Extraction Date: 08/09/93

Parameter	Units = UG/KG	Result	Q
Acenaphthene		40	J
Acenaphthylene		470	U
Anthracene		80	J
Benzo(a)anthracene		320	J
Benzo(b)fluoranthene		310	J
Benzo(k)fluoranthene		140	J
Benzo(ghi)perylene		100	J
Benzo(a)pyrene		240	J
Benzoic acid		2300	U
Benzyl alcohol		470	U
Bis(2-chloroethoxy) methane		470	U
Bis(2-chloroethyl) ether		470	U
Bis(2-chloroisopropyl) ether		470	U
Bis(2-ethylhexyl) phthalate		420	J
4-Bromophenyl phenyl ether		470	U
Butyl benzyl phthalate		470	U
4-Chloroaniline		470	U
4-Chloro-3-methylphenol		470	U
2-Chloronaphthalene		470	U
2-Chlorophenol		470	U
4-Chlorodiphenylether		470	U
Chrysene		290	J
Dibenzo(a,h)anthracene		470	U
Dibenzofuran		470	U
Di-n-butyl phthalate		470	U
1,2-Dichlorobenzene		470	U
1,3-Dichlorobenzene		470	U
1,4-Dichlorobenzene		470	U
3,3'-Dichlorobenzidine		940	U
2,4-Dichlorophenol		470	U
Diethyl phthalate		470	U
2,4-Dimethylphenol		470	U
Dimethyl phthalate		470	U
4,6-Dinitro-2-methylphenol		2300	U

E I DUPONT DE NEMOURS

METHOD 8270 - TCL SEMI-VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2436
Lab Sample ID: AS040958
Client Sample ID: SED-1

Matrix: Sediment
Dilution Factor: 1
Sample Date: 08/05/93
Analysis Date: 08/11/93
Extraction Date: 08/09/93

Parameter	Units = UG/KG	Result	Q
2,4-Dinitrophenol		2300	U
2,4-Dinitrotoluene		470	U
2,6-Dinitrotoluene		470	U
Di-n-octyl phthalate		470	U
Fluoranthene		550	
Fluorene		470	U
Hexachlorobenzene		470	U
Hexachlorobutadiene		470	U
Hexachlorocyclopentadiene		470	U
Hexachloroethane		470	U
Indeno(1,2,3-cd)pyrene		130	J
Isophorone		470	U
2-Methylnaphthalene		470	U
2-Methylphenol		470	U
4-Methylphenol		470	U
Naphthalene		30	J
2-Nitroaniline		2300	U
3-Nitroaniline		2300	U
4-Nitroaniline		2300	U
Nitrobenzene		470	U
2-Nitrophenol		470	U
4-Nitrophenol		2300	U
N-nitrosodiphenylamine		470	U
N-Nitroso-Di-n-propylamine		470	U
Pentachlorophenol		2300	U
Phenanthrene		300	J
Phenol		470	U
Pyrene		510	
1,2,4-Trichlorobenzene		470	U
2,4,5-Trichlorophenol		2300	U
2,4,6-Trichlorophenol		470	U

E I DUPONT DE NEMOURS

METHOD 8080 - TCL PESTICIDES/PCBS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Sediment
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AS040958	Sample Date:	08/05/93
Client Sample ID:	SED-1	Analysis Date:	08/12/93
		Extraction Date:	/ /
		% Dry Weight:	70.20

Parameter	Units = UG/KG	Result	Q
Aldrin		5.7	U
alpha-BHC		5.7	U
beta-BHC		2.4	J
gamma-BHC (Lindane)		5.7	U
delta-BHC		5.7	U
Chlordane		57	U
4,4'-DDD		12	U
4,4'-DDE		12	U
4,4'-DDT		12	U
Dieldrin		12	U
Endosulfan I		12	U
Endosulfan II		12	U
Endosulfan Sulfate		12	U
Endrin		1.2	J
Endrin ketone		12	U
Heptachlor		5.7	U
Heptachlor epoxide		2.2	J
Methoxychlor		57	U
Toxaphene		114	U
Aroclor 1016		57	U
Aroclor 1221		114	U
Aroclor 1232		57	U
Aroclor 1242		57	U
Aroclor 1248		57	U
Aroclor 1254		57	U
Aroclor 1260		57	U

E I DUPONT DE NEMOURS

Total Metals Analysis

oratory: Recra Environmental, Inc. - RECNY
o Job No: A93-2436
o Sample ID: AS040958
ient Sample ID: SED-1

Matrix: Sediment
Sample Date: 08/05/93

Dilution Factor: 1

Parameter	Units = MG/KG	Method	Digestion Date	Analysis Date	Result	Q
luminum - Total		6010	08/09/93	08/11/93	10900	
ntimony - Total		7041	08/09/93	08/11/93	0.63	U
rsenic - Total		7060	08/09/93	08/11/93	7.7	
arium - Total		6010	08/09/93	08/11/93	106	
eryllium - Total		6010	08/09/93	08/11/93	1.2	
admium - Total		7130	08/09/93	08/10/93	5.8	
alcium - Total		6010	08/09/93	08/11/93	154000	
hromium - Total		7190	08/09/93	08/10/93	20.0	
obalt - Total		6010	08/09/93	08/11/93	2.8	
opper - Total		7210	08/09/93	08/10/93	24.0	
ron - Total		6010	08/09/93	08/11/93	8880	
ead - Total		7420	08/09/93	08/10/93	95.0	
agnesium - Total		6010	08/09/93	08/11/93	18800	
anganese - Total		6010	08/09/93	08/11/93	1530	
ercury - Total		7471	08/09/93	08/09/93	1.5	
ickel - Total		6010	08/09/93	08/11/93	23.0	
otassium - Total		6010	08/09/93	08/11/93	653	
elenium - Total		7740	08/09/93	08/11/93	0.38	
ilver - Total		7761	08/09/93	08/12/93	0.066	
odium - Total		6010	08/09/93	08/11/93	807	
hallium - Total		7841	08/09/93	08/11/93	0.50	U
anadium - Total		6010	08/09/93	08/11/93	11.0	
inc - Total		7950	08/09/93	08/10/93	177	

E I DUPONT DE NEMOURS

Wet Chemistry Analysis

boratory: Recra Environmental, Inc.- RECNY
b Job No: A93-2436
b Sample ID: AS040958
ient Sample ID: SED-1

Matrix: Sediment
Sample Date: 08/05/93

Dilution Factor: 1

Parameter	Units of Measure	Method	Analysis Date	Result	Q
Cyanide - Total	UG/G	9010	08/10/93	1.0	U
Dry Weight	%	D2216-19	08/10/93	75.2	

SECTION F-3
ANALYTICAL RESULTS FOR METHOD BLANK SAMPLES

E I DUPONT DE NEMOURS

METHOD 8240 - VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AR010107	Sample Date:	-
Client Sample ID:	METHOD BLANK	Analysis Date:	08/05/93

Parameter	Units = UG/L	Result	Q
Acetone		10	U
Benzene		5	U
Bromodichloromethane		5	U
Bromoform		5	U
Bromomethane		10	U
2-Butanone		10	U
Carbon Disulfide		5	U
Carbon Tetrachloride		5	U
Chlorobenzene		5	U
Chloroethane		10	U
Chloroform		5	U
Chloromethane		10	U
Dibromochloromethane		5	U
1,1-Dichloroethane		5	U
1,2-Dichloroethane		5	U
1,1-Dichloroethene		5	U
1,2-Dichloroethene (Total)		5	U
1,2-Dichloropropane		5	U
cis-1,3-Dichloropropene		5	U
trans-1,3-Dichloropropene		5	U
Ethyl benzene		5	U
2-Hexanone		10	U
Methylene chloride		5	U
4-Methyl-2-pentanone		10	U
Styrene		5	U
1,1,2,2-Tetrachloroethane		5	U
Tetrachloroethene		5	U
Toluene		5	U
1,1,1-Trichloroethane		5	U
1,1,2-Trichloroethane		5	U
Trichloroethene		5	U
Vinyl acetate		10	U
Vinyl chloride		10	U
Total Xylenes		5	U

E I DUPONT DE NEMOURS

METHOD 8240 - VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AR010107	Sample Date:	-
Client Sample ID:	METHOD BLANK	Analysis Date:	08/05/93

Parameter	Units = UG/L	Result	Q
Methyl methacrylate		10	U

E I DUPONT DE NEMOURS

METHOD 8270 - TCL SEMI-VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AR010107	Sample Date:	-
Client Sample ID:	METHOD BLANK	Analysis Date:	08/10/93
		Extraction Date:	08/09/93

Parameter	Units = UG/L	Result	Q
Acenaphthene		10	U
Acenaphthylene		10	U
Anthracene		10	U
Benzo(a)anthracene		10	U
Benzo(b)fluoranthene		10	U
Benzo(k)fluoranthene		10	U
Benzo(ghi)perylene		10	U
Benzo(a)pyrene		10	U
Benzoic acid		50	U
Benzyl alcohol		10	U
Bis(2-chloroethoxy) methane		10	U
Bis(2-chloroethyl) ether		10	U
Bis(2-chloroisopropyl) ether		10	U
Bis(2-ethylhexyl) phthalate		10	U
4-Bromophenyl phenyl ether		10	U
Butyl benzyl phthalate		10	U
4-Chloroaniline		10	U
4-Chloro-3-methylphenol		10	U
2-Chloronaphthalene		10	U
2-Chlorophenol		10	U
4-Chlorodiphenylether		10	U
Chrysene		10	U
Dibenzo(a,h)anthracene		10	U
Dibenzofuran		10	U
Di-n-butyl phthalate		10	U
1,2-Dichlorobenzene		10	U
1,3-Dichlorobenzene		10	U
1,4-Dichlorobenzene		10	U
3,3'-Dichlorobenzidine		20	U
2,4-Dichlorophenol		10	U
Diethyl phthalate		10	U
2,4-Dimethylphenol		10	U
Dimethyl phthalate		10	U
4,6-Dinitro-2-methylphenol		50	U

E I DUPONT DE NEMOURS

METHOD 8270 - TCL SEMI-VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AR010107	Sample Date:	-
Client Sample ID:	METHOD BLANK	Analysis Date:	08/10/93
		Extraction Date:	08/09/93

Parameter	Units = UG/L	Result	Q
2,4-Dinitrophenol		50	U
2,4-Dinitrotoluene		10	U
2,6-Dinitrotoluene		10	U
Di-n-octyl phthalate		10	U
Fluoranthene		10	U
Fluorene		10	U
Hexachlorobenzene		10	U
Hexachlorobutadiene		10	U
Hexachlorocyclopentadiene		10	U
Hexachloroethane		10	U
Indeno(1,2,3-cd)pyrene		10	U
Isophorone		10	U
2-Methylnaphthalene		10	U
2-Methylphenol		10	U
4-Methylphenol		10	U
Naphthalene		10	U
2-Nitroaniline		50	U
3-Nitroaniline		50	U
4-Nitroaniline		50	U
Nitrobenzene		10	U
2-Nitrophenol		10	U
4-Nitrophenol		50	U
N-nitrosodiphenylamine		10	U
N-Nitroso-Di-n-propylamine		10	U
Pentachlorophenol		50	U
Phenanthrene		10	U
Phenol		10	U
Pyrene		10	U
1,2,4-Trichlorobenzene		10	U
2,4,5-Trichlorophenol		50	U
2,4,6-Trichlorophenol		10	U

E I DUPONT DE NEMOURS

METHOD 8080 - TCL PESTICIDES/PCBS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AR010107	Sample Date:	-
Client Sample ID:	METHOD BLANK	Analysis Date:	08/11/93
		Extraction Date:	08/09/93

Parameter	Units = UG/L	Result	Q
Aldrin		0.050	U
alpha-BHC		0.050	U
beta-BHC		0.050	U
gamma-BHC (Lindane)		0.050	U
delta-BHC		0.050	U
Chlordane		0.50	U
4,4'-DDD		0.10	U
4,4'-DDE		0.10	U
4,4'-DDT		0.10	U
Dieldrin		0.10	U
Endosulfan I		0.10	U
Endosulfan II		0.10	U
Endosulfan Sulfate		0.10	U
Endrin		0.10	U
Endrin ketone		0.10	U
Heptachlor		0.050	U
Heptachlor epoxide		0.050	U
Methoxychlor		0.50	U
Toxaphene		1.0	U
Aroclor 1016		0.50	U
Aroclor 1221		1.0	U
Aroclor 1232		0.50	U
Aroclor 1242		0.50	U
Aroclor 1248		0.50	U
Aroclor 1254		0.50	U
Aroclor 1260		0.50	U

E I DUPONT DE NEMOURS

Total Metals Analysis

aboratory: Recra Environmental, Inc. - RECNY
ab Job No: A93-2436
ab Sample ID: AR010107
.ient Sample ID: METHOD BLANK

Matrix: Aqueous
Sample Date: -

Dilution Factor: 1

Parameter	Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Aluminum - Total		200.7	08/06/93	08/07/93	0.070	U
Antimony - Total		204.2	08/06/93	08/08/93	0.0050	U
Arsenic - Total		206.2	08/06/93	08/07/93	0.0050	U
Barium - Total		200.7	08/06/93	08/07/93	0.020	U
Beryllium - Total		200.7	08/06/33	08/07/93	0.0030	U
Cadmium - Total		200.7	08/06/93	08/07/93	0.016	U
Calcium - Total		200.7	08/06/93	08/07/93	1.0	U
Chromium - Total		200.7	08/06/93	08/07/93	0.010	U
Cobalt - Total		200.7	08/06/93	08/07/93	0.020	U
Copper - Total		200.7	08/06/93	08/07/93	0.0050	U
Iron - Total		200.7	08/06/93	08/07/93	0.077	
Lead - Total		239.2	08/06/93	08/07/93	0.0020	U
Magnesium - Total		200.7	08/06/93	08/07/93	0.30	U
Manganese - Total		200.7	08/06/93	08/07/93	0.0050	U
Mercury - Total		245.1	08/06/93	08/10/93	0.00020	U
Nickel - Total		200.7	08/06/93	08/07/93	0.030	U
Potassium - Total		200.7	08/06/93	08/07/93	0.20	U
Selenium - Total		270.2	08/06/93	08/07/93	0.0030	U
Silver - Total		272.2	08/06/93	08/08/93	0.010	U
Sodium - Total		200.7	08/06/93	08/07/93	0.80	U
Thallium - Total		279.2	08/06/93	08/07/93	0.0040	U
Vanadium - Total		200.7	08/06/93	08/07/93	0.020	U
Zinc - Total		200.7	08/06/93	08/07/93	0.010	U

E I DUPONT DE NEMOURS

Wet Chemistry Analysis

boratory: Recra Environmental, Inc.- RECNY
b Job No: A93-2436
b Sample ID: AR010107
ient Sample ID: METHOD BLANK

Matrix: Aqueous
Sample Date: -

Dilution Factor: 1

Parameter	Units of Measure	Method	Analysis Date	Result	Q
Biochemical Oxygen Demand	MG/L	405.1	08/10/93	2.0	U
Chemical Oxygen Demand	MG/L	410.1	08/06/93	5.0	U
Cyanide - Total	MG/L	335.2	08/11/93	0.010	U
Nitrate	MG/L	353.2	08/10/93	0.050	U
Nitrite	MG/L	353.2	08/10/93	0.050	U
Non-Filterable Residue (103°C)	MG/L	160.2	08/09/93	4.0	U
Total Kjeldahl Nitrogen	MG/L	351.3	08/09/93	0.10	U
Total Phosphorous	MG P/L	365.2	08/12/93	0.020	U
Total Recoverable Oil & Grease	MG/L	413.1	08/09/93	5.0	U

E I DUPONT DE NEMOURS

METHOD 8240 - VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AR010108	Sample Date:	-
Client Sample ID:	METHOD BLANK	Analysis Date:	08/05/93

Parameter	Units = UG/KG	Result	Q
Acetone		10	U
Benzene		5	U
Bromodichloromethane		5	U
Bromoform		5	U
Bromomethane		10	U
2-Butanone		10	U
Carbon Disulfide		5	U
Carbon Tetrachloride		5	U
Chlorobenzene		1	J
Chloroethane		10	U
Chloroform		5	U
Chloromethane		10	U
Dibromochloromethane		5	U
1,1-Dichloroethane		5	U
1,2-Dichloroethane		5	U
1,1-Dichloroethene		5	U
1,2-Dichloroethene (Total)		5	U
1,2-Dichloropropane		5	U
cis-1,3-Dichloropropene		5	U
trans-1,3-Dichloropropene		5	U
Ethyl benzene		5	U
2-Hexanone		10	U
Methylene chloride		5	U
4-Methyl-2-pentanone		10	U
Styrene		5	U
1,1,2,2-Tetrachloroethane		5	U
Tetrachloroethene		5	U
Toluene		1	J
1,1,1-Trichloroethane		5	U
1,1,2-Trichloroethane		5	U
Trichloroethene		5	U
Vinyl acetate		10	U
Vinyl chloride		10	U
Total Xylenes		5	U

E I DUPONT DE NEMOURS

METHOD 8240 - VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AR010108	Sample Date:	-
Client Sample ID:	METHOD BLANK	Analysis Date:	08/05/93

Parameter	Units = UG/KG	Result	Q
Methyl methacrylate		10	U

E I DUPONT DE NEMOURS

METHOD 8270 - TCL SEMI-VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AR010108	Sample Date:	-
Client Sample ID:	METHOD BLANK	Analysis Date:	08/10/93
		Extraction Date:	08/09/93

Parameter	Units = UG/KG	Result	Q
Acenaphthene		330	U
Acenaphthylene		330	U
Anthracene		330	U
Benzo(a)anthracene		330	U
Benzo(b)fluoranthene		330	U
Benzo(k)fluoranthene		330	U
Benzo(ghi)perylene		330	U
Benzo(a)pyrene		330	U
Benzoic acid		1600	U
Benzyl alcohol		330	U
Bis(2-chloroethoxy) methane		330	U
Bis(2-chloroethyl) ether		330	U
Bis(2-chloroisopropyl) ether		330	U
Bis(2-ethylhexyl) phthalate		330	U
4-Bromophenyl phenyl ether		330	U
Butyl benzyl phthalate		330	U
4-Chloroaniline		330	U
4-Chloro-3-methylphenol		330	U
2-Chloronaphthalene		330	U
2-Chlorophenol		330	U
4-Chlorodiphenylether		330	U
Chrysene		330	U
Dibenzo(a,h)anthracene		330	U
Dibenzofuran		330	U
Di-n-butyl phthalate		330	U
1,2-Dichlorobenzene		330	U
1,3-Dichlorobenzene		330	U
1,4-Dichlorobenzene		330	U
3,3'-Dichlorobenzidine		660	U
2,4-Dichlorophenol		330	U
Diethyl phthalate		330	U
2,4-Dimethylphenol		330	U
Dimethyl phthalate		330	U
4,6-Dinitro-2-methylphenol		1600	U

E I DUPONT DE NEMOURS

METHOD 8270 - TCL SEMI-VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2436
Lab Sample ID: AR010108
Client Sample ID: METHOD BLANK

Matrix: Soil
Dilution Factor: 1
Sample Date: -
Analysis Date: 08/10/93
Extraction Date: 08/09/93

Parameter	Units = UG/KG	Result	Q
2,4-Dinitrophenol		1600	U
2,4-Dinitrotoluene		330	U
2,6-Dinitrotoluene		330	U
Di-n-octyl phthalate		330	U
Fluoranthene		330	U
Fluorene		330	U
Hexachlorobenzene		330	U
Hexachlorobutadiene		330	U
Hexachlorocyclopentadiene		330	U
Hexachloroethane		330	U
Indeno(1,2,3-cd)pyrene		330	U
Isophorone		330	U
2-Methylnaphthalene		330	U
2-Methylphenol		330	U
4-Methylphenol		330	U
Naphthalene		330	U
2-Nitroaniline		1600	U
3-Nitroaniline		1600	U
4-Nitroaniline		1600	U
Nitrobenzene		330	U
2-Nitrophenol		330	U
4-Nitrophenol		1600	U
N-nitrosodiphenylamine		330	U
N-Nitroso-Di-n-propylamine		330	U
Pentachlorophenol		1600	U
Phenanthrene		330	U
Phenol		330	U
Pyrene		330	U
1,2,4-Trichlorobenzene		330	U
2,4,5-Trichlorophenol		1600	U
2,4,6-Trichlorophenol		330	U

E I DUPONT DE NEMOURS

METHOD 8080 - TCL PESTICIDES/PCBS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2436	Dilution Factor:	1
Lab Sample ID:	AR010108	Sample Date:	-
Client Sample ID:	METHOD BLANK	Analysis Date:	08/10/93
		Extraction Date:	/ /

Parameter	Units = UG/KG	Result	Q
Aldrin		4.0	U
alpha-BHC		4.0	U
beta-BHC		4.0	U
gamma-BHC (Lindane)		4.0	U
delta-BHC		4.0	U
Chlordane		40	U
4,4'-DDD		8.0	U
4,4'-DDE		8.0	U
4,4'-DDT		8.0	U
Dieldrin		8.0	U
Endosulfan I		8.0	U
Endosulfan II		8.0	U
Endosulfan Sulfate		8.0	U
Endrin		8.0	U
Endrin ketone		8.0	U
Heptachlor		4.0	U
Heptachlor epoxide		4.0	U
Methoxychlor		40	U
Toxaphene		80	U
Aroclor 1016		40	U
Aroclor 1221		80	U
Aroclor 1232		40	U
Aroclor 1242		40	U
Aroclor 1248		40	U
Aroclor 1254		40	U
Aroclor 1260		40	U

E I DUPONT DE NEMOURS

Total Metals Analysis

aboratory: Recra Environmental, Inc. - RECNY
ab Job No: A93-2436
ab Sample ID: AR010108
lient Sample ID: METHOD BLANK

Matrix: Soil
Sample Date: -

Dilution Factor: 1

Parameter	Units = MG/KG	Method	Digestion Date	Analysis Date	Result	Q
luminum - Total		6010	08/09/93	08/11/93	7.0	U
ntimony - Total		7041	08/09/93	08/11/93	0.50	U
rsenic - Total		7060	08/09/93	08/11/93	0.40	U
arium - Total		6010	08/09/93	08/11/93	2.0	U
eryllium - Total		6010	08/09/93	08/11/93	0.30	U
admium - Total		7130	08/09/93	08/11/93	1.0	U
alcium - Total		6010	08/09/93	08/11/93	100	U
hromium - Total		7190	08/09/93	08/10/93	1.0	U
obalt - Total		6010	08/09/93	08/11/93	2.0	U
opper - Total		7210	08/09/93	08/10/93	1.0	U
ron - Total		6010	08/09/93	08/11/93	4.0	U
ead - Total		7420	08/09/93	08/10/93	6.0	U
agnesium - Total		6010	08/09/93	08/11/93	30.0	U
anganese - Total		6010	08/09/93	08/11/93	0.50	U
ercury - Total		7471	08/09/93	08/09/93	0.020	U
ickel - Total		6010	08/09/93	08/11/93	2.0	U
otassium - Total		6010	08/09/93	08/11/93	200	U
elenium - Total		7740	08/09/93	08/11/93	0.030	U
ilver - Total		7760	08/09/93	08/12/93	0.020	U
odium - Total		6010	08/09/93	08/11/93	80.0	U
hallium - Total		7841	08/09/93	08/11/93	0.40	U
anadium - Total		6010	08/09/93	08/11/93	2.0	U
inc - Total		7950	08/09/93	08/10/93	2.0	U

E I DUPONT DE NEMOURS

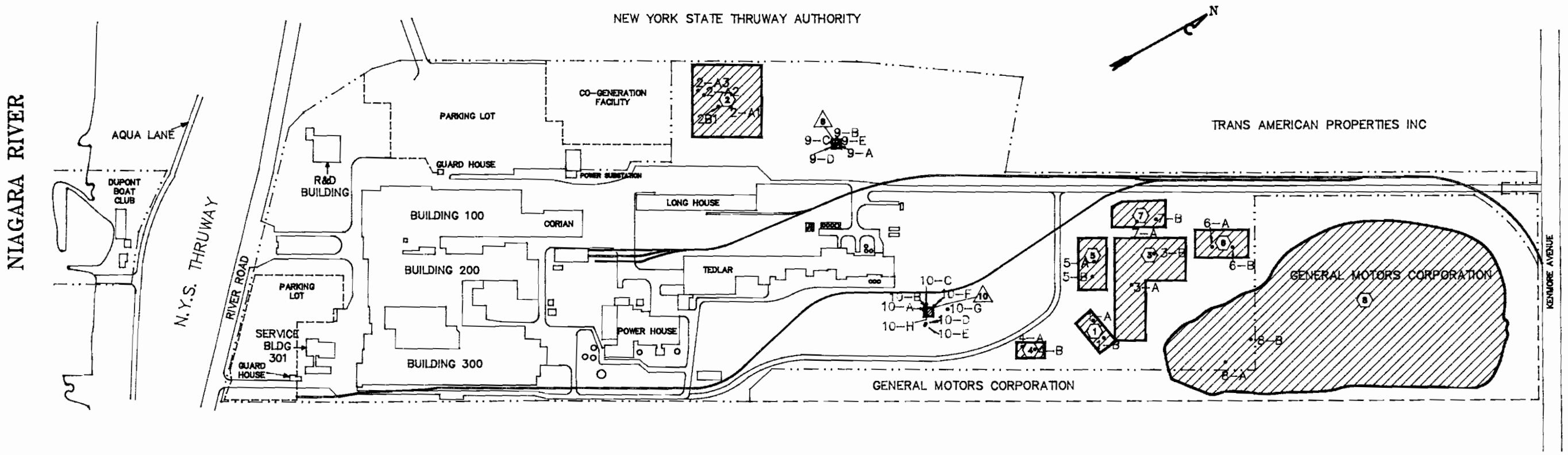
Wet Chemistry Analysis

boratory: Recra Environmental, Inc.- RECNY
b Job No: A93-2436
b Sample ID: AR010108
ient Sample ID: METHOD BLANK

Matrix: Soil
Sample Date: -

Dilution Factor: 1
% Dry Weight: 75.20

Parameter	Units of Measure	Method	Analysis Date	Result	Q
Cyanide - Total	UG/G	9010	08/10/93	1.0	U



UNIT	WASTE CLASSIFICATION	APPROXIMATE LENGTH	APPROXIMATE WIDTH	APPROXIMATE DEPTH	DATE EXCAVATED
1	GENERAL WASTE	150'	80'	12'	1960
2	TEDLAR WASTE	250'	250'	20'	1962
3	GENERAL WASTE	380/160'	110/265'	30'	1963
4	GENERAL WASTE	125'	65'	15'	3/74
5	GENERAL WASTE	200'	100'	15'	10/74
6	GENERAL WASTE	200'	100'	15'	10/75
7	GENERAL WASTE	200'	100'	15'	10/76
8	GENERAL WASTE	ORIGINALLY A TOPOGRAPHIC LOW – NO EXCAVATION FILLED 4' TO 5' AND COVERED			
9	R&D WASTE	25'	25'	10'	1956
10	R&D WASTE	25'	25'	10'	1957

LEGEND

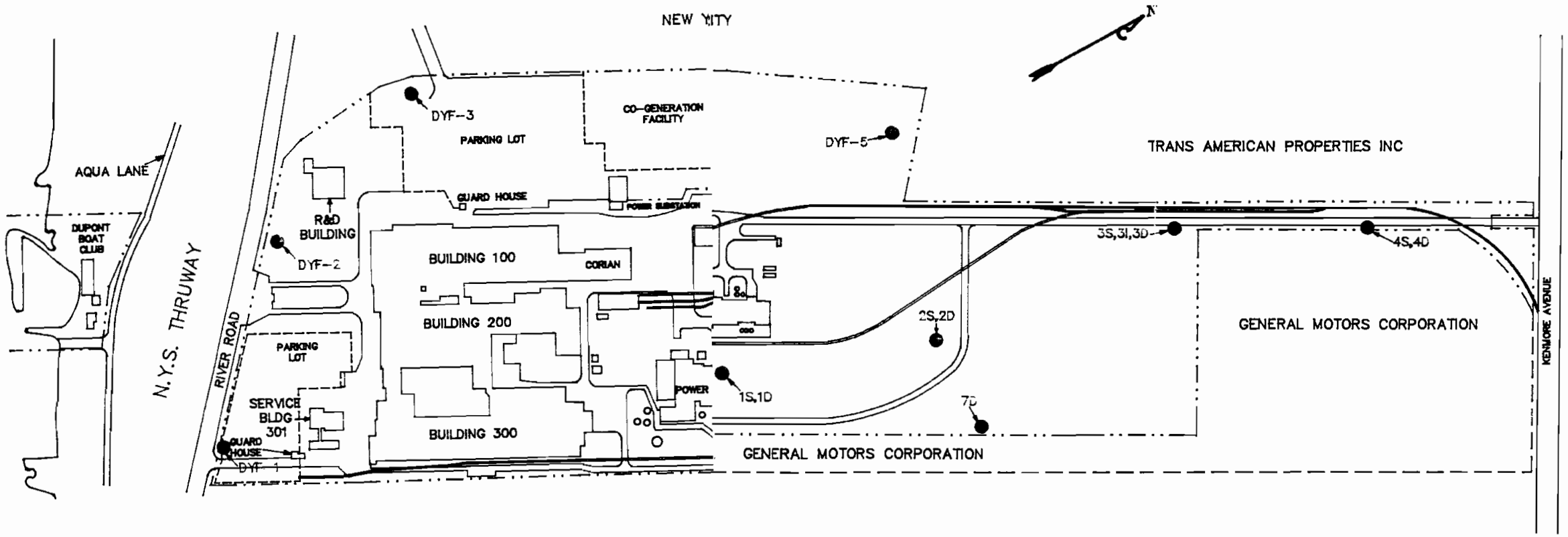
- PROPERTY BOUNDARY/FENCE LINE
- OLD PROPERTY BOUNDARY
- FENCE LINE
- 4 — PHASE II MONITORING WELL LOCATION
- 4-A — SOIL BORING PREVIOUS MONITORING WELL LOCATION

E.I. du Pont de Nemours and Company Inc.
Yerkes Facility: Tonawanda, New York
Phase II Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

LOCATION OF LANDFILL AREAS AND SOIL BORINGS

Job No.: 90C2331-1	Drawing No.	Date: 7-07-93
Checked by: KRM	Rev. No.:	
Scale: 0' 200' 400' 600'		Figure 1-2



LEGEND

—·—·— PROPERTY BOUNDARY/FENCE LINE

— — — — OLD PROPERTY BOUNDARY

---------- FENCE LINE

DYF-3 PHASE II MONITORING WELL LOCATION

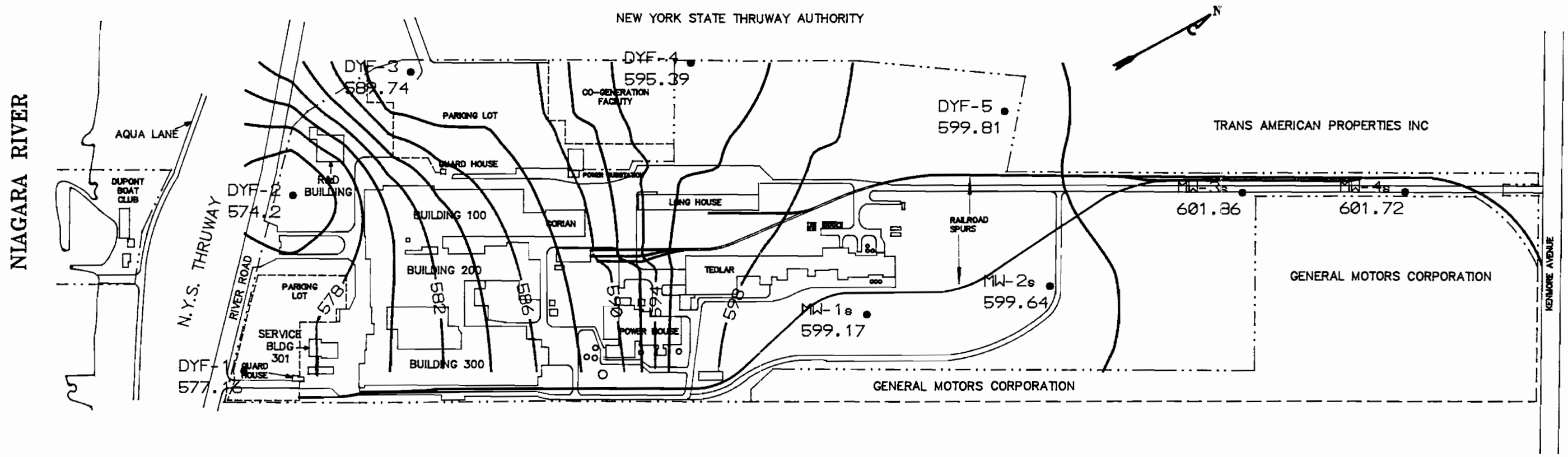
1S,1D PREVIOUS MONITORING WELL LOCATION

E.I. du Pont de Nemours and Company Inc.
Yerkes Facility: Tonawanda, New York
Phase II Investigation

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

MONITORING WELL LOCATION PLAN

Job No.: 60C2331-1	Drawing No.	Date: 7-07-93
Checked by: KRM	Rev. No.:	Figure 2-1
Scale: 0' 200' 400' 600'		



LEGEND

—·—·— PROPERTY BOUNDARY/FENCE LINE

— — — — OLD PROPERTY BOUNDARY

---------- FENCE LINE

E.I. du Pont de Nemours and Company Inc.
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Phase II Investigation

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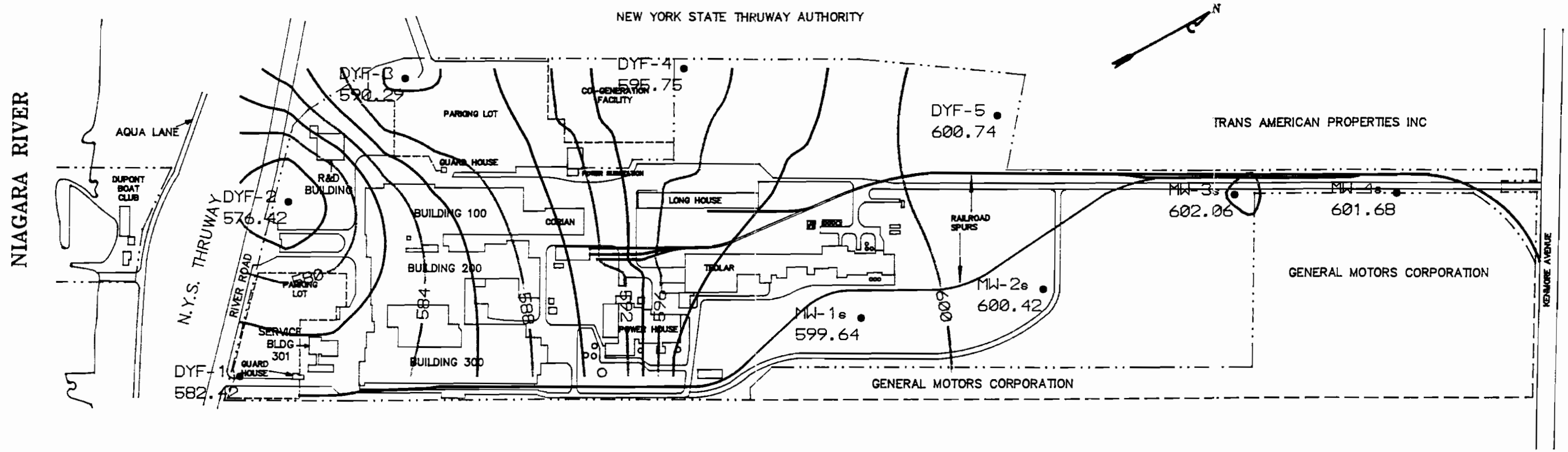
POTENTIOMETRIC SURFACE CONTOUR MAP
OVERBURDEN ZONE
SEPTEMBER 1992

Job No.: 90C2331-1	Drawing No.	Date: 5-7-93
Checked by: KRM	Rev. No.:	
Scale: 0' 200' 400' 600'		Figure 3-1



LEGEND

—·—·— PROPERTY BOUNDARY/FENCE LINE

— — — — OLD PROPERTY BOUNDARY

---------- FENCE LINE

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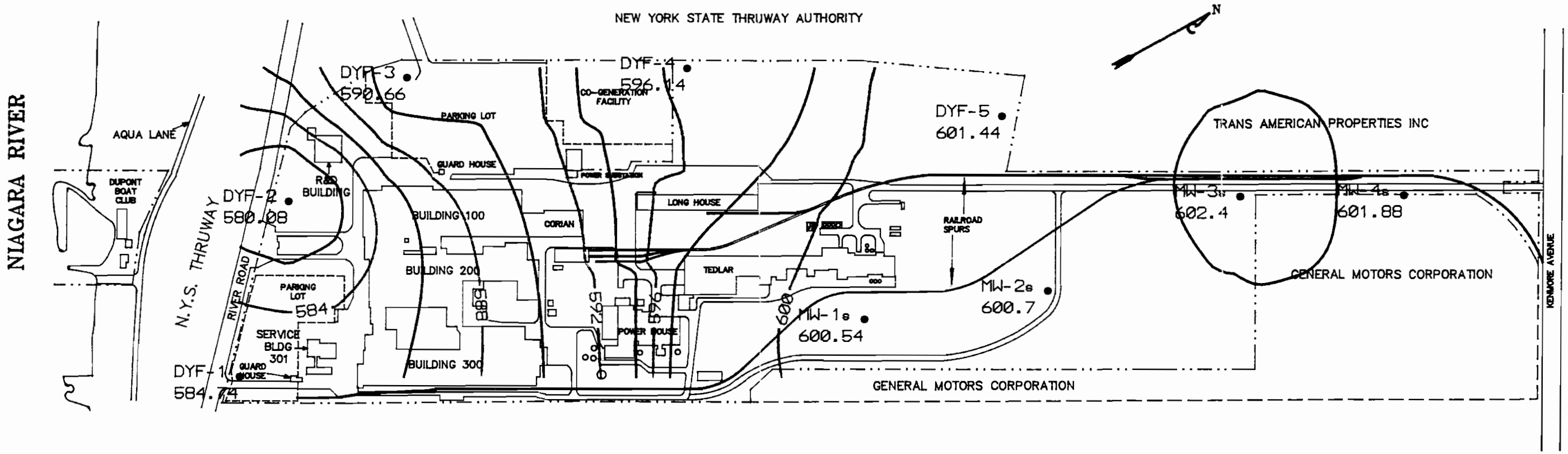
POTENTIOMETRIC SURFACE CONTOUR MAP
OVERBURDEN ZONE
DECEMBER 1992

Job No.: 90C2331-1	Drawing No.	Date: 5-7-93
Checked by: KRM	Rev. No.:	
Scale: 0' 200' 400' 600'		Figure 3-2



LEGEND

—·—·— PROPERTY BOUNDARY/FENCE LINE

— — — — OLD PROPERTY BOUNDARY

---------- FENCE LINE

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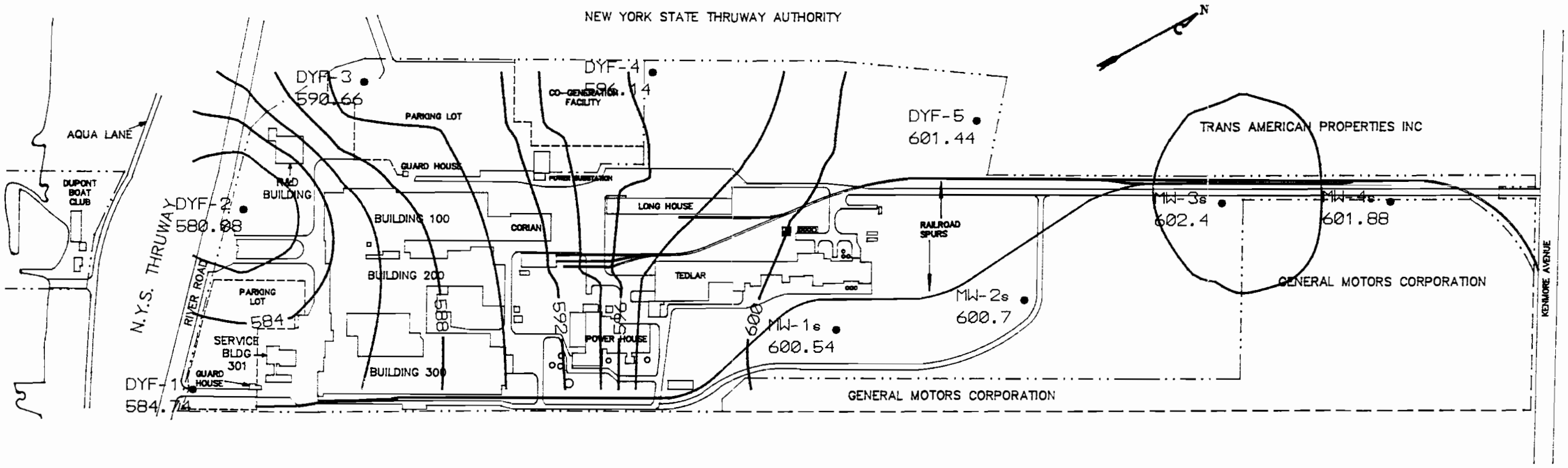
POTENTIOMETRIC SURFACE CONTOUR MAP
OVERBURDEN ZONE
MARCH 1993

Job No.: 91C2331-1	Drawing No.	Date: 5-7-93
Checked by: KRM	Rev. No.:	Figure 3-3
Scale: 0' 200' 400' 600'		



LEGEND

—·—·— PROPERTY BOUNDARY/FENCE LINE

— — — — OLD PROPERTY BOUNDARY

---------- FENCE LINE

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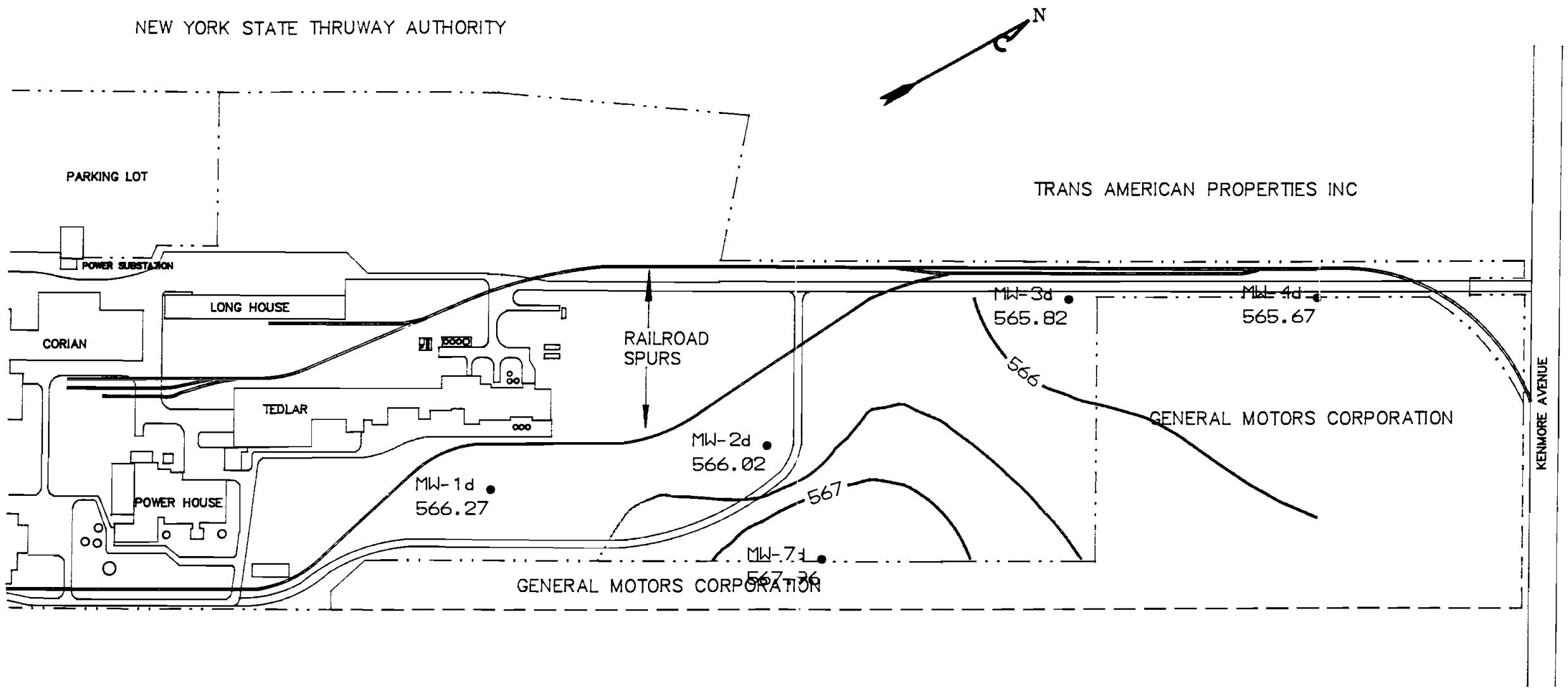
POTENTIOMETRIC SURFACE CONTOUR MAP
OVERBURDEN ZONE
JUNE 1993

Job No.: 90C2331-1	Drawing No.	Date: 6-22-93
Checked by: KRM	Rev. No.:	
Scale: 0' 200' 400' 600'		Figure 3-4



LEGEND

PROPERTY BOUNDARY/FENCE LINE

OLD PROPERTY BOUNDARY

E.I. du Pont de Nemours and Company Inc.
Yerkes Facility: Tonawanda, New York
Phase II Investigation

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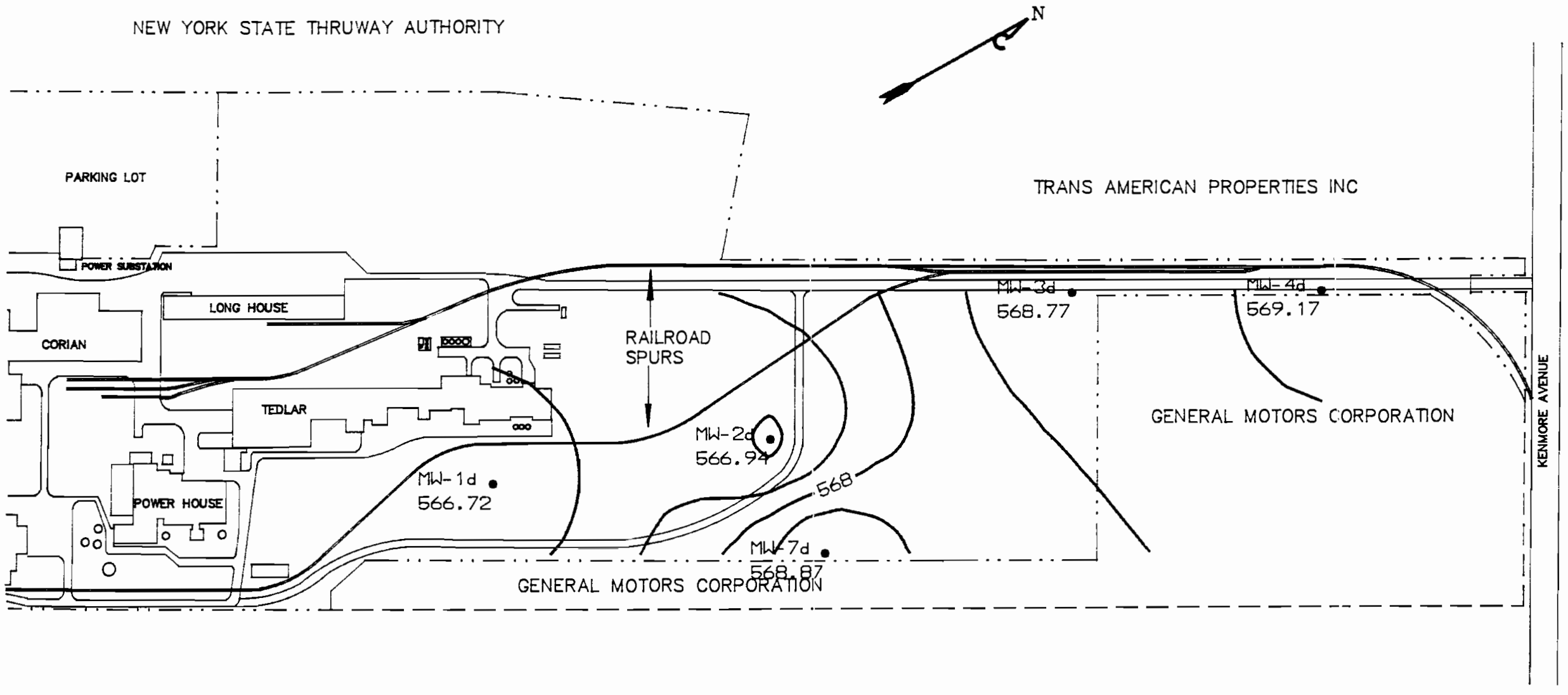
POTENTIOMETRIC SURFACE CONTOUR MAP
BEDROCK ZONE
SEPTEMBER 1992

Job No.:	Drawing No.	Date: 5-10-93
Checked by: KRM	Rev. No.:	
Scale: 1"=300'		Figure 3-5



LEGEND

— · · — · · — PROPERTY BOUNDARY/FENCE LINE

— — — — — OLD PROPERTY BOUNDARY

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Phase II Investigation

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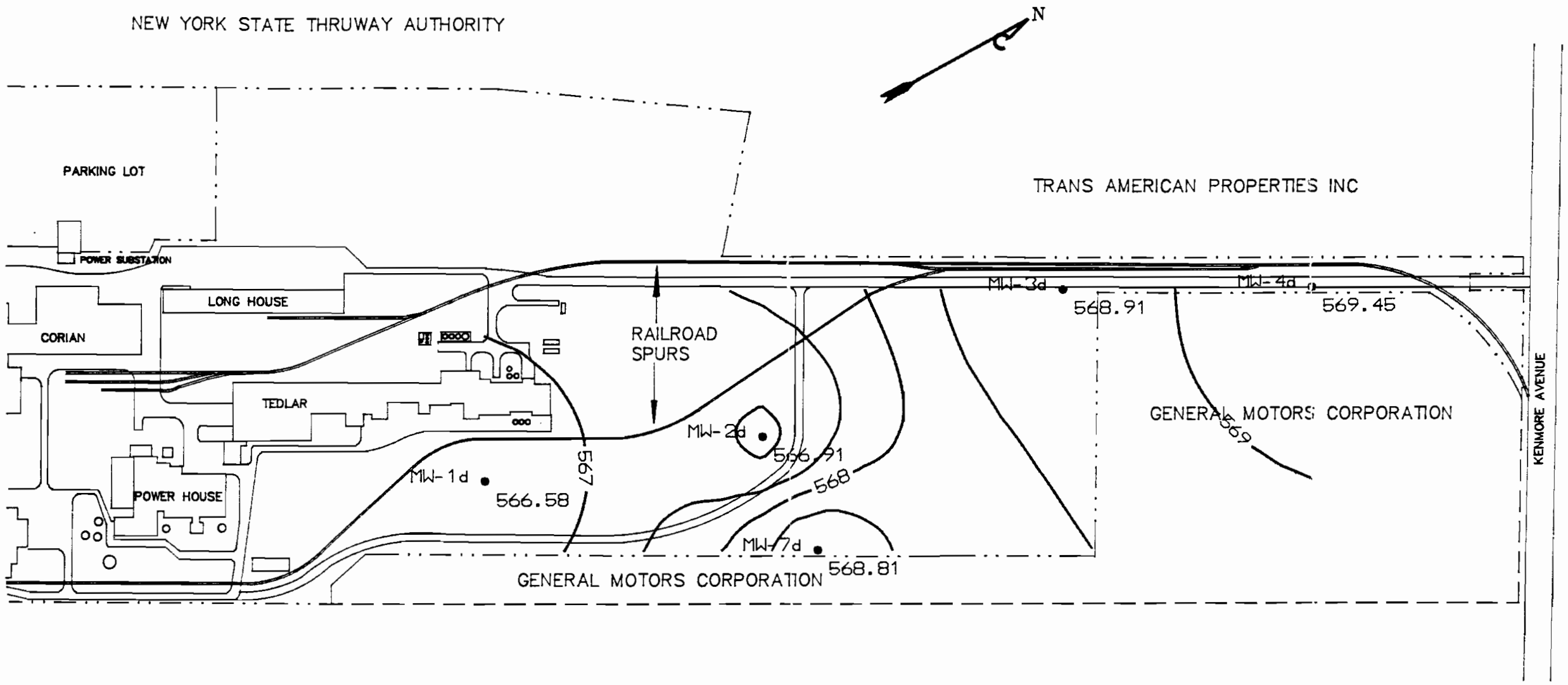
POTENTIOMETRIC SURFACE CONTOUR MAP
BEDROCK ZONE
DECEMBER 1992

Job No.:	Drawing No.	Date: 5-10-93
Checked by: KRM	Rev. No.:	
Scale: 1"=300'		Figure 3-6



LEGEND

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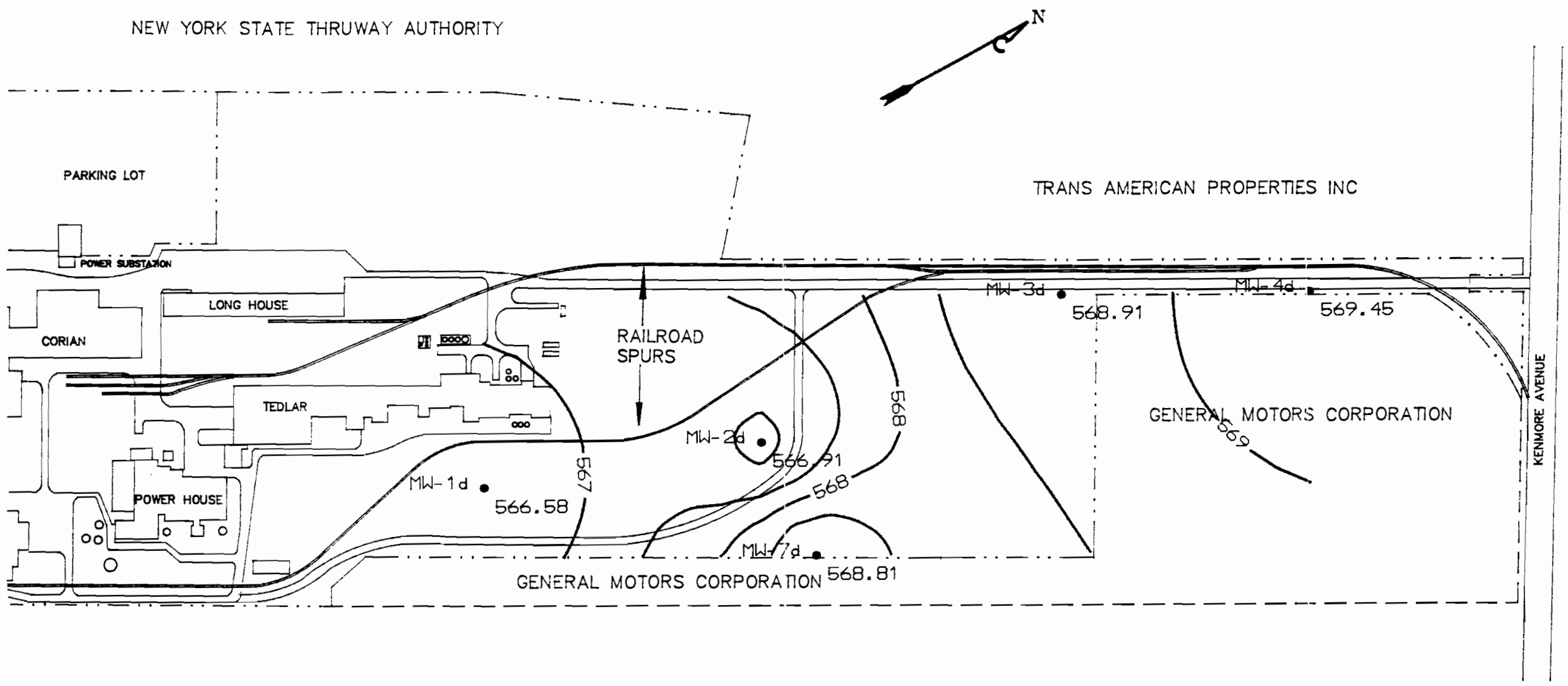
POTENTIOMETRIC SURFACE CONTOUR MAP
BEDROCK ZONE
MARCH 1993

Job No.:	Drawing No.	Date: 5-10-93
Checked by: KRM	Rev. No.:	
Scale: 1"=300'		Figure 3-7



LEGEND

— · · — · · — PROPERTY BOUNDARY/FENCE LINE

— — — — — OLD PROPERTY BOUNDARY

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POTENTIOMETRIC SURFACE CONTOUR MAP
BEDROCK ZONE
JUNE 1993

Job No.:	Drawing No.	Date: 6-22-93
Checked by: KRM	Rev. No.:	
Scale: 1"=300'		

Figure 3-8