Remedial Investigation Report - Final

Volume II of II - Appendices

Peter Cooper Landfill Site
Gowanda, New York

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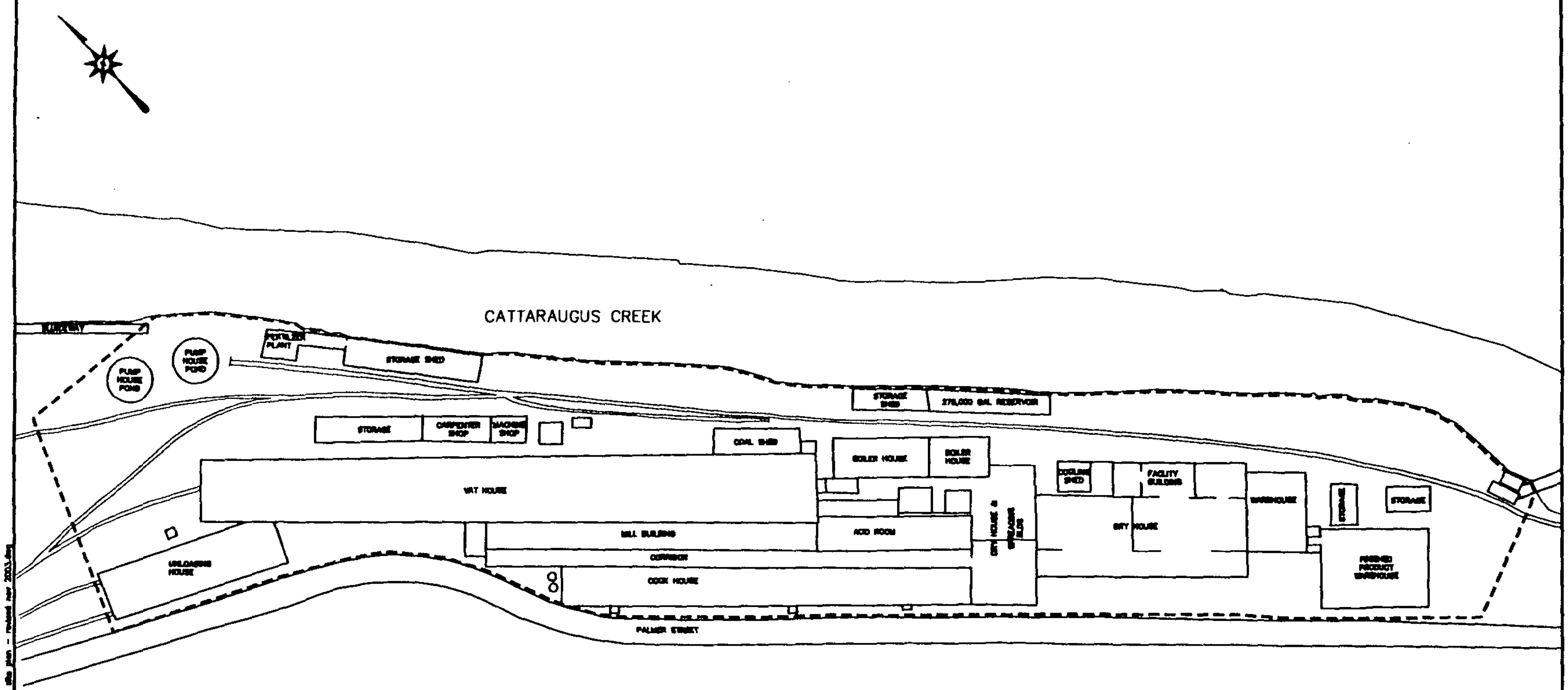
November 2002

APPENDIX A

APPENDIX A
Historic Site Manufacturing Process Features



NOTES:
1. ALL STRUCTURES / BUILDINGS SHOWN ARE HISTORICAL FEATURES THAT NO LONGER EXIST. HISTORIC SITE FEATURES BASED ON 1948 FIRE INSURANCE MAP UNLESS OTHERWISE INDICATED.

2. PUMPHOUSE PONDS APPEAR ON 1924 FIRE INSURANCE MAP. PONDS ARE SHOWN AS CONCRETE TANKS LEVEL WITH GRADE IN 1948.

150' 0' 150' 300'

SCALE: 1 INCH = 150 FEET
SCALE IN FEET
(approximate)

EXPLANATION

- - - - - APPROXIMATE BOUNDARY OF FORMER MANUFACTURING PLANT AREA

═══ FORMER RAILROAD SPUR

301183

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

GEOMATRIX

JOB NO.: 0021-001-400

SITE PLAN
REMEDIAL INVESTIGATION REPORT
PETER COOPER GOWANDA SITE
FORMER MANUFACTURING PLANT AREA
GOWANDA, NEW YORK
PREPARED FOR
COLLIER SHANNON

FIGURE 7

APPENDIX B

APPENDIX B

Historic Analytical Data

APPENDIX B-1

Phase I Results

PETER COOPER CORPORATION

NEW YORK STATE SUPERFUND
PHASE I SUMMARY REPORT

FINAL

Nomvember 28, 1983

Prepared By:

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PETER COOPER CORPORATION

NEW YORK STATE SUPERFUND

PHASE I SUMMARY REPORT

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1.0 EXECUTIVE SUMMARY

The Peter Cooper Corporation Superfund site is composed of two (2) study areas; (1) the Gowanda Plant Facility including the old disposal area and, (2) the Markhams landfill site.

Currently the plant facility is operating a small adhesive division. From 1925 to 1972 the plant mainly manufactured animal glue. The waste sludges resulting from this process were landfilled at the Markhams site which is presently inactive.

Prior to 1971, residual sludges from the glue division were surface piled at the plant facility adjacent to Cattaraugus Creek. This practice was discontinued in compliance with a court order which required the removal of the waste piles from the Gowanda site due to their close proximity to Cattaraugus Creek. Consequently, a portion of the sludge material was moved to the landfill site in Markhams, New York. The remaining material at the Gowanda site was capped and seeded. It has been estimated that 38,600 tons of sludge was moved to the Markhams site.

Leachate seeps were observed at both sites. Seeps located at the Gowanda site were observed entering Cattaraugus Creek.

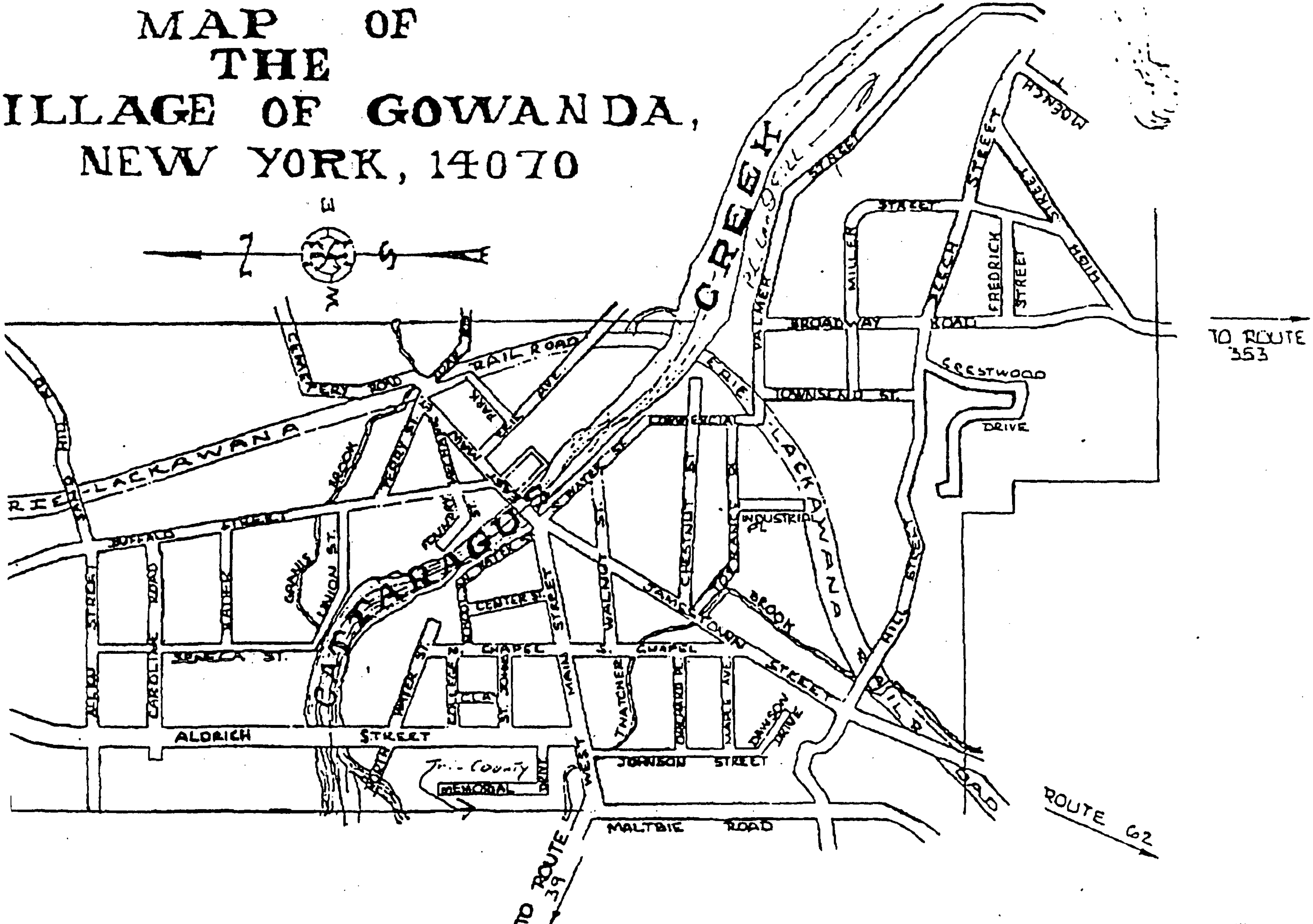
2.0 SITE DESCRIPTION

The Peter Cooper Corporation site is composed of two (2) areas: the plant facility including an old disposal area located on Palmer Street in Gowanda, New York (Figure 1A) and the landfill which is located in the hamlet of Markhams, six (6) miles south of Gowanda (Figure 2A).

The Gowanda plant is situated on approximately fifty (50) acres of land adjacent to Cattaraugus Creek (Figure 1B). Most of the original plant buildings have been razed and the area is presently grass covered, showing little evidence of past activities. In the northwest section, a fifteen (15) to twenty (20) foot rise in topography is attributed to remaining surface piled material which has been capped and seeded. The mound is generally well vegetated with low grasses and scrubs. The eastern perimeter of the surface mound had several leachate seeps and outbreaks. Some of thee seeps were observed discharging into the Cattaraugus Creek. Discoloration of the soil and rocks by leachate was evident. In some cases a whitish-yellow precipitate was noted associated with these leachate areas as was a distinct noxious, organic odor.

The Markhams site encompasses ninety-one (91) acres (Figure 2B). Of this area, fifteen (15) acres were utilized for landfill activities. Five (5) acres are designated as protected wetlands, however, no landfilling has occurred in this area. The surrounding area is rural and sparsely populated. Farms are located to the north and east of the site.

MAP OF THE ILLAGE OF GOWANDA, NEW YORK, 14070



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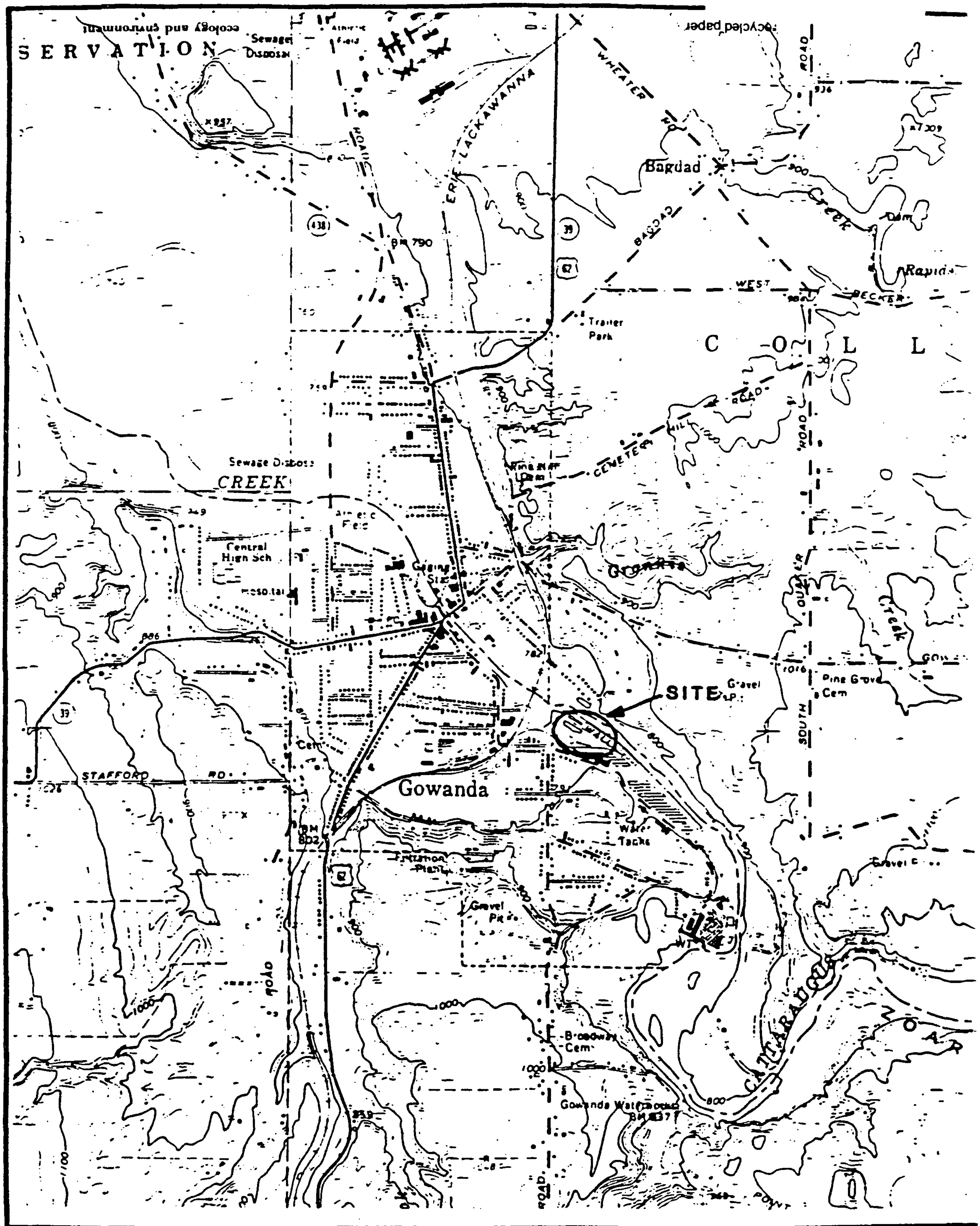
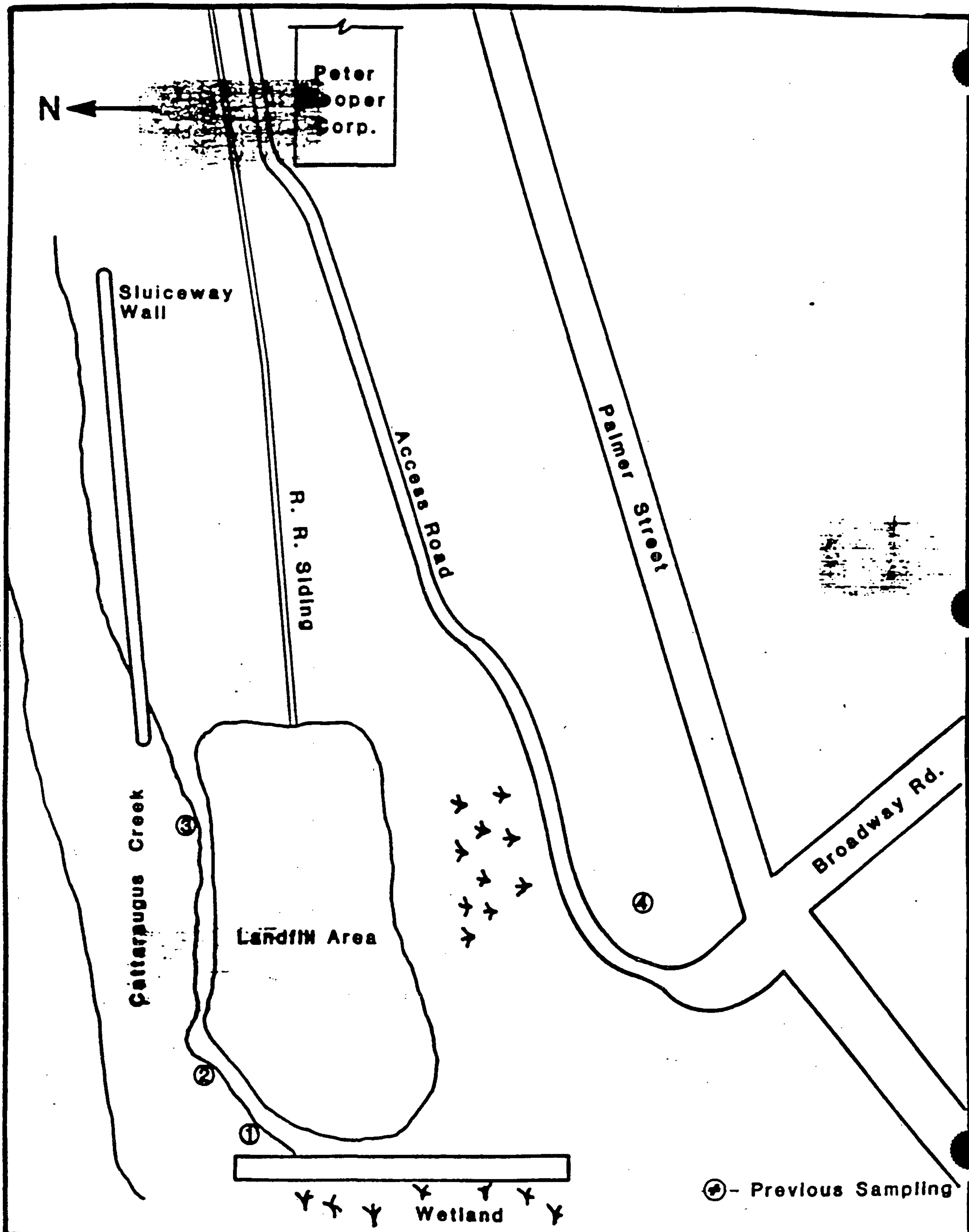
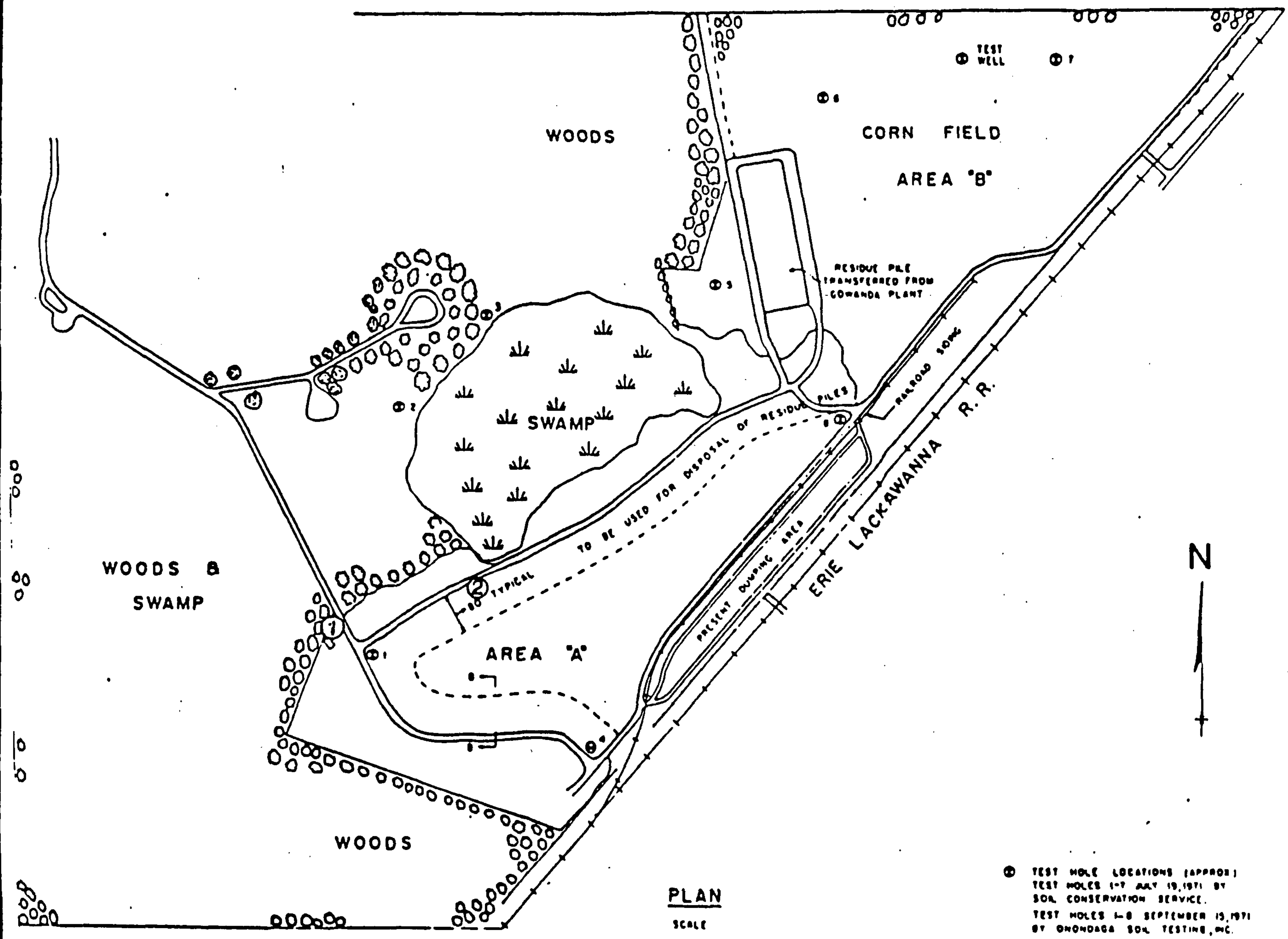


USGS Topographical Map 7.5' Gowanda Quad. 1963	VICINITY MAP GOWANDA PLANT	Figure 1-A



Not To Scale	SITE MAP GOWANDA PLANT FACILITY	Figure 1-B



TEST HOLE LOCATIONS (APPROX)
TEST HOLES 1-7 JULY 19, 1971 BY SOIL CONSERVATION SERVICE.
TEST HOLES 1-8 SEPTEMBER 15, 1971 BY ONONDAGA SOIL TESTING, INC.

NOTE: TAKEN FROM DRAWINGS BY PETER COOPER CORPORATION NO FIELD SURVEY MADE

- Previous Sampling

Scale as Shown

SITE MAP
MARKHAMS SITE

Figure 2-B

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4.0 SITE HISTORY

The Peter Cooper Corporation's animal glue division was operational from 1925 to 1972. During this period of activity, the plant utilized raw materials and tannery wastes which were acquired from a local tannery. The resulting residue sludges were surface piled in the northwest section of the plant adjacent to Cattaraugus Creek. The sludges were classified as spent collagenous protein sludge, Cookhouse sludge (the residue remaining on process equipment) and Vacuum filter sludge from the wastewater treatment plant (Reference 2).

The surface piling of residue sludges adjacent to the Creek was discontinued in 1971 in compliance with a Court order requiring the removal of th material from the creek banks. A portion of this material was moved to Markhams, New York, a ninety-one (91) acre lot, 6 miles south of Gowanda. However, surface piled material which has been capped and seeded still remains on the plant site.

At the Markhams site, approximately fifteen (15) acres were utilized for landfilling operations. The site is situated on thick glacial gravels which extend to great depths and limit the occurrence of natural cover material. Due to the lack of natural cover material the spent collagenous protein sludge was utilized for cover. This material becomes a granular powder as it stabilizes and is supportive of vegetations (Reference 1). Reportedly, farmers in the area have used this material as fertilizer (Reference 5). It has been estimated that 38,600 tons of sludges were disposed of at Markhams along wit an undetermined amount of plant debris collected during maintenance (Reference

1).

On November 30, 1981, soil and surface water samples were collected at the two (2) Peter Cooper sites by the New York State Department of Environmental Conservation. Sampling locations are illustrated in Figures 1B and 2B. Analysis of these samples indicated contamination of heavy metals, particularly t-chromium, in the soil samples from both sites.

5.0 SITE DATA

5.1 Site Area Surface Features

5.1.1 Topography and Drainage - the Gowanda plant site is located on the floodplain of Cattaraugus Creek. Slope of the area is 0% as determined from U.S.G.S. topographic map (Reference 6). Surface water runoff is directed toward Cattaraugus Creek which is a Class C water resource (Reference 13).

The Markhams site is located in the Conewango Creek Basin. Slope of this area is approximately 2% to the south (Reference 6). Surface water runoff appears to be directed toward the wetland area and Slab City Creek southwest of the site. Slab City Creek is a Class C water resource and flows southeast to discharge into Conewango Creek (Reference 13).

5.1.2 Environmental Setting - the Peter Cooper plant is located in an urban/commercial section of Gowanda, New York along Cattaraugus Creek. The creek banks showed signs of public use (e.g., well-beaten foot paths, bottles, cans). Leachate seeps were evident along this section of the creek. No critical habitats of endangered species or wildlife refuges are in the site vicinity.

The Markhams site is in a rural and sparsely populated area. A designated protected wetland (CK, PEI Detter-Markham) is located on the site property. No disposal activities have taken place in this area. There are no critical habitats of endangered species or wildlife refuges in the site vicinity.

5.2 Hydrogeology

5.2.1 Geology - The Peter Cooper Sites are located in the glaciated southern New York Uplands of the Allegheny Plateau. The overburden materials consist of aluvial and glacial deposits; mainly gravel outwash and lacustrine sediments. The bedrock is composed of interbedded marine shales and siltstone, which are associated with the Upper Devonian Clastic Wedge. Bedrock is reported dipping to the south at approximately 8 meters-/kilometers (Reference 3).

5.2.2 Soils - The surficial soil at the Gowanda site is classified as Chenango Gravelly loam (Reference 7). This soil has 8 inches of a loose gravelly loam underlain by firm silt loam or gravelly loam to a depth of approximately 20 inches. These gravels are non-clastic in origin.

The Markhams site soil was identified by Onondaga Soil Testing, Inc. as primarily gravel outwash underlain by lacustrine sediments of silt and sand. These lacustrine sediments are reported as extending to a great depth and being well drained. The wetland area, which is reported to be a glacial kettle, is underlain by fine sand and silt loam soils (Reference 1).

5.2.3 Groundwater - The Village of Gowanda is serviced by a public water supply. Water is mainly drawn from the Point Peter Watershed located to the south of the site. During seasonal fluctuations this source is supplemented by two (2) town wells located upgrade from the village. These wells are screened in the bedrock aquifer at a depth of approximately 380 feet (Reference 8). See attached figures.

At the Markhams site, groundwater is believed to be located in the gravel aquifer due to its extended depth. Although the areas surrounding the site rely on groundwater as their sole drinking water source, it appears that there are no wells in hydraulic connection with the area of concern (Reference 1).

5.3 Previous Sampling and Analysis

5.3.1 Groundwater Quality Data - No analytical testing performed.

5.3.2 Surface Water Quality Data - On November 31, 1981 the NYSDEC conducted sampling at both the Gowanda and Markhams sites. Analytical results indicated detectable levels of heavy metals particularly t-Chromium. Results appear on the following

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pages. Sampling points are located in Figures 1B and 2B.

5.3.3 Air Quality Data - No testing of this nature performed.

5.3.4 Other Analytical Data - Soil samples were collected simultaneously with the surface water samples on November 30, 1981. Analytical results indicate contamination of soil with heavy metals and specifically t-chromium. Also, trace concentrations of organics were detected in a halogenated organic scan. Results are presented on the following pages.

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ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ATOMIC ABSORPTION
PRIORITY POLLUTANT ANALYSES
SOIL ANALYSES
GOWANDA SITE

Report Date: 12/30/81
Date Received: 11/30/81

WATER 9'
SOIL 6'
ADJ TO CONC.
CREEK
METALS BK-1 3 4

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		R-001-01 (11/30/81)	R-001-08 (11/30/81)	R-001-12 (11/30/81)
Total antimony	ug/g dry	<30	<40	<30
Total arsenic	ug/g dry	61	4,600	58
Total beryllium	ug/g dry	1.6	<2	4.3
Total cadmium	ug/g dry	<0.8	1	<0.7
Total chromium	ug/g dry	2,700	1,800	78
Total copper	ug/g dry	160	93	18
Total lead	ug/g dry	94	52	38
Total mercury	ug/g dry	<0.7	3.4	<0.8
Total nickel	ug/g dry	84	41	110
Total selenium	ug/g dry	<1	<2	<1
Total silver	ug/g dry	1.6	<2	1.3
Total thallium	ug/g dry	<20	<20	<10
Total zinc	ug/g dry	660	1,500	590
Dry Weight	%	14	9.5	12

COMMENTS: Comments pertain to data on one or all pages of this report. Samples were received at Recra on 11/30/81.

FOR RECRA RESEARCH, INC. Kevin D. Marchie

DATE 12/30/81

301204

I.D. #81-1091

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ATOMIC ABSORPTION
PRIORITY POLLUTANT ANALYSES
SOIL ANALYSES
MARKHAM SITE

Report Date: 12/30/81
Date Received: 11/30/81

MARKHAM SOIL-25' NE OF SHED

SALT-100' NE OF ROY

METALS

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) R-002-01 (11/30/81)	R-002-02 (11/30/81)
Total antimony	µg/g dry	<30	<80
Total arsenic	µg/g dry	49	84
Total beryllium	µg/g dry	<2	<4
Total cadmium	µg/g dry	1.2	2.5
Total chromium	µg/g dry	66	31,000
Total copper	µg/g dry	140	69
Total lead	µg/g dry	32	120
Total mercury	µg/g dry	<0.7	0.9
Total nickel	µg/g dry	76	21
Total selenium	µg/g dry	<1	2
Total silver	µg/g dry	1.4	4.1
Total thallium	µg/g dry	<20	<40
Total zinc	µg/g dry	300	1,300
Dry Weight	%	14	11

COMMENTS: All results for soil analyses are being reported on a dry weight basis.

FOR RECRA RESEARCH, INC. [illegible signature]

DATE [illegible]

...CH, INC
I.D. #81-1091

301205

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ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ATOMIC ABSORPTION
PRIORITY POLLUTANT ANALYSES
WATER ANALYSES
GOWANDA SITE

Report Date: 12/30/81
Date Received: 11/30/81

WATER BY 3" PIPE @ CRK BK

METALS ↓ #1 2 3

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) R-001-02 (11/30/81)	R-001-05 (11/30/81)	R-001-09 (11/30/81)
Total antimony	mg/l	<0.2	<0.2	<0.2
Total arsenic	μg/l	13	24	4,400
Total beryllium	mg/l	<0.01	<0.01	<0.01
Total cadmium	mg/l	0.008	0.010	<0.005
Total chromium	mg/l	0.070	0.346	0.266
Total copper	mg/l	0.014	<0.010	0.060
Total lead	mg/l	<0.03	<0.03	0.04
Total mercury	μg/l	<1	<1	<1
Total nickel	mg/l	<0.03	0.06	0.05
Total selenium	μg/l	<4	<4	<20
Total silver	mg/l	<0.008	0.016	<0.008
Total thallium	mg/l	0.2	<0.1	<0.1
Total zinc	mg/l	<0.005	<0.005	1.28

COMMENTS: Values reported as "less than" (<) indicate the working detection limit for the particular sample and/or parameter.

FOR RECRA RESEARCH, INC. Karen D. Marchin

DATE 12/30/81

301206

RECRA RESEARCH INC.

I.D. #81-1091

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ATOMIC ABSORPTION
PRIORITY POLLUTANT ANALYSES
WATER ANALYSES
MARKHAM SITE

Report Date: 12/30/81
Date Received: 11/30/81

Markham

METALS

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		R-002-03 (11/30/81)	R-002-06 (11/30/81)	R-002-09 (11/30/81)
Total antimony	mg/l	<0.2	<0.2	<0.2
Total arsenic	µg/l	<8	<20	<8
Total beryllium	mg/l	<0.01	<0.01	<0.01
Total cadmium	mg/l	<0.005	0.008	<0.005
Total chromium	mg/l	0.336	77.6	0.010
Total copper	mg/l	0.026	3.18	0.018
Total lead	mg/l	<0.03	0.06	<0.03
Total mercury	µg/l	<1	<1	<1
Total nickel	mg/l	<0.03	0.23	<0.03
Total selenium	µg/l	<20	<20	<4
Total silver	mg/l	0.008	0.009	0.012
Total thallium	mg/l	<0.1	<0.1	<0.1
Total zinc	mg/l	0.616	26.0	0.006

COMMENTS: All analyses were performed according to U.S. Environmental Protection Agency methodologies where applicable.

FOR RECRA RESEARCH, INC. Karen E. Marchio

DATE 12/30/81

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ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SOIL ANALYSES

Report Date: 12/30/81
Date Received: 11/30/81

GAS CHROMATOGRAPHY

	SAMPLE IDENTIFICATION	SAMPLE DATE	PARAMETER (UNITS OF MEASURE) HALOGENATED ORGANIC SCAN (ECD) (ug/g DRY AS CHLORINE; LINDANE STANDARD)	DRY WEIGHT (%)
...TER BY ... F. TO ... C/CRK ...	R-001-01	11/30/81	0.45	14
	R-001-08	11/30/81	0.57	9.5
...RKHAM	R-001-12	11/30/81	0.38	12
5' NE OF SHED	R-002-01	11/30/81	0.35	14
'NE OF RD Y	R-002-02	11/30/81	0.75	11

COMMENTS: Halogenated Organic Scan results are used for screening purposes only and are not designed for qualification or quantification of any specific organic compound. Results are calculated based upon the chlorine content and the response factor of Lindane but do not imply either the presence or absence of Lindane itself. Halogenated Organic Scan results do not include volatile organic constituents.

FOR RECRA RESEARCH, INC. Karen G. Marchus

DATE 12/30/81

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6.0 ADEQUACY OF AVAILABLE DATA

In compiling the Hazardous Ranking Score, the Peter Cooper Corporation sites were found to have the following scores for migration potential (Sm). Gowanda Plant 52.3. Markham Site 36.5. However, due to a certain degree of subjectivity in scoring route rating factors, a range for Sm was developed. For the Gowanda plant the range for Sm is 10.0 to 50.0. For the Markhams site the range is 32.5 to 40.5. Data inadequacies are as follows:

- Currently, Cattaraugus County is undergoing a soil survey and as a result, information regarding surficial soils was limited.

- Population in the area of the Markhams site was difficult to determine and therefore estimated from the topographic map of the area.

- Population serviced by groundwater was estimated based on information provided by the water superintendent.

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7.0 PROPOSED PHASE II WORK PLAN

7.1 Objectives

As per the inadequacies of the data base that were itemized in the preceding section, a work plan has been developed which, to the extent practical, will provide the information required to address the following list.

- o Potential environmental effects of the landfills.
- o The extent and magnitude of contamination, based on site specific hydrogeologic conditions.
- o The data inputs necessary to effectuate the development and recommendation of cost effective remedial actions.

Detailed descriptions of the elements of this work plan are herein provided.

7.2 Scope of Work

The primary purpose of this work element is to fill the data gaps identified in the preliminary assessment so as to permit a complete site characterization/ranking (HRS) and engineering evaluation of remedial alternatives. The preliminary field investigation includes the following items:

- Geophysical Exploration - Plant Site
- Subsurface Investigation
- Monitoring Well Installation
- Sampling and Analysis

Throughout the investigative effort, field activities will be performed in strict accordance with established safety protocol, presented in Recra Research, Inc.'s Operation Manual - Field and Analytical Services (previously submitted to NYSDEC by Recra as part of a prequalifying submission).

7.2.1 Geophysical Exploration - Due to the adequacy of data a geophysical exploration is not considered necessary for the Peter Cooper Plant site. However, after initial assessment of the ambient air quality at the Markhams site, a geophysical program will be conducted to determine the limits of the disposal area, aid in determining the possibility and extent of groundwater contamination, and supplement data on the site-specific geology. The method proposed for the Markhams site is a VLF-EM Terrain Conductivity Survey. This survey will be performed by recording continuous conductivity measurements on an EM-31 terrain conductivity meter equipped with a strip chart recorder. These measurements will be taken on a grid pattern established using a tape and level, in the area of the disposal site.

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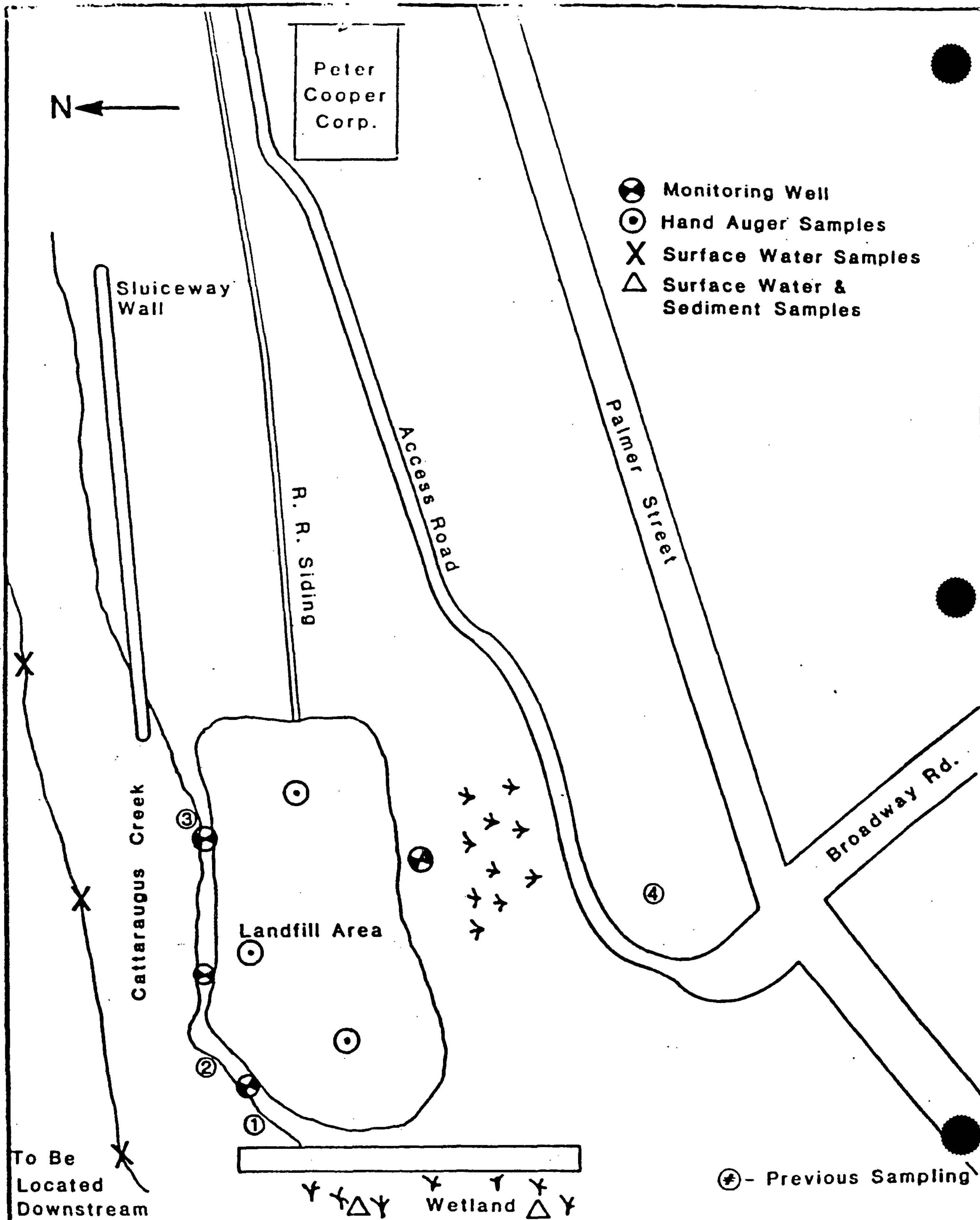
7.2.2 Subsurface Investigation - Four (4) monitoring wells will be installed at the Gowanda Plant Site per the attached rawing. The estimated depth of each will be twenty (20) feet. At the Markhams site, a similar pjrogram of four (4) well installations to twenty (20) feet is expected. Additionally at the plan site, three (3) hand auger samples will be collected. Seven (7) hand augers are to be taken at the Markhams site. See Figure 3 and 4 for sampling and well locations.

The borings at both sides will be drilled with a truck, trailer, and/or all-terrain-mounted auger rig using hollow stem augers. During construction of the borings, split spoon samples will be obtained at five (5) foot intervals and/or when noticeable changes in lithology or drilling characteristics occur. If the unconsolidated material is found to be extremely heterogeneous, all borings will be continuously sampled.

The acquired samples will be visually identified in the field following the procedure set forth in ASTM-D-2488, noted appropriately on the boring logs with the sample number and recorded standard penetration test results (ASTM-D-1586), and placed in pre-cleaned, teflon-lined, screw-cap glass jars for return to Recra Research, Inc.'s Tonawanda, New York laboratory.

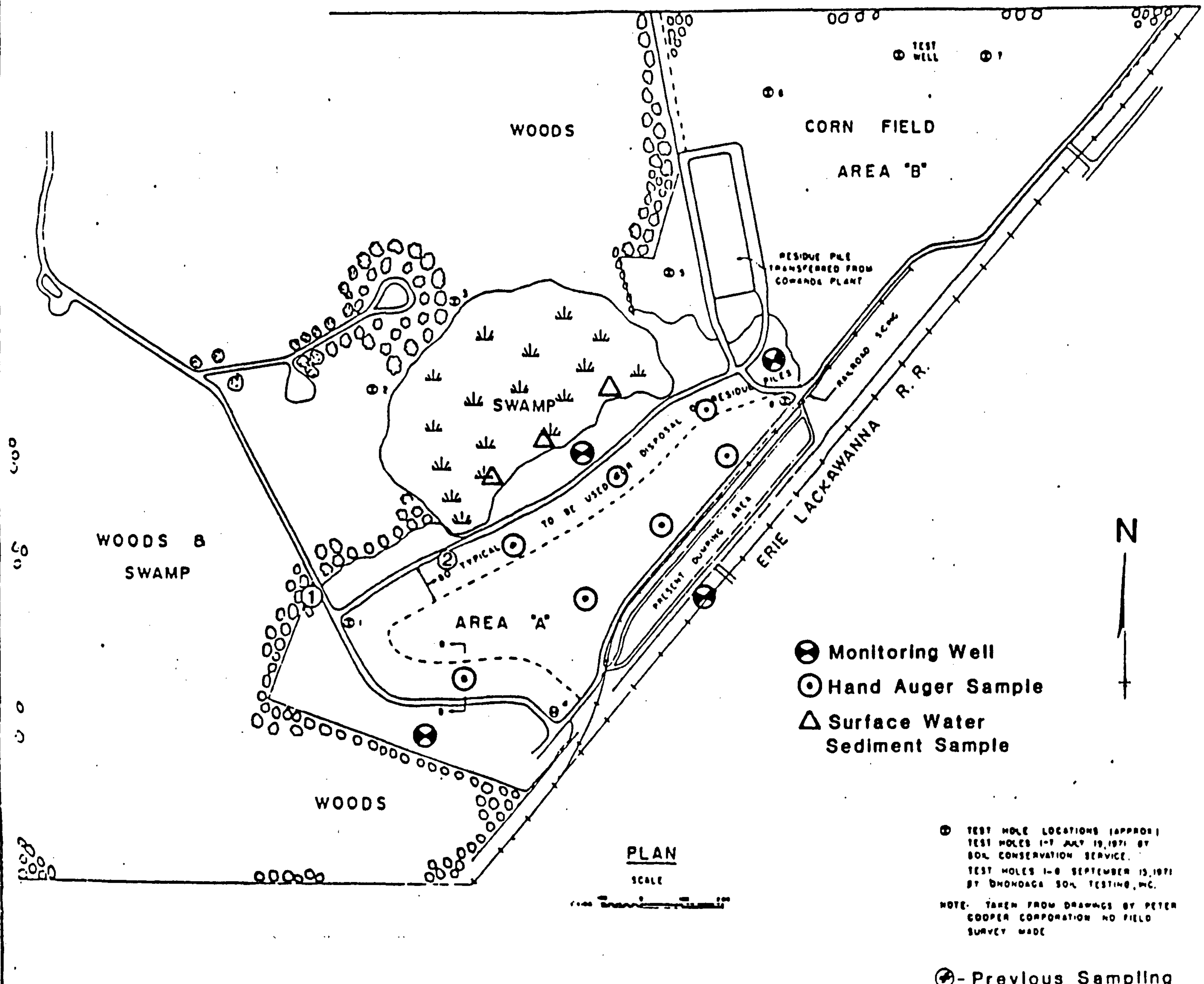


Not To Scale	Sampling & Well Locations GOWANDA PLANT FACILITY	Figure

Scale as Shown

Sampling & Well Locations
MARKHAMS SITE

Figure



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In order to avoid possible cross-contamination during construction of the borings, the apparent upgradient borings will be completed first; then the downgradient holes will be drilled. Between each boring, the augers will be cleaned with water obtained from a known non-contaminated source. Also, between each split spoon sample, the split spoon will be cleaned with water, acetone and distilled water. All spent water/acetone liquid accumulated during this process will be disposed of in an on-site drum. Upon completion of each boring to bedrock, the boring will be backfilled with cement bentonite grout to approximately five (5) to six (6) feet below the first encountered water level, in order to avoid the possible vertical migration of contaminated groundwater from the first encountered water-bearing zone to bedrock. Prior to leaving the site, the drill rig will be decontaminated using high pressure water.

7.2.3 Monitoring Well Installation - The monitoring wells will be constructed of two-inch I.D. cast iron riser pipe with a five-foot long galvanized, wire-wound-wrapped steel screen. Although the use of PVC casing and screens would be less expensive, the possible presence of solvents suggests the use of galvanized steel screens and risers. The screen will be placed just below the encountered water table. The annulus between the casing/screen and boring well will be properly sand-packed and sealed (cement/bentonite and cement) to the ground surface and the well provided with a locking cap. A typical monitoring well in unconsolidated material is illustrated in Figure 4.

Upon completion of well construction, all monitoring wells will be properly developed, and all test borings and/or top of well casings will be surveyed to determine their location and elevation above sea level. At that time, variable head tests will be performed on the wells around the site to estimate the in-situ permeability of the screened interval.

All field activity will be under the direct supervision of a qualified geologist and/or hydrogeologist.

7.2.4 Sampling and Analysis - The following procedures will encompass the sampling and analyses from the newly installed wells and surface water and sediment, sampling and analyses of the samples obtained during air monitoring, and analyses of selected samples from the boring program. If desired, all samples will be split with the owner of the site. Also, upon completion of the analytical program, the owner will be notified of the results if he so requests. All groundwater and surface water samples will be analyzed for the parameters listed in Table 1.

Figure

MONITORING WELL DETAIL

In Unconsolidated Formation

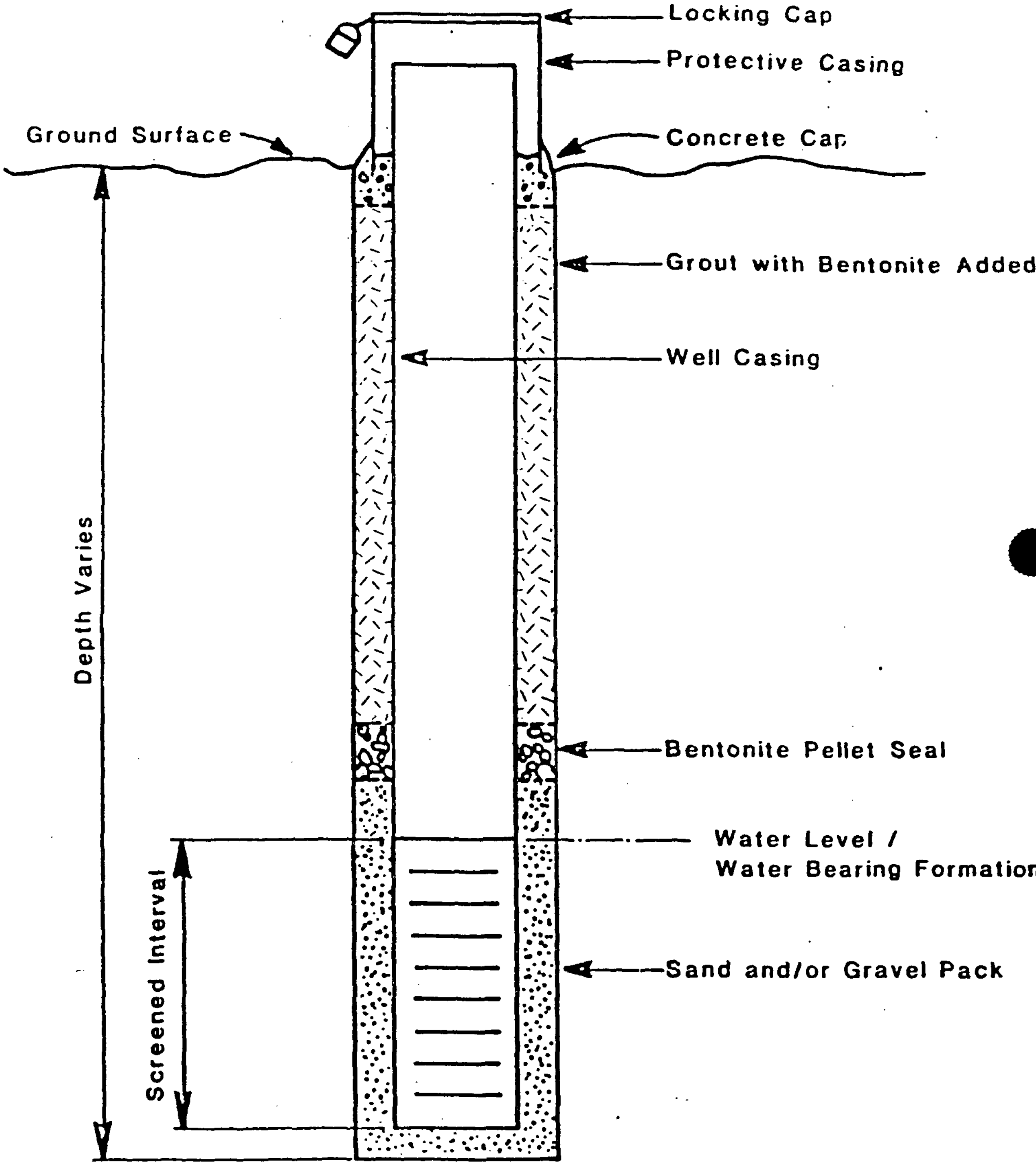


TABLE 1: ANALYTICAL PARAMETERS

pH

Specific Conductance

Chloride

Total Metals

+Arsenic

+Beryllium

+Chromium (t)

+Copper

+Lead

+Mercury

+Nickel

+Silver

+Zinc

+Halogenated Organic Scan

+Volatile Halogenated Organic Scan

Dry Weight (soils only)

Grain size and Atterberg limits (10 samples)

+Indicates analyses also done on soils.

7.2.4.1 Groundwater - Following equilibrium of water levels within the installed wells, water elevations will be measured to determine the water table surface. Representative groundwater samples will then be collected after the wells have been fully evacuated or a volume of three times the well contents have been removed.

Evacuation of water from the wells and the acquisition of the samples will be accomplished with an ISCO Model 1580 peristaltic pump, using separate low-density polyethylene

301219

tubing for each well and changing the silicon rubber tubing within the ISCO between wells. An exception to this procedure will be employed when obtaining the required volume of sample for volatile organic analysis. This will be accomplished using small volume galvanized steel bailers that have been separately designated for each well.

Upon collection of the samples, field pH, temperature and conductivity measurements will be recorded. The samples will be placed in appropriate precleaned bottles/septa vials, labelled, chilled and immediately returned to Recra's Tonawanda, New York laboratory for preservation and analyses of previously listed chemical parameters. If the samples cannot be returned to Recra's laboratory in a timely fashion due to the distance between the site and Recra's laboratory, field preservation will be performed prior to chilling.

7.2.4.2 <u>Surface Water</u> - The sampling of surface water at the Plant site will entail collecting water and sediment at two (2) locations in the wetland west of the landfill and water samples only at three (3) locations in Cattaraugus Creek. The creek samples will be taken upstream of, adjacent to, and downstream of the landfill. Sampling locations are illustrated in Figure 3.

The sampling of surface water at the Markhams site will entail collecting water and sediment samples from three (3) locations in the wetland located north of the landfill. Sampling locations for this site are illustrated in Figure 4.

The samples will be obtained using a pond sampler with separate sampling bottles designated for each sampling location. Sediment samples will be taken using a two (2) foot gravity type sampler. All sediment samples will be placed in precleaned, teflon-lined, screw capped glass jars, labelled, chilled and returned to Recra for analysis. The same procedures as determined for groundwater will be followed after acquisition of the surface water samples and the samples will be analyzed for the previously listed parameters.

7.2.4.3 <u>Soil</u> - Selected subsurface soil samples will undergo both physical and chemical analyses. The remaining samples will be archived by Recra Research, Inc. for a period of 6 months after completion of the contract.

The physical analysis will aid in the characterization of the underlying unconsolidated material. The physical parameters of concern during this investigation are grain size distribution (ASTM-D-422), and classification

(ASTM-D-248). The number of samples to undergo analysis for the above parameters is dependent on the homogeneity of the subsurface conditions underlying the bottom of the uncontrolled hazardous waste landfill. The results from these tests, in conjunction with Standard Penetration Test results, will aid in the design and evaluation of remedial programs.

Chemical analyses of selected samples will be used to characterize attenuation by on-site soils. A sample from the unsaturated zone and a sample from the saturated zone will generally be utilized from each test boring.

7.2.5 Chemical Analytical Methods - The procedures to be utilized for analyses of water, stream sediment and soil samples during this investigation are in basic accordance with one or more of the following reference texts:

- Methods for Chemical Analysis of Water and Wastes, United States Environmental Protection Agency,
- NIOSH Manual of Analytical Methods, 2nd Edition, United States Department of Health, Education and Welfare,
- Standard Methods for the Examination of Water and Wastewater, 14th Edition, APHA, AWWA, WPCF.

7.2.6 Quality Assurance Program - An overall Quality Assurance Program is essential for the production of high-quality analytical data. Such a program requires precise control of laboratory activities. For the Quality Assurance Program in effect at the laboratories of Recra Research, Inc., the reader is referred to a document previously submitted by Recra Research, Inc. to NYSDEC, entitled "Operations Manual - Field and Analytical Services".

7.2.7 Engineering Evaluation Report/HRS Score - The purpose of this evaluation report is to compile all existing and newly-developed information concerning the sites, and utilize this information to:

- Evaluate feasible remedial alternatives at the sites and prepare budget-level cost estimates for these alternatives.

- Based upon this evaluation, recommend the most cost-effective and environmentally sound course of remedial action.

- Prepare a Hazard Ranking System (HRS) score for the sites.

It is presently anticipated that the output from this Evaluation Report will consist of a single bound report, subdivided into at least the following sections:

- HRS Score - Utilizing USEPA's formal method of presentation (Federal Register/Vol. 47, No. 137/Friday, July 16, 1982, the following completed work sheets will be included in this opening section: HRS Cover Sheet; Groundwater Route Work Sheet; Surface Water Route Work Sheet; Air Route Work Sheet; Fire and Explosion Work Sheet; and Direct Contact Work Sheet.

- Background

- Summary of Project Activities

- Identification and Evaluation of Remedial Alternatives

- Recommendations

- Appendix - Complete Site Data Base

7.3 Estimated Costs

The estimated costs per individual element of the preceding scope of work are listed as follows:

o	Geophysical Exploration	$ 3,309.12
o	Subsurface Investigation	14,286.86
o	Sampling and Analysis	10,822.00
o	Engineering Evaluation	13,119.64
	TOTAL	$ 41,537.62

301224

APPENDIX A

REFERENCES

1.) O'Brien and Gere Report, November 1, 1971. Solid Waste Management.

2.) O'Brien and Gere Report, September, 1971. Interim Report Solid Waste Management.

3.) Calkin, P.E. and Muller E.H. Geologic Setting and Glacial Overview of the Upper Cattaraugus Basin, Southwestern New York.

4.) Letter from Peter Cooper Corporation Office regarding a brief history of the site and the existence of the engineering reports, April 20, 1983.

5.) Richard Orth, plant purchasing agent. Personal interview June 18, 1983.

6.) U.S.G.S. Topographic Map Gowanda Quad 1963 and Perrysburg Quad, 1954.

7.) Soil Conservation Survey conversation with a soil technician regarding site soils. May 27, 1983.

8.) Roger Overfield, water superintendent for the Village of Gowanda. Personal interview, April 29, 1983.

9.) Ehmke Drillers. Conversation with Mr. Ehmke regarding domestic wells. May 4, 1983.

10.) NYSDEC Report regarding site and samples collected on November 30, 1981.

11.) Industrial Chemical Survey, January 19, 1977 list of chemicals on-site.

12.) NYSDEC. Conversation with a staff biologist regarding wetland classification. June 2, 1983.

13.) Codes, Rules and Regulations of the State of New York, Vol. 6(C), Sec. 838.6, pg. 1669, 1967.

APPENDIX B

HAZARDOUS WASTE DISPOSAL SITE REPORT REVISED

Code: E

Site Code: 905003

Name of Site: Peter Cooper Corp. - Gowanda Site

Region: 9

County: Cattaraugus

Town/City: Gowanda

Street Address: Palmer Street

Status of Site:

- o Animal glue division is inactive, a small adhesive process is in operation today.
- o Suburban community. Flat topography.
- o Nearest body of water: Cattaraugus Creek less than 10 feet.
- o Water supply: Village of Gowanda has a public water supply.
- o Soil type: Chenango gravelly loam.
- o Leachate outbreaks observed.

Type of Site: Manufacturing plant/landfill.

Estimated Size: 50 acres

Hazardous Waste Disposed? yes

Type and Quantity of Hazardous Waste: The industrial sludges surface piled at this site may have contained metals such as chromium. The actual constituents listed in Reference 1 indicate Chromium contamination of soils. Estimated quantity of sludge is 38,600 tons.

Present Owner: Peter Cooper Corp.

Time Period Site Was Used: 1925 to 1971

Site Status: Glue division is inactive, adhesive division is still active.

Type of Samples: None

Remedial Action: Some of the material that was originally landfilled has been removed and transferred to the company's Markhams site.

Status of Legal Action: None

Permits Issued: None

Assessment of Environmental Problems: Leachate outbreaks evident along the creek banks.

Assessment of Health Problems: None known.

APPENDIX B

HAZARDOUS WASTE DISPOSAL SITE REPORT REVISED

Code: Unknown

Site Code: Unknown

Name of Site: Peter Cooper Corp. Markhams Site

Region: 9

County: Cattaraugus

Town/City: Markhams in the Town of Dayton

Street Address: Bentley Road

Status of Site:

- Site is inactive.
- Rural area.
- Nearest body of water: Slab City Creek approximately 9,000 ft. from site.
- Water supply: Private wells on Bentley Road.
- Soil type: Gravelly silt loam.
- Leachate outbreaks observed.
- Site is located within a designated wetland (EK, PE1, Dexter-Markham) no landfilling in this area.

Type of Site: landfill

Estimated Size: 91 acres/15 acres used for landfilling

Hazardous Waste Disposed? Yes

Type and Quantity of Hazardous Waste: Sludges from the plant were landfilled, estimated amount of sludge is 38,600 tons.

Present Owner: Peter Cooper Corp.

Time Period Site Was Used: 1971 - ?

Site Status: Inactive active.

Type of Samples: None

Remedial Action: None

Permits Issued None

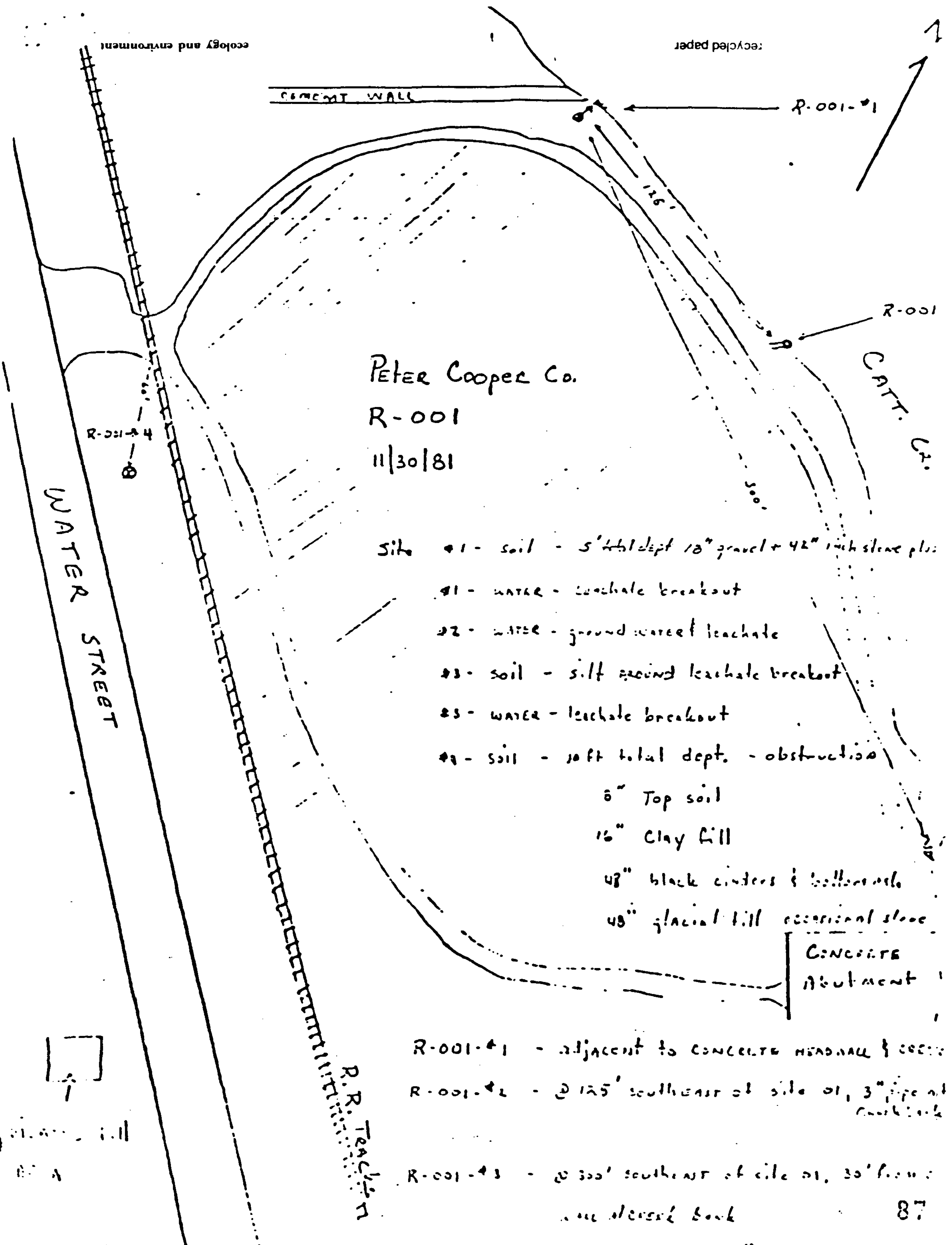
Assessment of Environmental Problems: Leachate outbreaks observed entering the wetlands.

Assessment of Health Problems: None known.

REFERENCE NO. 9

APPENDIX B-2

Phase II Results



Peter Cooper Co.
R-001
11/30/81

Site #1 - soil - 5' total dept 18" gravel + 42" inch stone plus
#1 - water - leachate breakout
#2 - water - ground water & leachate
#3 - soil - silt around leachate breakout
#3 - water - leachate breakout
#4 - soil - soft total dept. - obstruction
6" Top soil
16" Clay fill
48" black cinders & bottom ash
48" glacial till occasional stone

R-001-#1 - adjacent to concrete headwall & creek
R-001-#2 - @ 125' southeast of site 01, 3" pipe at creek bank
R-001-#3 - @ 300' southeast of site 01, 30' from creek bank
R-001-#4 - @ 35' from ...

301233

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ATOMIC ABSORPTION
PRIORITY POLLUTANT ANALYSES
SOIL ANALYSES
GOWANDA SITE

Report Date: 12/30/81
Date Received: 11/30/81

METALS

COMPOUNDS	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) WATER ST. SOIL 5' ADJ TO CONC WALL & CREEK #1	WATER ST. SOIL 5' ADJ TO CONC WALL & CREEK #3	WATER ST. SOIL 5' ADJ TO CONC WALL & CREEK #4
Total antimony	ug/g dry	<30	<40	<30
Total arsenic	ug/g dry	61	4,600	58
Total beryllium	ug/g dry	1.6	<2	4.3
Total cadmium	ug/g dry	0.8	<1	<0.7
Total chromium	ug/g dry	2,700	1,800	78
Total copper	ug/g dry	160	93	18
Total lead	ug/g dry	94	52	38
Total mercury	ug/g dry	<0.7	3.4	<0.8
Total nickel	ug/g dry	84	41	110
Total selenium	ug/g dry	<1	<2	<1
Total silver	ug/g dry	1.6	<2	1.3
Total thallium	ug/g dry	<20	<20	<10
Total zinc	ug/g dry	660	1,500	590
Dry Weight	%	14	9.5	12

COMMENTS: Comments pertain to data on one or all pages of this report. Samples were received at Recra on 11/30/81.

FOR RECRA RESEARCH, INC. ____________________

DATE ____________________

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ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ATOMIC ABSORPTION
PRIORITY POLLUTANT ANALYSES
SOIL ANALYSES
GOWANDA SITE

Report Date: 12/30/81
Date Received: 11/30/81

METALS

COMPOUNDS	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) WATER ST 3" PIPE E CRK BK #1	WATER ST 3" PIPE E CRK BK #2	WATER ST 3" PIPE E CRK BK #3
Total antimony	ug/g dry	<0.2	<0.2	<0.2
Total arsenic	ug/g dry	13	24	4,400
Total beryllium	ug/g dry	<0.01	<0.01	<0.01
Total cadmium	ug/g dry	0.008	0.010	<0.005
Total chromium	ug/g dry	0.070	0.246	0.266
Total copper	ug/g dry	0.014	<0.010	0.060
Total lead	ug/g dry	<0.03	<0.03	0.04
Total mercury	ug/g dry	<1	<1	<1
Total nickel	ug/g dry	<0.03	0.06	0.05
Total selenium	ug/g dry	<4	<4	<20
Total silver	ug/g dry	<0.008	0.016	<0.008
Total thallium	ug/g dry	<0.2	<0.2	<0.1
Total zinc	ug/g dry	0.02	<0.1	<0.1
Dry Weight	%	<0.005	<0.005	1.28

COMMENTS: Values reported as "less than" (<) indicate the working detection limit for the particular sample and/or parameter.

FOR RECRA RESEARCH, INC. ____________________

DATE ____________________

1/T914

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ATOMIC ABSORPTION
PRIORITY POLLUTANT ANALYSES
SOIL ANALYSES
MARKHAMS SITE

Report Date: 12/30/81
Date Received: 11/30/81

METALS

COMPOUNDS	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		MARKHAM SWAMP H_2O	MARKHAM SWAMP H_2O	MARKHAM SWAMP H_2O
Total antimony	ug/g dry	<0.2	<0.2	<0.2
Total arsenic	ug/g dry	<8	20	<8
Total beryllium	ug/g dry	<0.01	<0.01	<0.01
Total cadmium	ug/g dry	<0.005	0.008	<0.005
Total chromium	ug/g dry	0.336	77.6	0.010
Total copper	ug/g dry	0.026	3.18	0.018
Total lead	ug/g dry	<0.03	0.06	<0.03
Total mercury	ug/g dry	<1	<1	<1
Total nickel	ug/g dry	<0.03	0.23	<0.03
Total selenium	ug/g dry	<20	<20	<4
Total silver	ug/g dry	0.008	0.009	0.012
Total thallium	ug/g dry	<0.1	<0.1	<0.1
Total zinc	ug/g dry	0.416	26.0	0.006

COMMENTS: All analyses were performed according to U.S. Environmental Protection Agency methodologies where applicable.

FOR RECRA RESEARCH, INC. ____________________

DATE ____________________

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ATOMIC ABSORPTION
PRIORITY POLLUTANT ANALYSES
SOIL ANALYSES
MARKHAMS SITE

Report Date: 12/30/81
Date Received: 11/30/81

METALS

COMPOUNDS	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		MARKHAM SOIL - 25' OF SHED	MARKHAM SOIL - 100' NE OF ROY
Total antimony	ug/g dry	<30	<80
Total arsenic	ug/g dry	49	84
Total beryllium	ug/g dry	<2	<4
Total cadmium	ug/g dry	1.2	2.5
Total chromium	ug/g dry	66	31,000
Total copper	ug/g dry	140	69
Total lead	ug/g dry	32	120
Total mercury	ug/g dry	<0.7	<0.9
Total nickel	ug/g dry	76	21
Total selenium	ug/g dry	<1	<2
Total silver	ug/g dry	1.4	4.1
Total thallium	ug/g dry	<20	<40
Total zinc	ug/g dry	500	1,300
Dry Weight	%	14	11

COMMENTS: All results for soil analyses are being reported on a dry weight basis.

FOR RECRA RESEARCH, INC. ____________________

DATE ____________________

i/T914

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SOIL ANALYSIS

Report Date: 12/30/81
Date Received: 11/30/81

GAS CHROMATOGRAPHY

SAMPLE IDENTIFICATION	SAMPLE DATE	PARAMETER (UNITS OF MEASURE): HALOGENATED ORGANIC SCAN (ECD) (ug/g DRY AS CHLORINE; LINDANE STANDARD)	DRY WEIGHT (%)
R-001-01	11/30/81	0.45	14
R-001-08	11/30/81	0.57	9.5
R-001012	11/30/81	0.38	12
R-002-01	11/30/81	0.35	14
R-002-02	11/30/81	0.75	11

COMMENTS: Halogenated Organic Scan results are used for screening purposes only and are not designed for qualification or quantification of any specific organic compound. Results are calculated based upon the chlorine content and the response factor of lindane but do not imply either the presence or absence of Lindane itself. Halogenated Organic Scan results do no include volatile organic constituents.

FOR RECRA RESEARCH, INC. ____________________

DATE ____________________

GEOTECHNICAL DATA

3/907

ANALYTICAL PROCEDURES
NYS DEC SUPERFUND

Peter Cooper Corporation
Gowanda, New York
Markhams, New York

Report Date: 8-13-84

Soil samples, which were received by Recra Geotechnical Laboratory, were prepared and tested in accordance with the procedures from the American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards: Part 19 Natural Building Stones, Soil, and Rock, c-1982. The following standard methods were utilized in whole or in part:

- ASTM D 2216-80 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.
- ASTM D 421-58 Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants.
- ASTM D 1140-54 Amount of Material in Soils Finer Than the No. 200 (0.075 mm) Seive.
- ASTM D 422-63 Particle-Size Analysis of Soils.
- ASTM D 423-66 Liquid Limit of Soils.
- ASTM D 424-59 Plastic Limit and Plasticity Index of Soils.
- ASTM D 2487-69 Classification of Soils for Engineering Purposes.

FOR RECRA GEOTECHNICAL LABORATORY Carmen M. Panucci

DATE 8-13-84

I.D. # 2EM84001.5000

ANALYTICAL RESULTS
NYS DEC SUPERFUND

Peter Cooper Corporation
Markhams, New York

Report Date: 8-13-84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION B2 S-9	B3 S-6	B4 S-4	B4 S-7
Moisture Content (As Received)	%	19.7	24.6	18.7	16.3
Gravel (> 4.75 mm)	%	0.0	6.6	0.0	0.6
Sand (4.75 mm > and > 0.075 mm)	%	27.6	78.9	65.1	71.7
Silt and Clay (< 0.075 mm)	%	72.4	14.5	34.9	27.8
Coefficient of Uniformity (Cu)	–	–	–	–	–
Coefficient of Curvature (Cz)	–	–	–	–	–
Liquid Limit	%	19.5	NP	17.5	NP
Plastic Limit	%	15.1	NP	15.5	NP
Plasticity Index	%	4.4	NP	2.0	NP
Flow Index (Fw)	%	–	–	–	–
Soil Classification	–	CL-ML	SM	SM	SM

Additional Sample Information

	B2 S-9	B3 S-6	B4 S-4	B4 S-7
Sample Date	5-24-84	5-25-84	5-29-84	5-29-84
Analysis Date: Moisture Content	8-2-84	8-2-84	8-2-84	8-2-84
Analysis Date: Particle Size	8-9-84	8-9-84	8-9-84	8-9-84
Analysis Date: Atterberg Limits	8-10-84	–	8-10-84	–

FOR RECRA GEOTECHNICAL LABORATORY Carmen M. Panuccio

DATE 8-13-84

I.D.# 2EM84001.5000

ANALYTICAL RESULTS
NYS DEC SUPERFUND

Peter Cooper Corporation
Gowanda, New York

Report Date: 8-13-84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION MW1A S-5	MW3 S-1		
Moisture Content (As Received)	%	8.97	11.6		
Gravel (> 4.75 mm)	%	55.9	29.5		
Sand (4.75 mm > and > 0.075 mm)	%	29.3	30.3		
Silt and Clay (< 0.075 mm)	%	14.8	40.2		
Coefficient of Uniformity (Cu)	-	-	-		
Coefficient of Curvature (Cz)	-	-	-		
Liquid Limit	%	NP	20.7		
Plastic Limit	%	NP	15.2		
Plasticity Index	%	NP	5.5		
Flow Index	%	—	—		
Soil Classification	-	GM	SM-SC		

Additional Sample Information

Sample Date	5-21-84	5-23-84		
Analysis Date: Moisture Content	8-2-84	8-2-84		
Analysis Date: Particle Size	8-9-84	8-9-84		
Analysis Date: Atterberg Limits	-	8-10-84		

FOR RECRA GEOTECHNICAL LABORATORY Carmen M. Panucci

DATE 8-13-84

I.D. # 2EM84001.5000

ANALYTICAL RESULTS
NYS DEC SUPERFUND

Peter Cooper Corporation
Markhams, New York

QUALITY CONTROL

Report Date: 8-13-84

REPLICATE ANALYSIS OF SAMPLE B4 S-4

PARAMETER	UNITS OF MEASURE	VALUE 1	VALUE 2	VALUE 3	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Liquid Limit	%	17.6	17.4	--	17.5	0.1	0.8

Values 1 and 2 are each from a one-point method.

REPLICATE ANALYSIS OF SAMPLE B2 S-9

PARAMETER	UNITS OF MEASURE	VALUE 1	VALUE 2	VALUE 3	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Liquid Limit	%	19.9	19.2	--	19.5	0.5	2.5

Values 1 and 2 are each from a one-point method.

FOR RECRA GEOTECHNICAL LABORATORY Carmen M. Parucci

DATE 8-13-84

I.D.# 2EM84001.5000

ANALYTICAL NOTATIONS
NYS DEC SUPERFUND

Peter Cooper Corporation
Gowanda, New York
Markhams, New York

Report Date: 8-13-84

1. The one-point liquid limit method was utilized for Samples B2 S-9, B4 S-4, B1 S-7, and MW3 S-1 due to limited sample weight.

2. A quantitative determination of the Atterberg Limits (liquid limit and plastic limit) for Samples B1 S-6, B2 S-2, B2 S-5, B3 S-6, B4 S-7, and MW3 S-1 was not possible due to insufficient sample weight or due to the texture of the material. Qualitative techniques were utilized to determine the plasticity characteristics of material passing the No. 40 seive (0.42 mm). Samples were deemed either plastic or nonplastic (NP) for soil classification purposes.

3. Soil Samples B2 S-2, B3 S-6, MW1A S-5, and MW3 S-1 contained an appreciable amount of gravel. The amount of material, which was avilable to perform the particle size analysis, was less than that required by ASTM; hence, textural delineations should be considered approximate.

4. Particle size curves for the sand and gravel fractions are provided for all samples except B1 S-7, B2 S-9, and B4 S-4 (disposed of prior to dry stack seiving). Note that the particle size curves are not required for classification purposes.

FOR RECRA GEOTECHNICAL LABORATORY Carmen M Panucci

DATE 8-13-84

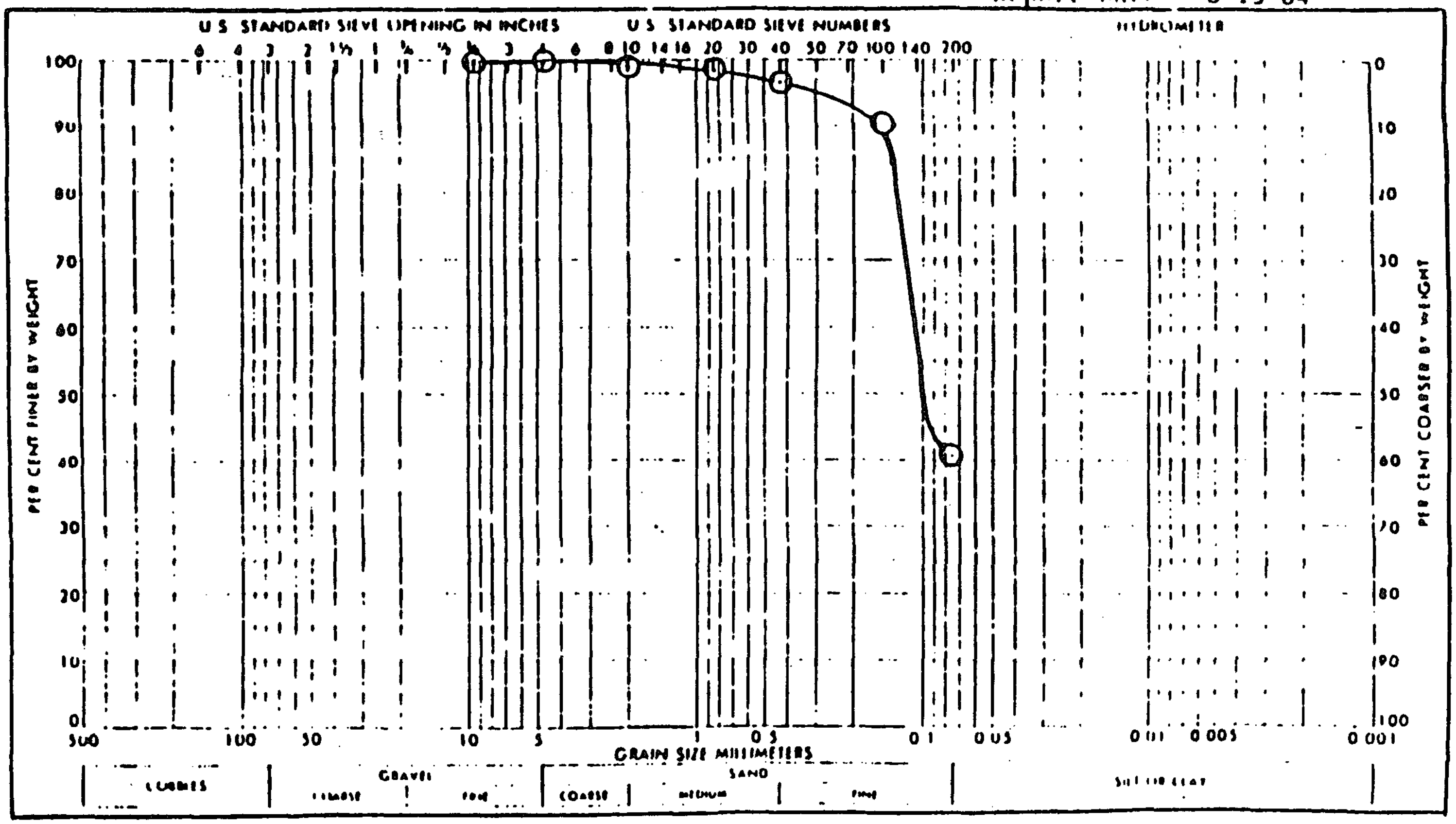
I.D.# 2EM84001.5000

ANALYTICAL RESULTS
NYS DEC SUPERFUND

PETER COOPER CORPORATION
MARKHAMS, NEW YORK

SOIL GRADATION CURVE

Report Date: 8-13-84



O = B1 S-6 (10-12 feet)

FOR EECRA GEOTECHNICAL LABORATORY Carmen M. Caruccio

DATE 8-13-84

I.D. 2EN84001.5000

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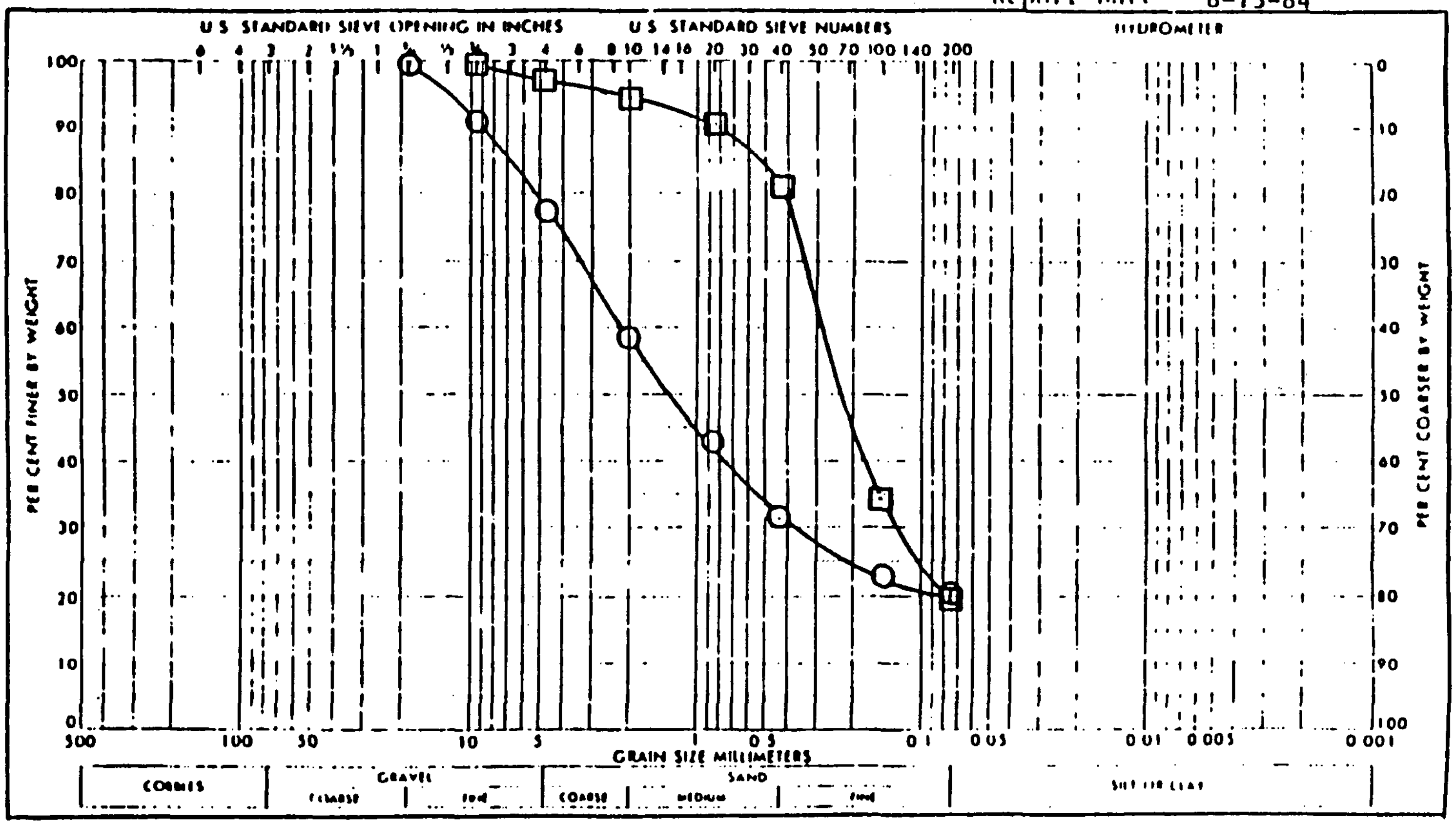
ANALYTICAL RESULTS
NYS DEC SUPERFUND

PETER COOPER CORPORATION
MARKHAMS, NEW YORK

SOIL GRADATION CURVES

Report Date: 8-13-84



O = B2 S-2 (2-3.5 feet) □ = B2 S-5 (8-9.2 feet)

FOR RECRA GEOTECHNICAL LABORATORY Carmen M. Caruccio

DATE 8-13-84

I.D. 2EM84001.5000

ecology and environment

recycled paper

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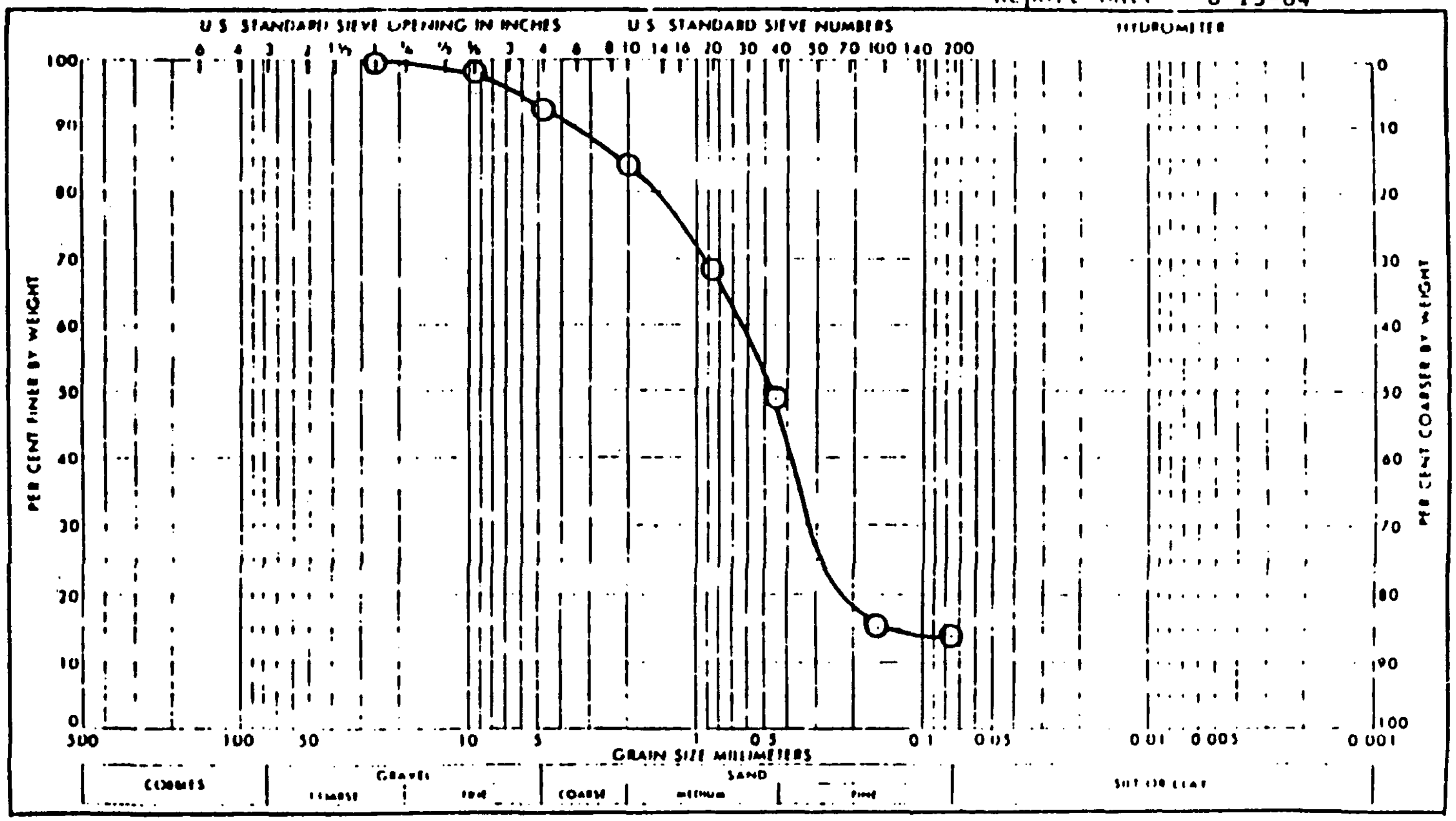
ANALYTICAL RESULTS
NYS DEC SUPERFUND

PETER COOPER CORPORATION
MARKHAMS, NEW YORK

SOIL GRADATION CURVE

Report Date: 8-13-84



O = B3 S-6 (10-12 feet)

FOR BECRA GEOTECHNICAL LABORATORY Carmen M. Panucci

DATE 8-13-84

I.D. 2EM84001.5000

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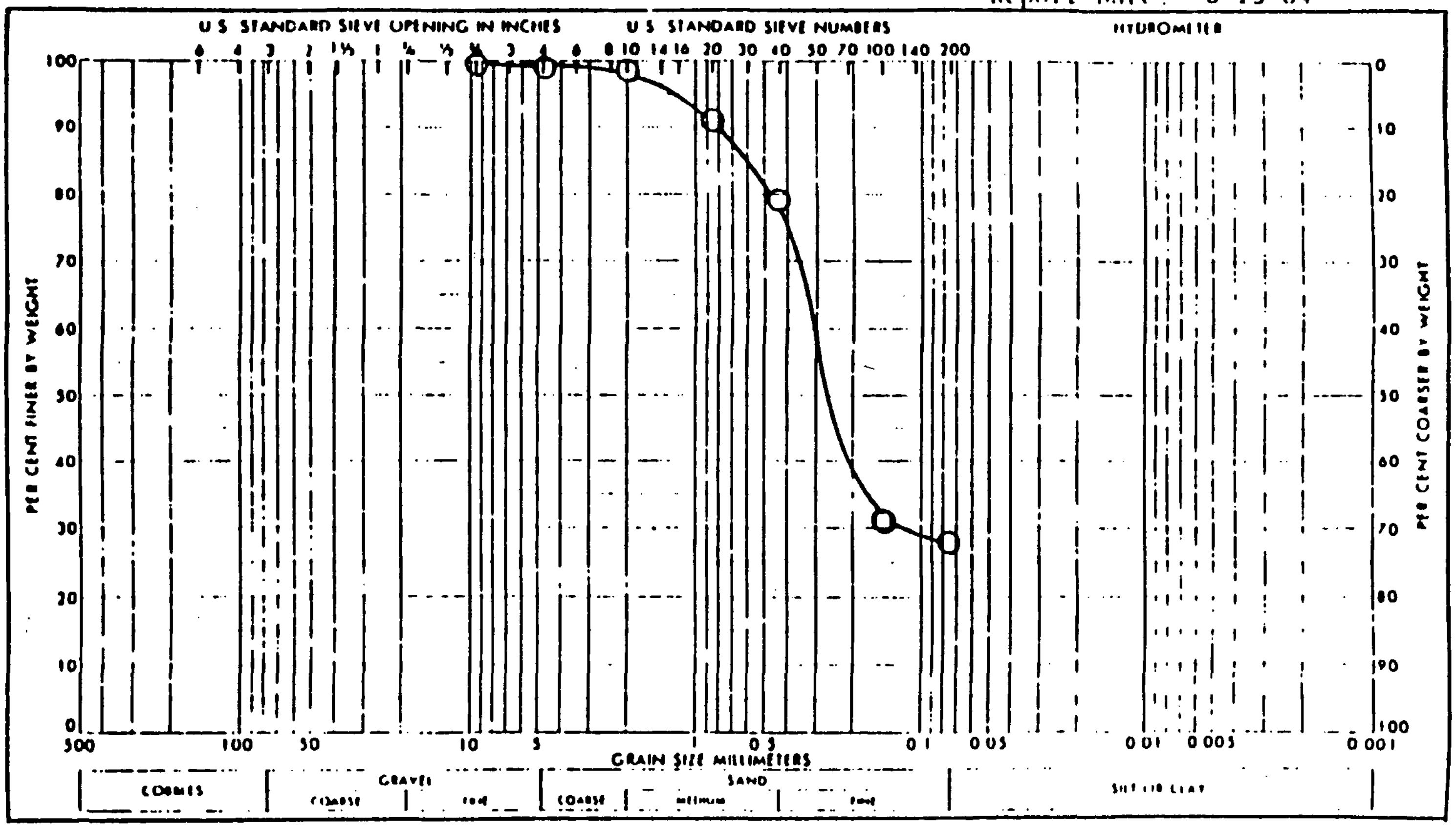
ANALYTICAL RESULTS
NYS DEC SUPERFUND

PETER COOPER CORPORATION
MARKHAMS, NEW YORK

SOIL GRADATION CURVE

Report Date: 8-13-84



O : B4 S-7 (12-14 feet)

FOR RECRA GEOTECHNICAL LABORATORY Carmen M. Panucci

DATE 8-13-84

I.D.# 2EM84001.5000

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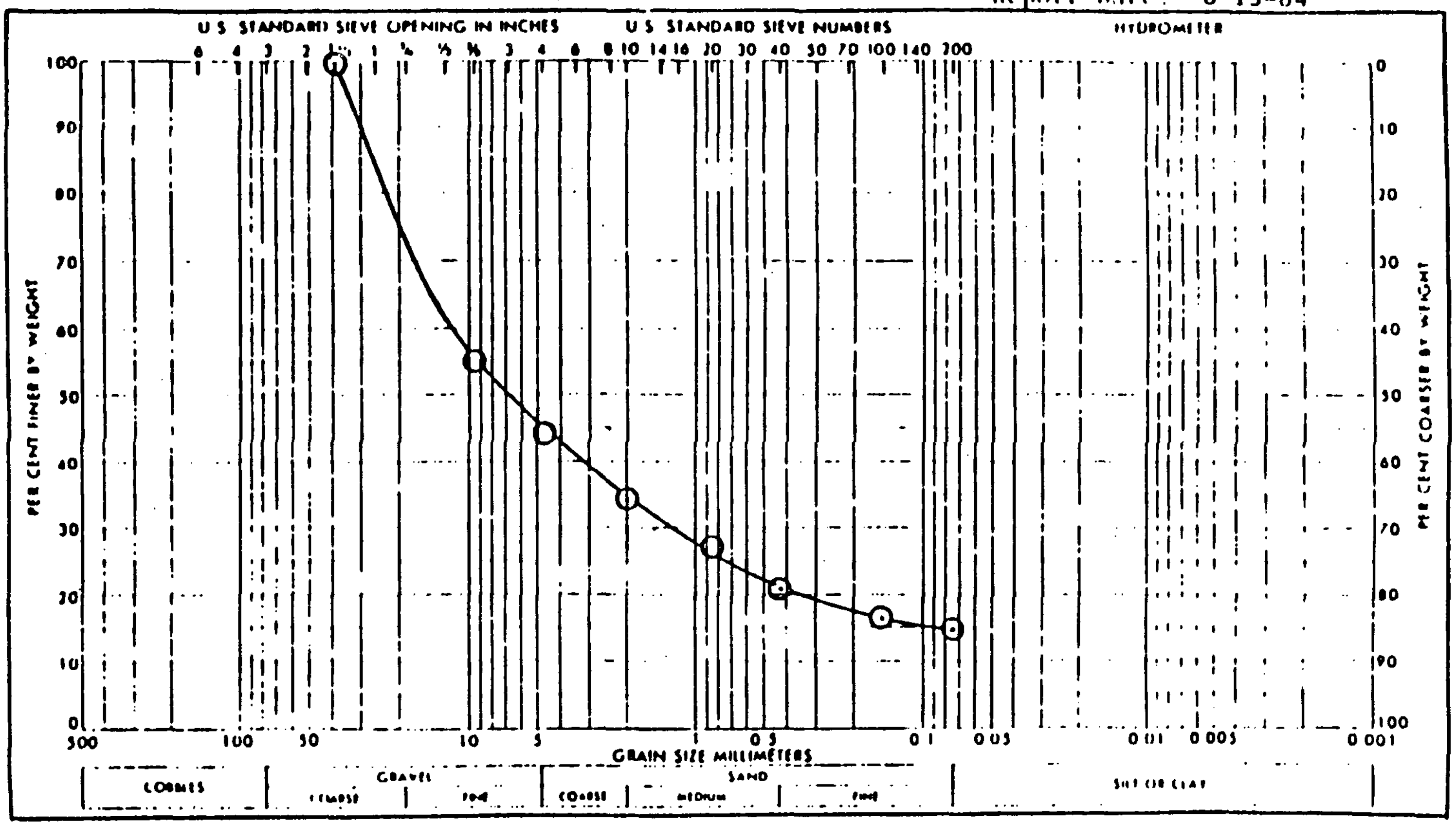
10

ANALYTICAL RESULTS
NYS DEC SUPERFUND

PETER COOPER CORPORATION
GOWANDA, NEW YORK

SOIL GRADATION CURVE

Report Date: 8-13-84



O : MW1A S-5 (8-10 feet)

FOR RECRA GEOTECHNICAL LABORATORY Carmen M. Panucci

DATE 8-13-84

I.D. 2EM84001.5000

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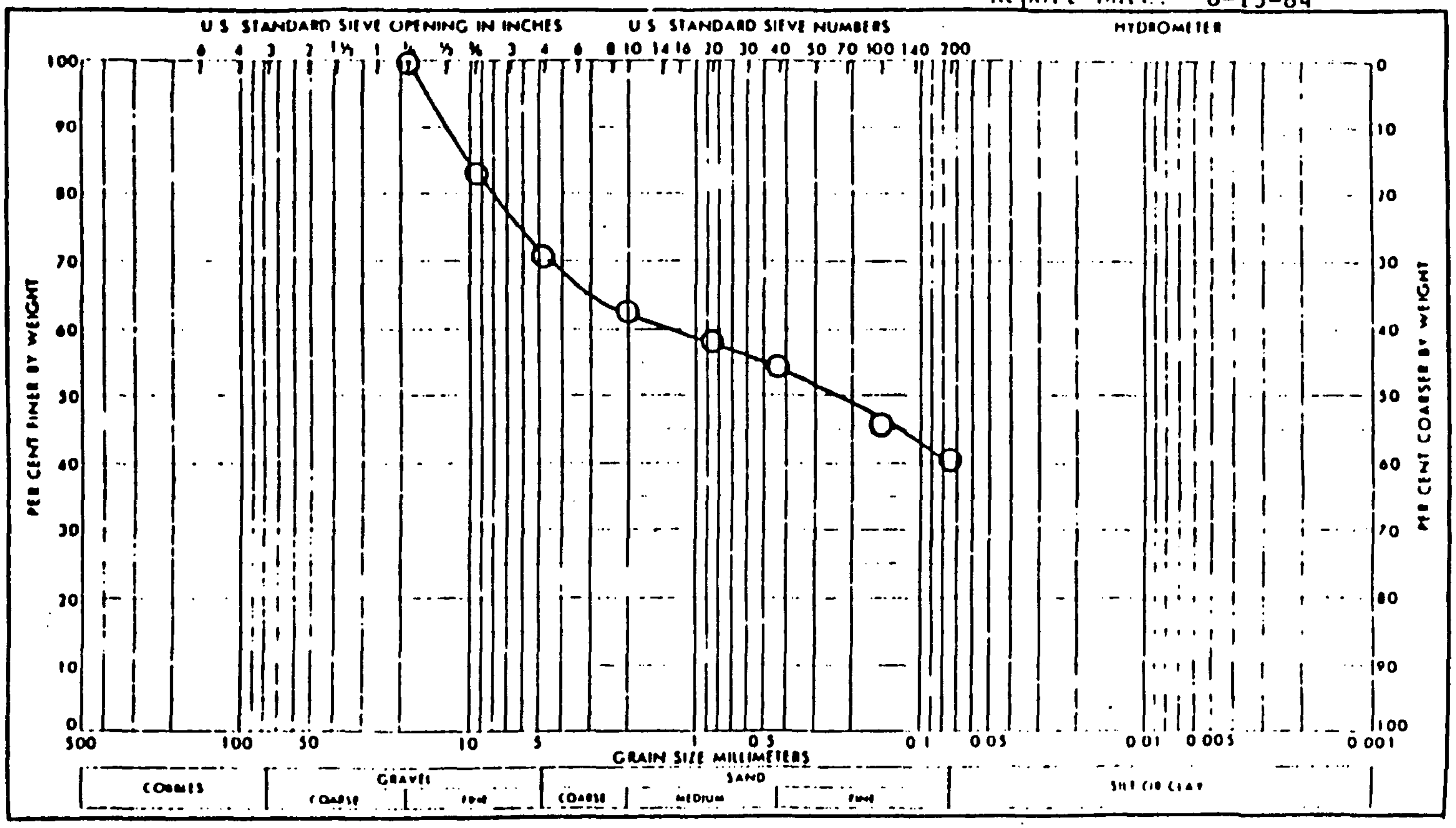
ANALYTICAL RESULTS
NYS DEC SUPERFUND

PETER COOPER CORPORATION
GOWANDA, NEW YORK

SOIL GRADATION CURVE

Report Date: 8-13-84



O = MW3 S-1 (0-2 feet)

FOR RECRA GEOTECHNICAL LABORATORY Carmen M Panuccio

DATE 8-13-84

I.D.# 2EM84001.5000

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PHASE II ANALYTICAL DATA

KEY TO ANALYTICAL SAMPLES
FOR PETER COOPER AND GOWANDA SITES 2EMS4001.5000

1-S	Surface Soil Gowanda
2-S	Surface Soil Gowanda
3-S	Surface Soil Gowanda
4-S	Surface Soil Markhams
5-S	Surface Soil Markhams
6-S	Surface Soil Markhams
7-S	Surface Soil Markhams
8-S	Surface Soil Markhams
9-S	Surface Soil Markhams
10-S	Surface Soil Markhams

1-C	Surface Water Sample with Sediment Gowanda (sediment portion)
2-C	Surface Water Sample with Sediment Gowanda (sediment portion)
3-C	Surface Water Sample with Sediment Markhams (sediment portion)
4-C	Surface Water Sample with Sediment Markhams (sediment portion)
5-C	Surface Water Sample with Sediment Markhams (sediment portion)

1-W	Surface Water with Sediment Gowanda (water portion)
2-W	Surface Water with Sediment Gowanda (water portion)
3-W	Surface Water with Sediment Markhams (water portion)
4-W	Surface Water with Sediment Markhams (water portion)
5-W	Surface Water with Sediment Markhams (water portion)

B-1	Ground Water Markhams
B-2	Ground Water Markhams
B-3	Ground Water Markhams
B-4	Ground Water Markhams
B-5	Ground Water Markhams

MW-1	Ground Water Gowanda
MW-2	Ground Water Gowanda
MW-3	Ground Water Gowanda
MW-4	Ground Water Gowanda
SW-1	Surface Water Gowanda
SW-2	Surface Water Gowanda
SW-3	Surface Water Gowanda

B-1	S#4	6-8'	Split Spoon Sample Markhams
B-1	S#8	14-16'	Split Spoon Sample Markhams
B-2	S#3	4-6'	Split Spoon Sample Markhams
B-2	S#8	14-16'	Split Spoon Sample Markhams
B-3	S#4	6-8'	Split Spoon Sample Markhams
B-3	S#9	16-18'	Split Spoon Sample Markhams
B-4	S#3	4-6'	Split Spoon Sample Markhams
B-4	S#8	14-16'	Split Spoon Sample Markhams
MW-1A	S#3	4-6'	Split Spoon Sample Gowanda
MW-3	S#2	2-4'	Split Spoon Sample Gowanda

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

COMMENTS:

Comments pertain to data on one or all pages of this report.

The samples were collected by Recra personnel on the date specified below each sample identification.

Analyses were performed according to U.S. Environmental Protection Agency Methodologies where applicable.

Halogenated Organic Scan (ECD) results are used for screening purposes only and are not designed for qualification or quantification of any specific organic compound. Results are calculated based upon the chlorine content and response factor of Lindane but do not imply either the presence or absence of Lindane itself. Halogenated Organic Scan results do not include volatile organic constituents.

Volatile Halogenated Organic Scan (Coulson's) results are used for screening purposes only and are not designed for qualification or quantification of specific organic compounds. Results are calculated based upon the chlorine content and response factor or Carbon Tetrachloride, but do not imply either the presence or absence of the compound itself.

Values reported as "less than" (<) indicate the working detection limit for the particular sample and/or parameter.

Results of the analysis of soils are corrected for moisture content and reported on a dry weight basis.

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Franco

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-560

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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) B-1 (6/6/84)	B-2 (6/4/84)	B-3 (6/1/84)	B-4 (6/1/84)
Chloride	mg/l	39	1.8	6.8	5.4
Soluble Arsenic	mg/l	<0.005	<0.005	<0.005	<0.005
Soluble Beryllium	mg/l	<0.005	<0.005	<0.005	<0.005
Soluble Chromium	mg/l	0.026	<0.01	<0.01	0.023
Soluble Copper	mg/l	<0.01	<0.01	<0.01	0.013
Soluble Lead	mg/l	<0.005	<0.005	<0.005	<0.005
Soluble Mercury	mg/l	<0.001	<0.001	<0.001	<0.001
Soluble Silver	mg/l	<0.006	0.015	<0.006	<0.006
Soluble Zinc	mg/l	[illegible]	0.791	0.315	5.00'

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R.V. Finn

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-560

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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		MW-1 (6/6/84)	MW-2 (6/6/84)	MW-3 (6/7/84)	MW-4 (6/7/84)
Chloride	mg/l	1.0	635	609	69
Soluble Arsenic	mg/l	<0.005	0.013	0.015	<0.005
Soluble Beryllium	mg/l	<0.005	<0.005	<0.005	<0.005
Soluble Chromium	mg/l	<0.01	0.863	0.362	0.223
Soluble Copper	mg/l	<0.01	<0.01	<0.01	<0.01
Soluble Lead	mg/l	<0.005	<0.005	<0.005	<0.005
Soluble Mercury	mg/l	<0.001	<0.001	<0.001	<0.001
Soluble Silver	mg/l	<0.006	<0.006	<0.006	<0.006
Soluble Zinc	mg/l	16.1	<0.005	0.018	0.065

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D. for R.V. Finn

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-560

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		SW-1 (6/7/84)	SW-2 (6/7/84)	SW-3 (6/7/84)
Chloride	mg/l	16	18	25
Total Arsenic	mg/l	<0.005	<0.005	<0.005
Total Beryllium	mg/l	<0.005	<0.005	<0.005
Total Chromium	mg/l	<0.01	<0.01	<0.01
Total Copper	mg/l	<0.01	<0.01	<0.01
Total Lead	mg/l	<0.005	<0.005	<0.005
Total Mercury	mg/l	<0.001	<0.001	<0.001
Total Silver	mg/l	<0.006	0.008	<0.006
Total Zinc	mg/l	0.013	<0.005	<0.005

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R.V. Finn

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RECRA ENVIRONMENTAL LABORATORIES
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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		1-W (6/7/84)	2-W (6/7/84)	3-W (6/11/84)
Chloride	mg/1	31	31	1.6
Total Arsenic	mg/1	0.006	0.006	0.006
Total Beryllium	mg/1	<0.005	<0.005	<0.005
Total Chromium	mg/1	0.019	<0.01	0.092
Total Copper	mg/1	<0.01	<0.01	0.017
Total Lead	mg/1	<0.005	<0.005	<0.005
Total Mercury	mg/1	<0.001	<0.001	<0.001
Total Silver	mg/1	<0.006	<0.007	<0.004
Total Zinc	mg/1	0.037	0.013	0.054

FOR RECRA ENVIRONMENTAL LABORATORIES D. J. D for R.V. Finn

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RECRA ENVIRONMENTAL LABORATORIES
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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

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PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) 4-W (6/11/84)	5-W (6/12/84)
Chloride	mg/l	2.4	4.2
Total Arsenic	mg/l	0.006	<0.005
Total Beryllium	mg/l	<0.005	<0.005
Total Chromium	mg/l	0.118	0.637
Total Copper	mg/l	0.022	0.018
Total Lead	mg/l	<0.005	<0.005
Total Mercury	mg/l	<0.001	<0.001
Total Silver	mg/l	<0.004	<0.007
Total Zinc	mg/l	0.070	0.114

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R.V. Finn

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		1-S (6/11/84)	2-S (6/11/84)	3-S (6/11/84)	4-S (6/12/84)
Total Arsenic	ug/g dry	11.5	11.1	10.5	13.6
Total Beryllium	ug/g dry	<0.5	<0.5	<0.5	<0.5
Total Chromium	ug/g dry	13.8	49.7	50.2	437
Total Copper	ug/g dry	18.9	25.9	25.7	34.1
Total Lead	ug/g dry	7.3	20.6	6.6	20.4
Total Mercury	ug/g dry	<0.05	<0.05	<0.06	0.11
Total Silver	ug/g dry	0.85	<0.4	<0.5	<0.5
Total Zinc	ug/g dry	67.1	104	100	156

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R.V. Finn

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RECRA ENVIRONMENTAL LABORATORIES
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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

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PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) 5-S (6/12/84)	6-S (6/12/84)	7-S (6/12/84)
Total Arsenic	ug/g dry	15.5	16.2	9.2
Total Beryllium	ug/g dry	<0.6	<0.5	<0.8
Total Chromium	ug/g dry	955	42.7	25,400
Total Copper	ug/g dry	50.1	24.4	124
Total Lead	ug/g dry	30.1	9.4	60.8
Total Mercury	ug/g dry	0.12	<0.06	0.91
Total Silver	ug/g dry	<0.5	0.54	<0.8
Total Zinc	ug/g dry	380	119	991

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R.Y. Finn

DATE 7/31/84

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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		8-S (6/12/84)	9-S (6/12/84)	10-S (6/12/84)
Total Arsenic	ug/g dry	9.9	20.2	14.8
Total Beryllium	ug/g dry	<0.5	<0.6	<0.5
Total Chromium	ug/g dry	2,340	1,850	162
Total Copper	ug/g dry	32.4	43.3	45.1
Total Lead	ug/g dry	8.8	11.4	12.4
Total Mercury	ug/g dry	<0.06	0.32	<0.05
Total Silver	ug/g dry	<0.5	<0.6	<0.5
Total Zinc	ug/g dry	135	168	467

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R.V. Finn

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RECRA ENVIRONMENTAL LABORATORIES
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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		1-C (6/7/84)	2-C (6/7/84)	3-C (6/11/84)
Total Arsenic	ug/g dry	8.6	11.2	3.9
Total Beryllium	ug/g dry	<0.9	<0.5	<0.9
Total Chromium	ug/g dry	63,600	57.9	27.2
Total Copper	ug/g dry	76.9	20.1	55.3
Total Lead	ug/g dry	7.6	41.9	144
Total Mercury	ug/g dry	1.9	<0.06	<0.1
Total Silver	ug/g dry	<0.4	4.1	<0.4
Total Zinc	ug/g dry	245	503	867

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R.Y. Finn

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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

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PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) 4-C (6/11/84)	5-C (6/12/84)
Total Arsenic	ug/g dry	2.7	3.0
Total Beryllium	ug/g dry	<2	<0.9
Total Chromium	ug/g dry	134	100
Total Copper	ug/g dry	85.2	25.6
Total Lead	ug/g dry	5.8	5.3
Total Mercury	ug/g dry	<0.3	<0.2
Total Silver	ug/g dry	6.7	<0.5
Total Zinc	ug/g dry	161	91.5

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PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) B-1, SB-4 (6-8') (5/24/84)	SAMPLE IDENTIFICATION (DATE) B-1, SB-8 (14-16') (5/24/84)
Total Arsenic	ug/g dry	7.8	8.2
Total Beryllium	ug/g dry	<0.5	<0.5
Total Chromium	ug/g dry	1,290 ✓	13.0
Total Copper	ug/g dry	41.7	16.7
Total Lead	ug/g dry	18.8	2.1
Total Mercury	ug/g dry	<0.05	<0.05
Total Silver	ug/g dry	0.63	2.9
Total Zinc	ug/g dry	131	104

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R.V. Finn

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RECRA ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) B-2, SB-3 (4-6') (5/24/84)	B-2, SB-8 (14-16') (5/24/84)
Total Arsenic	ug/g dry	8.6	7.5
Total Beryllium	ug/g dry	<0.5	<0.5
Total Chromium	ug/g dry	56.1	6.4
Total Copper	ug/g dry	31.3	15.3
Total Lead	ug/g dry	6.7	1.6
Total Mercury	ug/g dry	<0.05	<0.05
Total Silver	ug/g dry	<0.3	0.77
Total Zinc	ug/g dry	141	87.2

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R. V. Finn

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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		B-3, SB-4 (6-8') (5/25/84)	B-3, SB-9 (16-18') (5/25/84)
Total Arsenic	ug/g dry	11.5	5.2
Total Beryllium	ug/g dry	<0.4	<0.5
Total Chromium	ug/g dry	13.7	4.9
Total Copper	ug/g dry	43.4	14.5
Total Lead	ug/g dry	7.6	4.9
Total Mercury	ug/g dry	<0.04	<0.07
Total Silver	ug/g dry	<0.4	<0.3
Total Zinc	ug/g dry	269	224

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R.V. Finn

DATE 7/31/84

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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) B-4, SB-3 (4-6') (5/29/84)	SAMPLE IDENTIFICATION (DATE) B-4, SB-8 (14-16') (5/29/84)
Total Arsenic	ug/g dry	9.1	11.7
Total Beryllium	ug/g dry	<0.4	<0.4
Total Chromium	ug/g dry	21.9	10.1
Total Copper	ug/g dry	27.9	24.4
Total Lead	ug/g dry	2.2	1.7
Total Mercury	ug/g dry	<0.08	<0.07
Total Silver	ug/g dry	<0.3	0.66
Total Zinc	ug/g dry	83.3	73.4

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R. V. Finn

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RECRA ENVIRONMENTAL LABORATORIES

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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		MW-1A, SB-3 (4-6') (5/21/84)	MW-3, SB-2 (2-4') (5/22/84)
Total Arsenic	ug/g dry	8.9	10.7
Total Beryllium	ug/g dry	<0.4	<0.5
Total Chromium	ug/g dry	11.9	3,650 ✓
Total Copper	ug/g dry	15.9	100
Total Lead	ug/g dry	1.2	5.9
Total Mercury	ug/g dry	<0.06	0.42
Total Silver	ug/g dry	<0.3	<0.5
Total Zinc	ug/g dry	56.8	773

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R.Y. Finn

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RECRA ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) B-1 (6/6/84)	B-2 (6/4/84)	B-3 (6/1/84)	B-4 (6/1/84)
Halogenated Organic Scan (ECD)	µg/l as Chlorine; Lindane Standard	<0.5	<0.5	<0.5	<0.5
Volatile Halogenated Organic Scan (Coulson's)	µg/l as Carbon Tetrachloride Standard	<5	62	18	27

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Prario

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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

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PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		MW-1 (6/6/84)	MW-2 (6/6/84)	MW-3 (6/7/84)	MW-4 (6/7/84)
Halogenated Organic Scan (ECD)	µg/l as Chlorine; Lindane Standard	<0.5	<0.5	<0.5	<0.5
Volatile Halogenated Organic Scan (Coulson's)	µg/l as Carbon Tetrachloride Standard	30	<5	540	2,000

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Prarico

DATE 7/31/84

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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

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PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) SW-1 (6/7/84)	SW-2 (6/7/84)	SW-3 (6/7/84)
Halogenated Organic Scan (ECD)	µg/l as Chlorine; Lindane Standard	<0.5	<0.5	<0.5
Volatile Halogenated Organic Scan (Coulson's)	µg/l as Carbon Tetrachloride Standard	34	50	54

FOR RECRA ENVIRONMENTAL LABORATORIES [illegible]

DATE 7/31/84

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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) 1-W (6/7/84)	2-W (6/7/84)	3-W (6/11/84)
Halogenated Organic Scan (ECD)	ug/l as Chlorine; Lindane Standard	<0.5	<0.5	<0.5
Volatile Halogenated Organic Scan (Coulson's)	ug/l as Carbon Tetrachloride Standard	26	33	30

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Travis

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RECRA ENVIRONMENTAL LABORATORIES

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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

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PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) 4-W (6/11/84)	5-W (6/12/84)
Halogenated Organic Scan (ECD)	μg/l as Chlorine; Lindane Standard	<0.5	<0.5
Volatile Halogenated Organic Scan (Coulson's)	μg/l as Carbon Tetrachloride Standard	58	10

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Trasciu

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PETER COOPER CORPORATION
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PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		1-S (6/11/84)	2-S (6/11/84)	3-S (6/11/84)	4-S (6/12/84)
Halogenated Organic Scan (ECD)	ug/g dry as Chlorine; Lindane Standard	<0.5	<0.5	<0.5	<0.5
Volatile Halogenated Organic Scan (Coulson's)	ug/g dry as Chlorine; Carbon Tetrachloride Standard	<1	<1	<1	<1
Dry Weight (103°C)	%	93	92	91	81

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Francis

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES

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PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

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PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		5-S (6/12/84)	6-S (6/12/84)	7-S (6/12/84)
Halogenated Organic Scan (ECD)	ug/g dry as Chlorine; Lindane Standard	<0.5	<0.5	<0.5
Volatile Halogenated Organic Scan (Coulson's)	ug/g dry as Chlorine; Carbon Tetrachloride Standard	<1	<1	<1
Dry Weight (103°C)	%	76	88	46

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Travis

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RECRA ENVIRONMENTAL LABORATORIES
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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

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PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) 8-S (6/12/84)	9-S (6/12/84)	10-S (6/12/84)
Halogenated Organic Scan (ECD)	µg/g dry as Chlorine; Lindane Standard	<0.5	<0.5	<0.5
Volatile Halogenated Organic Scan (Coulson's)	µg/g dry as Chlorine; Carbon Tetrachloride Standard	<1	<1	<1
Dry Weight (103°C)	%	84	81	90

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Franco

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-560

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		1-C (6/7/84)	2-C (6/7/84)	3-C (6/11/84)
Halogenated Organic Scan (ECD)	μg/g dry as Chlorine; Lindane Standard	<1	<0.5	<0.5
Volatile Halogenated Organic Scan (Coulson's)	μg/g dry as Chlorine; Carbon Tetrachloride Standard	<3	<2	<3
Dry Weight (103°C)	%	37	66	42

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Francis

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-560

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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) 4-C (6/11/84)	5-C (6/12/84)
Halogenated Organic Scan (ECD)	ug/g dry as Chlorine; Lindane Standard	<1	<0.5
Volatile Halogenated Organic Scan (Coulson's)	ug/g dry as Chlorine; Carbon Tetrachloride Standard	<6	<3
Dry Weight (103°C)	%	18	44

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Draus

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-560

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) B-1, SB-4 (6-8') (5/24/84)	SAMPLE IDENTIFICATION (DATE) B-1, SB-8 (14-16') (5/24/84)
Halogenated Organic Scan (ECD)	µg/g dry as Chlorine; Lindane Standard	<0.5	<0.5
Volatile Halogenated Organic Scan (Coulson's)	µg/g dry as Chlorine; Carbon Tetrachloride Standard	<1	<1
Dry Weight (103°C)	%	86	87

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Francis

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-560

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) B-2, SB-3 (4-6') (5/24/84)	B-2, SB-8 (14-16') (5/24/84)
Halogenated Organic Scan (ECD)	µg/g dry as Chlorine; Lindane Standard	<0.5	<0.5
Volatile Halogenated Organic Scan (Coulson's)	µg/g dry as Chlorine; Carbon Tetrachloride Standard	<1	<1
Dry Weight (103°C)	%	84	81

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Maio

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-560

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) B-3, SB-4 (6-8') (5/25/84)	SAMPLE IDENTIFICATION (DATE) B-3, SB-9 (16-18') (5/25/84)
Halogenated Organic Scan (ECD)	µg/g dry as Chlorine; Lindane Standard	<0.5	<0.5
Volatile Halogenated Organic Scan (Coulson's)	µg/g dry as Chlorine; Carbon Tetrachloride Standard	<1	<1
Dry Weight (103°C)	%	86	76

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Frazier

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-560

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) B-4, SB-3 (4-6') (5/29/84)	B-4, SB-8 (14-16') (5/29/84)
Halogenated Organic Scan (ECD)	µg/g dry as Chlorine; Lindane Standard	<0.5	<0.5
Volatile Halogenated Organic Scan (Coulson's)	µg/g dry as Chlorine; Carbon Tetrachloride Standard	<1	<1
Dry Weight (103°C)	%	87	84

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Fraccia

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.

Report Date: 7/31/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) MW-1A, SB-3 (4-6') (5/21/84)	MW-3, SB-2 (2-4') (5/22/84)
Halogenated Organic Scan (ECD)	μg/g dry as Chlorine; Lindane Standard	<0.5	<0.5
Volatile Halogenated Organic Scan (Coulson's)	μg/g dry as Chlorine; Carbon Tetrachloride Standard	<1	<1
Dry Weight (103°C)	%	90	80

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Braun

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-560

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.
QUALITY CONTROL

Report Date: 7/31/84

REPLICATE ANALYSIS OF
SAMPLE MW-3, SB-2 (2-4')

PARAMETER	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Halogenated Organic Scan (ECD)	µg/g dry as Chlorine; Lindane Standard	1.2	1.4	1.3	0.14	11

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Bracco

DATE 7/31/84

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.
QUALITY CONTROL

Report Date: 7/31/84

RECOVERY ANALYSIS OF
SOIL METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Lindane	0.24	0.20	83

RECOVERY ANALYSIS OF
SOIL METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Lindane	0.24	0.20	83

RECOVERY ANALYSIS OF
SOIL METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Lindane	0.13	0.12	92

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Prairie

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-560

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.
QUALITY CONTROL

Report Date: 7/31/84

RECOVERY ANALYSIS OF
WATER METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Lindane	0.24	0.26	108

RECOVERY ANALYSIS OF
WATER METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Lindane	0.24	0.22	92

RECOVERY ANALYSIS OF
WATER METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Lindane	0.24	0.23	96

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Prazio

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.
QUALITY CONTROL

Report Date: 7/31/84

REPLICATE ANALYSIS OF
SAMPLE B-4

PARAMETER	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Volatile Halogenated Organic Scan (Coulson's)	µg/l as Chlorine; Carbon Tetrachloride Standard	31	22	27	6.4	24

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Francis

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-560

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.
QUALITY CONTROL

Report Date: 7/31/84

RECOVERY ANALYSIS OF
SAMPLE SW-1

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Carbon Tetrachloride	100	120	120

RECOVERY ANALYSIS OF
SAMPLE MW-2

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Carbon Tetrachloride	16	18	113

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Arasino

DATE 7/31/84

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.
QUALITY CONTROL

Report Date: 7/31/84

RECOVERY ANALYSIS OF
SAMPLE 8-S

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Carbon Tetrachloride	73	71	97

RECOVERY ANALYSIS OF
SAMPLE MW-3, SB-2 (2-4')

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Carbon Tetrachloride	16	12	75

FOR RECRA ENVIRONMENTAL LABORATORIES [illegible]

DATE 7/31/84

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RECRA ENVIRONMENTAL LABORATORIES

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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.
QUALITY CONTROL

Report Date: 7/31/84

REPLICATE ANALYSES

PARAMETER	SAMPLE I.D.	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
	B-3	mg/l	6.7	7.0	6.85	0.21	3.1
Chloride	2-W	mg/l	31.5	31.5	31.5	0	0
	B-1	mg/l	<0.005	<0.005	<0.005	-	-
Soluble Arsenic	2-W	mg/l	0.006	0.006	0.006	0	0
	2-W	mg/l	<0.005	<0.005	<0.005	-	-
Soluble Beryllium	5-W	mg/l	<0.005	<0.005	<0.005	-	-
	2-W	mg/l	<0.01	<0.01	<0.01	-	-
Soluble Chromium	5-W	mg/l	0.660	0.613	0.637	0.033	5.2
	2-W	mg/l	<0.01	<0.01	<0.01	-	-
Soluble Copper	5-W	mg/l	0.019	0.017	0.018	0.0014	7.9
	2-W	mg/l	<0.005	<0.005	<0.005	-	-
Soluble Lead	5-W	mg/l	<0.005	<0.005	<0.005	-	-
	1-W	mg/l	<0.001	<0.001	<0.001	-	-
Soluble Mercury	2-W	mg/l	<0.001	<0.001	<0.001	-	-
	B-2	mg/l	0.014	0.016	0.015	0.0014	9.4
Soluble Silver	2-W	mg/l	<0.007	<0.007	<0.007	-	-
	2-W	mg/l	0.014	0.011	0.0125	0.0021	17
Soluble Zinc	5-W	mg/l	0.114	0.113	0.1135	0.0007	0.62

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R.V. Finn

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-560

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.
QUALITY CONTROL

Report Date: 7/31/84

RECOVERY ANALYSIS

PARAMETER	SAMPLE IDENTIFICATION	µg OF SPIKE	µg RECOVERED	% RECOVERY
Chloride	B-3	2,500	2,462	98.5
	2-W	2,500	2,497	99.9
Soluble Arsenic	B-4	100	97	97
	1-W	100	113	113
Soluble Beryllium	MW-2	1,000	1,020	102
	4-W	1,000	930	93
Soluble Chromium	B-2	1,000	1,030	103
	4-W	1,000	950	95
Soluble Copper	B-2	1,000	1,020	102
	4-W	1,000	940	94
Soluble Lead	B-2	100	99	99
Soluble Mercury	MW-2	0.4	0.308	77
	1-W	0.4	0.384	96
Soluble Silver	B-4	1,000	870	87
	1-W	1,000	920	92
Soluble Zinc	B-2	1,000	990	99
	1-W	1,000	1,010	101

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R.Y. Finn

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-560

ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.
QUALITY CONTROL

Report Date: 7/31/84

REPLICATE ANALYSES

PARAMETER	SAMPLE IDENTIFICATION	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
	6-S	ug/g dry	18.8	13.7	16.2	3.6	22
	5-C	ug/g dry	2.95	3.09	3.02	0.098	3.3
Total Arsenic	B-3, SB-9 (16-18')	ug/g dry	4.88	5.44	5.16	0.40	7.8
	6-S	ug/g dry	<0.5	<0.5	<0.5	-	-
	5-C	ug/g dry	<0.9	<0.9	<0.9	-	-
Total Beryllium	B-3, SB-9 (16-18')	ug/g dry	<0.5	<0.5	<0.5	-	-
	6-S	ug/g dry	40.8	44.5	42.6	2.6	6.2
	5-C	ug/g dry	123	77.5	100	32	32
Total Chromium	B-3, SB-9 (16-18')	ug/g dry	4.66	5.07	4.87	0.29	6.0
	6-S	ug/g dry	23.97	24.18	24.07	0.15	0.[illegible]
	5-C	ug/g dry	26.56	24.68	25.63	1.3	5.2
Total Copper	B-3, SB-9 (16-18')	ug/g dry	14.4	14.56	14.47	0.13	0.90
	6-S	ug/g dry	9.3	9.5	9.4	0.14	1.5
	5-C	ug/g dry	4.15	6.41	5.28	1.59	30
Total Lead	B-3, SB-9 (16-18')	ug/g dry	2.82	7.12	4.94	3.0	61
	6-S	ug/g dry	<0.06	<0.06	<0.06	-	-
	5-C	ug/g dry	<0.2	<0.2	<0.2	-	-
Total Mercury	B-3, SB-9 (16-18')	ug/g dry	<0.07	<0.07	<0.07	-	-
	6-S	ug/g dry	0.45	0.62	0.535	0.12	22
	5-C	ug/g dry	<0.5	<0.5	<0.5	-	-
Total Silver	B-3, SB-9 (16-18')	ug/g dry	<0.3	<0.3	<0.3	-	-
	6-S	ug/g dry	119	117	118	1.4	1.2
	5-C	ug/g dry	94.8	88.4	91.5	4.49	4.9
Total Zinc	B-3, SB-9 (16-18')	ug/g dry	200	249	224	34.4	15

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R.V. Finn

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-560

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ANALYTICAL RESULTS

PETER COOPER CORPORATION
GOWANDA AND MARKHAMS, N.Y.
QUALITY CONTROL

Report Date: 7/31/84

RECOVERY ANALYSIS

PARAMETER	SAMPLE IDENTIFICATION	µg OF SPIKE	µg RECOVERED	% RECOVERY
	5-S	100	98	98
Total Arsenic	MW-3, SB-2 (2-4')	100	99	99
	5-S	1,000	930	93
	10-S	1,000	990	99
Total Beryllium	5-C	1,000	950	95
	5-S	1,000	970	97
	5-C	1,000	1,090	109
Total Chromium	B-3, SB-9 (16-18')	1,000	1,080	108
	5-S	1,000	1,040	104
	10-S	1,000	970	97
Total Copper	MW-3, SB-2 (2-4')	1,000	900	90
	5-S	100	140	140
	5-C	100	71	71
Total Lead	MW-3, SB-2 (2-4')	100	108	108
	5-S	0.4	0.464	116
	B-3, SB-9 (16-18')	0.4	0.412	103
Total Mercury	MW-3, SB-2 (2-4')	0.4	0.412	103
	5-S	1,000	1,020	102
	10-S	1,000	1,040	104
Total Silver	5-C	1,000	970	97
	5-S	1,000	950	95
Total Zinc	5-C	1,000	980	98

FOR RECRA ENVIRONMENTAL LABORATORIES D.J.D for R. V. Finn

DATE 7/31/84

RECRA ENVIRONMENTAL LABORATORIES

APPENDIX B-3

1989 O'Brien & Gere RI Results

PETER COOPER CORP.
GOWANDA SITE PLAN

N

LEGEND

- GROUNDWATER MONITORING WELL
- SOIL/SEDIMENT SAMPLE LOCATION
- SURFACE WATER SAMPLE LOCATION
- RESISTIVITY MEASUREMENT
- LEACHATE/SEEP SAMPLE LOCATION
- EM 1 ELECTROMAGNETIC SURVEY TRAVERSE
- LANDFILL BORING LOCATION

From 1989 R I Report

O'BRIEN & GERE
O'Brien & Gere Engineers, Inc.

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TABLE 1
GOWANDA SITE
WASTE CHARACTERIZATION

Location	Sample Date	Total Chromium (mg/kg)(1)	Total Arsenic (mg/kg)(1)	Total Zinc (mg/kg)(1)	EP Chromium (mg/l)(2)	EP Arsenic (mg/l)(2)	EP Zinc (mg/l)(2)
G-47	8/30/88	(3)	(3)	(3)	0.32	LT 0.5	0.44
G-48	7/11/88	52	11	71	LT 0.5	LT 0.5	0.29
G-50	7/11/88	44,000	6.5	840	LT 0.5	LT 0.5	0.44
G-52	8/30/88	(3)	(3)	(3)	0.06	LT 0.5	0.50
G-54	7/12/88	23	16	62	LT 0.5	LT 0.5	0.44
G-56	8/30/88	(3)	(3)	(3)	0.06	LT 0.5	0.22
Mean		13,000	9.8	620	0.20	LT 0.5	0.39
Criteria (40 CFR 261)		---	---	---	5.0	5.0	No limit

(1) Expressed on a dry weight basis

(2) Expressed in milligrams/liter in leachate per 40 CFR 261

(3) See Appendix A for composite waste analyses

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TABLE 3
GOWANDA SITE
INFILTROMETER TEST DATA

Test No.	Total Elapsed Time (sec)	Cumulative Liquid Added (ml) Inner	Outer	Calculated Infiltration Rate (cm/sec) Inner	Outer
1	0				
	480	1700	4300	---	---
	1860	2050	5850	---	---
	7260	2340	6850	---	--
	65580	2540	8650	---	---
	149880	3090	10400	---	---
	259380	3190	11350	---	---
	329880	3440	12850	1.4E-5	1.8E-5
2	0				
	10860	280	260	---	---
	69000	1385	260	---	---
	154560	2255	910	---	---
	168240	2255	1070	1.8E-5	2.9E-6
3	0				
	10560	0	1590	---	---
	68700	875	7865	---	---
	153180	1725	13795	---	---
	167640	1725	14635	1.4E-5	4.0E-5

AVERAGE CAP INFILTRATION RATE 1.8E-5 cm/sec

TABLE 4
GOWANDA SITE
SOIL ANALYSES[1]

Location(2)	Depth(3)	Zinc(4)	Arsenic	Total Chromium	Hexavalent Chromium (5)
14	3	NA	6.5	6.5	LT 0.09
15	3	NA	32	481	12
16	3	NA	9.6	96	3.7
17	3	NA	6.1	51	1.1
18	3	NA	1.6	113	1.8
19	3	NA	17	14	0.11
20	3	NA	18	40	0.29
21	3	NA	24	70	0.77
22	3	NA	34	186	7.8
23	3	NA	19	16	0.090
24	3	NA	29	14	LT 0.08
25	3	NA	23	80	1.9
26	3	NA	21	115	2.0
27	3	NA	36	14	0.014
28	3	NA	9.5	26	0.45
29	3	NA	18	12	0.10
30	3	NA	417	801	17
31	3	NA	14	6.0	LT 0.08
32	3	NA	28	19	LT 0.08
33	3	NA	27	43	0.61
34	3	NA	10	409	4
34	12	NA	3.3	470	16
35	3	NA	8.5	383	6.2
35	12	NA	7.7	1,430	24
36	3	NA	4.6	21	LT 0.2
36	12	NA	3.0	14	LT 0.2
37	3	NA	11	88	0.4
37	12	NA	8.9	72	0.31
38	3	NA	3.7	13	LT 0.15
38	12	NA	3.6	13	LT 0.23
39	3	NA	9.6	312	1.5
39	12	NA	6.8	136	0.61
40	3	NA	2.8	13	LT 0.09
40	12	NA	3.2	15	LT 0.19
41	3	NA	34	16	0.22
41	12	NA	25	16	0.21
42	3	NA	9.7	17	0.13
42	12	NA	18	19	0.19
43	3	NA	10	50	0.79
43	12	NA	11	166	LT 0.12
44	3	NA	19	3,610	5.2
44	12	NA	10	3,420	1.6
45	3	NA	10	17	0.15
45	12	NA	12	13	LT 0.07

TABLE 4
GOWANDA SITE
SOIL ANALYSES[1]
(continued)

Location(2)	Depth(3)	Zinc(4)	Arsenic	Total Chromium	Hexavalent Chromium (5)
46	3	NA	10	62	1.8
46	12	NA	14	33	0.78
57	3	80	11	28	LT 0.1
58	3	72	18	17	LT 0.1
59	3	84	18	34	LT 0.1
60	3	240	16	1,400	LT 0.1
60	12	120	7.4	600	LT 0.1
61	3	390	20	720	LT 0.1
61	12	140	15	520	LT 0.1
62	3	310	28	330	LT 0.1
62	12	480	19	33,000	LT 0.1
63	3	390	23	530	LT 0.1
63	12	390	16	12,000	LT 0.1
64	36	77	11	100	LT 0.1
65	3	1100	12	120	LT 0.1
65	12	300	13	70	LT 0.1
66	3	200	20	820	LT 0.1
66	12	170	9.1	2000	LT 0.1
67	3	61	8.7	29	LT 0.1
67	12	64	12	16	LT 0.1
68	3	91	12	21	LT 0.1
68	12	54	8.1	14	LT 0.1

(1) All concentrations reported in milligrams/kilogram on a dry weight basis
(2) Locations noted on Figure 2
(3) All "3" indicates core of 0 to 3 inches below grade, a "12" indicates core of 9 to 12 inches below grade, a "36" indicates core of 33 to 36 inches below grade
(4) NA represents "Not Analyzed"
(5) LT represents "Less Than"

TABLE 5
GOWANDA SITE
BACKGROUND CONCENTRATIONS - SOIL[1]

Location[2]	Depth[3]	Zinc[4]	Arsenic	Total Chromium	Hexavalent Chromium[5]
57	3	80	11	28	LT 0.1
58	3	72	18	17	LT 0.1
59	3	84	18	34	LT 0.1
No. Of Observations		3	3	3	3
Mean		79	16	26	LT 0.1
Standard Deviation		6	4	9	0

LT = Less Than

(1) All concentrations reported in milligrams/kilogram on a dry weight basis
(2) Locations noted on Figure 2
(3) All "3" indicates core of 0 to 3 inches below grade, a "12" indicates core of 9 to 12 inches below grade
(4) NA represents "Not Analyzed"
(5) LT represents "Less Than"
1

TABLE 7
GOWANDA SITE
GROUND WATER QUALITY RESULTS - INORGANIC ANALYSES[1]

Monitoring Well	Date	pH	SPCOND (umhos/cm)	Arsenic	Chromium	Hexavalent Chromium	Zinc	Chloride	Sulfate
1-Shallow (Abandon)	---	---	---	---	---	---	---	---	---
1R Shallow	4/13/87	6.5	290	0.13	0.16	0.006	---	---	---
1R Shallow	7/12/88	6.0	425	LT 0.005	0.09	0.108 [2]	11	---	---
1-Deep	9/9/86	8.5	725	---	---	---	---	---	---
1-Deep	4/13/87	6.8	650	0.011	0.017	0.007	---	---	---
1-Deep (Dup)	4/13/87	6.9	680	0.009	0.018	0.005	---	---	---
1-Deep	7/12/88	6.0	460	LT 0.005	LT 0.01	0.012	0.02	---	---
1-Deep (Dup)	7/12/88	6.2	425	LT 0.005	LT 0.01	LT 0.010	0.02	---	---
2-Deep	9/9/86	6.5	5000	---	---	---	---	---	---
2-Deep (Dup)	9/9/86	6.5	5000	---	---	---	---	---	---
2-Deep	4/13/87	6.5	4600	0.026	0.064	0.029	---	---	---

301301

TABLE 7
GOWANDA SITE
GROUND WATER QUALITY RESULTS - INORGANIC ANALYSES(1)

Monitoring Well	Date	pH	SPCOND (umhos/cm)	Arsenic	Chromium	Hexavalent Chromium	Zinc	Chloride	Sulfate
4-Deep	9/9/86	---	---	---	---	---	---	---	---
4-Deep	4/13/87	9.3	780	0.17	0.44	LT 0.005	---	75	180
4-Deep	7/12/88	8.2	---	---	---	---	---	---	---
5	9/9/86	6.7	1800	---	---	---	---	---	---
5	4/13/87	6.6	1370	0.06	0.14	LT 0.005	---	---	---
6	9/9/86	7.4	2800	---	---	---	---	---	---
6	4/13/87	7.1	2300	0.02	0.051	0.009	---	12	LT 1
6	7/11/88	6.5	2750	0.045	0.37	0.416 (2)	0.50	---	---

(1) Results reported in mg/l (ppm)
(2) Fined grained soils resulted in recovered groundwater turbidities greater than 100 NTU. Turbid samples cause interferences with colorimetric analyses. See Filterable Analyses on Table 8.

TABLE 8
GOWANDA SITE
GROUND WATER QUALITY
FILTERABLE METALS ANALYSES[1]

Monitoring Well	Sample Date	Arsenic	Chromium	Hexavalent Chromium	Zinc	Calcium	Magnesium	Sodium
1-Shallow (Abandon)	---	---	---	---	---	---	---	---
1R-Shallow	4/13/87	---	---	---	---	---	---	---
1R Shallow	7/12/88	LT 0.005	0.01	LT 0.010	0.22	---	---	---
1-Deep	9/9/86	LT 0.005	0.008	0.006	0.019	---	---	---
1-Deep	4/13/87	---	---	---	---	---	---	---
1-Deep (Dup)	4/13/87	---	---	---	---	---	---	---
1-Deep	7/12/88	LT 0.005	LT 0.01	LT 0.010	0.02	---	---	---
1-Deep (Dup)	7/12/88	LT 0.005	LT 0.01	LT 0.010	0.01	---	---	---
2-Deep	9/9/86	0.055	0.079	0.018	0.039	---	---	---
2-Deep (Dup)	9/9/86	LT 0.005	0.014	0.016	0.016	---	---	---
2-Deep	4/13/87	---	---	---	---	---	---	---
4-Deep	9/9/86	LT 0.005	0.014	LT 0.005	0.016	---	---	---
4-Deep	4/13/87	---	0.009	---	---	4.8	0.98	170
4-Deep	7/12/88	0.027	LT 0.01	---	0.02	---	---	---

TABLE 8
GOWANDA SITE
GROUND WATER QUALITY
FILTERABLE METALS ANALYSES(1)

Monitoring Well	Sample Date	Arsenic	Chromium	Chromium Hex	Zinc	Calcium	Magnesium	Sodium
5	9/9/86	LT 0.005	LT 0.005	LT 0.005	---	---	---	---
5	4/13/87	---	---	---	---	---	---	---
6	9/9/86	0.036	0.033	LT 0.005	0.033	---	---	---
6	4/13/87	---	0.024	---	---	92	92	15
6	7/11/88	0.014	0.04	LT 0.010	LT 0.01	---	---	---

(1) All samples field filtered through 0.45 micron membrane filter. Results reported in mg/l (ppm).

TABLE 9
GOWANDA SITE
GROUND WATER QUALITY
SPECIFIC ORGANIC ANALYSES (1)(2)

PARAMETER	WELL 1S	WELL 1D	WELL 1D (Dup)	WELL 4D	WELL 6S
2-Chlorophenol	LT 1	LT 1	LT 1	LT 1	LT 1
2-Nitrophenol	LT 1	LT 1	LT 1	LT 1	LT 1
Phenol	LT 1	LT 1	LT 1	LT 1	LT 1
2,4-Dimethylphenol	LT 5	LT 5	LT 5	LT 5	LT 5
2,4-Dichlorophenol	LT 5	LT 5	LT 5	LT 5	LT 5
2,4,6-Trichlorophenol	LT 5	LT 5	LT 5	LT 5	LT 5
4-Chloro-3-Methylphenol	LT 5	LT 5	LT 5	LT 5	LT 5
2,4-Dinitrophenol	LT 50	LT 50	LT 50	LT 50	LT 50
2-Methyl-4,6-Dinitrophenol	LT 50	LT 50	LT 50	LT 50	LT 50
Pentachlorophenol	LT 50	LT 50	LT 50	LT 50	LT 50
4-Nitrophenol	LT 50	LT 50	LT 50	LT 50	LT 50
Chloromethane	LT 1	LT 1	LT 1	LT 1	LT 1
Bromomethane	LT 1	LT 1	LT 1	LT 1	LT 1
Vinyl Chloride	LT 1	LT 1	LT 1	LT 1	LT 1
Chloroethane	LT 1	LT 1	LT 1	LT 1	LT 1
Methylene Chloride	LT 1	LT 1	LT 1	LT 1	LT 1
1,1-Dichloroethene	LT 1	LT 1	LT 1	LT 1	LT 1
1,2-Dichloroethane	LT 1	LT 1	LT 1	LT 1	LT 1
t-1,2-Dichloroethene	LT 1	LT 1	LT 1	LT 1	LT 1
Chloroform	LT 1	LT 1	LT 1	LT 1	LT 1
1,2-Dichloroethane	LT 1	LT 1	LT 1	LT 1	LT 1
1,1,1-Trichloroethane	LT 1	LT 1	LT 1	LT 1	LT 1
Carbon Tetrachloride	LT 1	LT 1	LT 1	LT 1	LT 1
Bromodichloromethane	LT 1	LT 1	LT 1	LT 1	LT 1
1,2-Dichloropropane	LT 1	LT 1	LT 1	LT 1	LT 1
t-1,3-Dichloropropene	LT 1	LT 1	LT 1	LT 1	LT 1
Trichloroethene	LT 1	LT 1	LT 1	LT 1	LT 1
Benzene	LT 1	LT 1	LT 1	LT 1	LT 1
Dibromochloromethane	LT 1	LT 1	LT 1	LT 1	LT 1
1,1,2-Trichloroethane	LT 1	LT 1	LT 1	LT 1	LT 1
c-1,3-Dichloropropene	LT 1	LT 1	LT 1	LT 1	LT 1
2-Chloroethylvinyl Ether	LT 10	LT 10	LT 10	LT 100	LT 100
Bromoform	LT 10	LT 10	LT 10	LT 100	LT 100
1,1,2,2-Tetrachloroethane	LT 1	LT 1	LT 1	LT 1	LT 1
Tetrachloroethene	LT 1	LT 1	LT 1	LT 1	LT 1
Toluene	LT 1	LT 1	LT 1	LT 1	LT 1
Chlorobenzene	LT 1	LT 1	LT 1	LT 1	26
Dichlorobenzene	LT 1	LT 1	LT 1	LT 1	LT 1
Ethylbenzene	LT 1	LT 1	LT 1	LT 1	LT 1
Xylenes	LT 1	LT 1	LT 1	LT 1	LT 1
1,3-Dichlorobenzene	LT 11	LT 11	LT 11	LT 20	LT 11
1,4- Dichlorobenzene	LT 11	LT 11	LT 11	LT 20	LT 11
1,2-Dichlorobenzene	LT 11	LT 11	LT 11	LT 20	LT 11
Hexachloroethane	LT 11	LT 11	LT 11	LT 20	LT 11
Bis (2-chloroethyl) ether	LT 11	LT 11	LT 11	LT 20	LT 11
Bis (2-chloroisopropyl) ether	LT 11	LT 11	LT 11	LT 20	LT 11
N-Nitrosodi-n-propylamine	LT 11	LT 11	LT 11	LT 20	LT 11
Nitrobenzene	LT 11	LT 11	LT 11	LT 20	LT 11
Hexachlorobutadiene	LT 11	LT 11	LT 11	LT 20	LT 11

TABLE 9
GOWANDA SITE
GROUND WATER QUALITY
SPECIFIC ORGANIC ANALYSES (1)(2)

PARAMETER	WELL 1S	WELL 1D	WELL 1D (Dup)	WELL 4D	WELL 6S
1,2,4-Trichlorobenzene	LT 11	LT 11	LT 11	LT 20	LT 11
Isophorone	LT 11	LT 11	LT 11	LT 20	LT 11
Naphthalene	LT 11	LT 11	LT 11	LT 20	LT 11
Bis (2-chloroethoxy) methane	LT 11	LT 11	LT 11	LT 20	LT 11
Hexachlorocyclopentadiene	LT 11	LT 11	LT 11	LT 20	LT 11
2-Chloronaphthalene	LT 11	LT 11	LT 11	LT 20	LT 11
Acenaphthylene	LT 11	LT 11	LT 11	LT 20	LT 11
Acenaphthene	LT 11	LT 11	LT 11	LT 20	LT 11
Dimethyl phthalate	LT 11	LT 11	LT 11	LT 20	LT 11
2,6-Dinitrotoluene	LT 11	LT 11	LT 11	LT 20	LT 11
Fluorene	LT 11	LT 11	LT 11	LT 20	LT 11
4-Chlorophenyl phenyl ether	LT 11	LT 11	LT 11	LT 20	LT 11
2,4-Dinitrotoluene	LT 11	LT 11	LT 11	LT 20	LT 11
1,2-Diphenylhydrazine	*	*	*	*	*
Diethylphthalate	LT 11	LT 11	LT 11	LT 20	LT 11
N-nitrosodiphenylamine	LT 11	LT 11	LT 11	LT 20	LT 11
Hexachlorobenzene	LT 11	LT 11	LT 11	LT 20	LT 11
4-Bromophenyl phenyl ether	LT 11	LT 11	LT 11	LT 20	LT 11
Phenanthrene	LT 11	LT 11	LT 11	LT 20	LT 11
Anthracene	LT 11	LT 11	LT 11	LT 20	LT 11
Di-n-buyl phthalate	LT 11(.08)(B)	LT 11(.08)(B)	LT 11 (2)(B)	LT 20	LT 11
Fluoranthene	LT 11	LT 11	LT 11	LT 20	LT 11
Pyrene	LT 11	LT 11	LT 11	LT 20	LT 11
Benzidine	*	*	*	*	*
Butyl benzyl phthalate	LT 11	LT 11	LT 11	LT 20	LT 11
Bis(2-ethylhexy) phthalate	LT 11 (6)(B)	20 (B)	LT 11 (8)(B)	LT 20	LT 11
Chrysene	LT 11	LT 11	LT 11	LT 20	LT 11
Benzo(a)anthracene	LT 11	LT 11	LT 11	LT 20	LT 11
3,3-Dichlorobenzidine	LT 21	LT 21	LT 21	LT 40	LT 21
Di-n-octylphthalate	LT 11	LT 11	LT 11	LT 20	LT 11
Benzo(b)fluoranthene	LT 11	LT 11	LT 11	LT 20	LT 11
Benzo(k)fluoranthene	LT 11	LT 11	LT 11	LT 20	LT 11
Benzo(a)pyrene	LT 11	LT 11	LT 11	LT 20	LT 11
Indeno (1,2,3-cd)pyrene	LT 11	LT 11	LT 11	LT 20	LT 11
Dibeno(a,h)anthracene	LT 11	LT 11	LT 11	LT 20	LT 11
Benzo(g,h,i)perylene	LT 11	LT 11	LT 11	LT 20	LT 11
N-Nitrosodimethyl Amine	*	*	*	*	*
Benzyl Alcohol	LT 53	LT 53	LT 11	LT 20	LT 11
2-Methyl Phenol	LT 11	LT 11	LT 11	LT 20	LT 11
4-Methyl Phenol	LT 11	LT 11	LT 11	LT 20	LT 11
Benzoic Acid	LT 11	LT 11	LT 53	LT 100	LT 53
4-Chloroaniline	LT 11	LT 11	LT 11	LT 20	LT 11
2-Methylnaphthalene	LT 11	LT 11	LT 11	LT 20	LT 11
2,4,5-Trichlorophenol	LT 53	LT 53	LT 53	LT 100	LT 53
2-Nitroaniline	LT 53	LT 53	LT 53	LT 100	LT 53
3-Nitroaniline	LT 53	LT 53	LT 53	LT 100	LT 53

TABLE 9
GOWANDA SITE
GROUND WATER QUALITY
SPECIFIC ORGANIC ANALYSES [1][2]

PARAMETER	WELL 1S	WELL 1D	WELL 1D (Dup)	WELL 4D	WELL 6S
Dibenzofuran	LT 11	LT 11	LT 11	LT 20	LT 11
4-Nitroaniline	LT 53	LT 53	LT 53	LT 100	LT 53
α-BHC	LT 0.05	LT 0.05	LT 0.05	LT 0.05	LT 0.05
λ-BHC	LT 0.05	LT 0.05	LT 0.05	LT 0.05	LT 0.05
β-BHC	LT 0.05	LT 0.05	LT 0.05	LT 0.05	LT 0.05
Heptachlor	LT 0.05	LT 0.05	LT 0.05	LT 0.05	LT 0.05
δ-BHC	LT 0.05	LT 0.05	LT 0.05	LT 0.05	LT 0.05
Aldrin	LT 0.05	LT 0.05	LT 0.05	LT 0.05	LT 0.05
Heptachlor Epoxide	LT 0.05	LT 0.05	LT 0.05	LT 0.05	LT 0.05
Endosulfan I	LT 0.05	LT 0.05	LT 0.05	LT 0.05	LT 0.05
4,4'-DDE	LT 0.1	LT 0.1	LT 0.1	LT 0.1	LT 0.1
Dieldrin	LT 0.1	LT 0.1	LT 0.1	LT 0.1	LT 0.1
Endrin	LT 0.1	LT 0.1	LT 0.1	LT 0.1	LT 0.1
4,4-'DDD	LT 0.1	LT 0.1	LT 0.1	LT 0.1	LT 0.1
Endosulfan II	LT 0.1	LT 0.1	LT 0.1	LT 0.1	LT 0.1
4,4'-DDT	LT 0.1	LT 0.1	LT 0.1	LT 0.1	LT 0.1
Endosulfan Sulfate	LT 0.1	LT 0.1	LT 0.1	LT 0.1	LT 0.1
Endrin Aldehyde	LT 0.1	LT 0.1	LT 0.1	LT 0.1	LT 0.1
Methoxychlor	LT 0.5	LT 0.5	LT 0.5	LT 0.5	LT 0.5
Endrin Ketone	LT 0.1	LT 0.1	LT 0.1	LT 0.1	LT 0.1
Chlordane	LT 0.5	LT 0.5	LT 0.5	LT 0.5	LT 0.5
Toxaphene	LT 1	LT 1	LT 1	LT 1	LT 1
PCB-1221	LT 0.5	LT 0.5	LT 0.5	LT 0.5	LT 0.5
PCB-1232	LT 0.5	LT 0.5	LT 0.5	LT 0.5	LT 0.5
PCB-1016/1242	LT 0.5	LT 0.5	LT 0.5	LT 0.5	LT 0.5
PCB-1248	LT 0.5	LT 0.5	LT 0.5	LT 0.5	LT 0.5
PCB-1254	LT 1	LT 1	LT 1	LT 1	LT 1
PCB-1260	LT 1	LT 1	LT 1	LT 1	LT 1

(1) Concentrations in micrograms/liter (parts per billion). LT means less than the method detection limit for the matrix tested.

(2) Samples collected July 11,12, 1988 with the exception of 4S which was collected September 1, 1988

* Not included in HSL list

(B) Also detected in Blank

TABLE 10
GOWANDA SITE
SURFACE WATER QUALITY RESULTS
INORGANIC ANALYSES

Location	Date	Arsenic (mg/l)	Chromium (mg/l)	Hexavalent Chromium (mg/l)	Zinc (mg/l)	Calcium (mg/l)	Magnesium (mg/l)
11	9/86	LT 0.005	0.006	LT 0.006	0.039	---	---
11	4/87	LT 0.005	LT 0.005	LT 0.005	0.11	37	6.2
11	7/88	LT 0.005	0.01	LT 0.01	LT 0.01	---	---
11 *	7/88	LT 0.005 *	LT 0.01 *	---	LT 0.01 *	---	---
11	8/88	LT 0.005	LT 0.01	LT 0.01	LT 0.01	---	---
11 *	8/88	LT 0.005 *	LT 0.01 *	LT 0.01 *	0.01 *	---	---
12	9/86	LT 0.005	0.012	0.011	0.036	---	---
12	4/87	LT 0.005	LT 0.005	LT 0.005	0.014	38	6.3
12	7/88	LT 0.005	0.01	LT 0.01	LT 0.01	---	---
12 *	7/88	LT 0.005 *	0.01 *	---	LT 0.01 *	---	---
12	8/88	LT 0.005	0.01	LT 0.01	LT 0.01	---	---
12 *	8/88	LT 0.005	LT 0.01 *	LT 0.01 *	LT 0.01 *	---	---
13	9/86	LT 0.005	0.019	0.016	0.033	---	---
13 (Dup)	9/86	LT 0.005	0.014	0.010	0.028	---	---
13	4/87	LT 0.005	0.008	LT 0.005	0.015	38	6.2
13	7/88	LT 0.005	LT 0.01	LT 0.01	LT 0.01	---	---
13 *	7/88	LT 0.005 *	LT 0.01 *	---	0.09 *	---	---
13	8/88	LT 0.005	LT 0.01	LT 0.01	0.01	---	---
13 *	8/88	LT 0.005 *	LT 0.01 *	LT 0.01 *	LT 0.01 *	---	---
34	4/87	LT 0.005	0.008	LT 0.005	0.043	100	16
35	4/87	LT 0.005	0.006	LT 0.005	0.034	120	15

* Acid Soluble Results

(1) The chromium standard is based on total hardness, as described in Section 6.03.01

LT = Less Than

TABLE 11
GOWANDA SITE
LEACHATE WATER QUALITY
INORGANIC ANALYSIS

Sample	Leachate Composite			Seep Composite	
Date	9/86	4/87	7/88	9/86	4/87
pH	7.4	7.9	7.0	6.9	7.3
SPCOND (umhos/cm)	5100	6200	8000	230	2000
Total Arsenic (mg/l)	0.080	0.088	0.110	0.015	LT 0.005
Total Chromium (mg/l)	0.206	0.270	0.290	0.235	LT 0.005
Total Hexavalent Chromium (mg/l)	0.091	0.098	0.090	0.116	LT 0.005
Total Zinc (mg/l)	0.033	0.024	0.06	0.052	0.029
Ammonia (mg NH_3-N/l)	789	880	900	552	22
Biochemical Oxygen Demand (5) (mg/l)	60	68	290	165	LT 10
Biochemical Oxygen Demand (28) (mg/l)	---	---	1300	---	---
Nitrate (mg NH_2-N/l)	1.26	LT 0.05	---	0.44	0.14
Nitrite (mg NO_2-N/l)	0.027	LT .01	---	1.37	LT 0.01
Total Kjeldahl Nitrogen (mg/l)	831	1050	---	575	26
Calcium (mg/l)	---	208	---	---	270
Magnesium (mg/l)	---	117	---	---	27

E 12
GOW... A SITE
GROUND WATER QUALITY
SPECIFIC ORGANIC ANALYSES (1)(2)

PARAMETER	WELL 4S	LEACHATE	SUMP
1,2,4-Trichlorobenzene	LT 11	LT 23	LT 18
Isophorone	LT 11	LT 23	LT 18
Naphthalene	LT 11	LT 23	LT 18
Bis (2-chloroethoxy) methane	LT 11	LT 23	LT 18
Hexachlorocyclopentadiene	LT 11	LT 23	LT 18
2-Chloronaphthalene	LT 11	LT 23	LT 18
Acenaphthylene	LT 11	LT 23	LT 18
Acenaphthene	LT 11	LT 23	LT 18
Dimethyl phthalate	LT 11	LT 23	LT 18
2,6-Dinitrotoluene	LT 11	LT 23	LT 18
Fluorene	LT 11	LT 23	LT 18
4-Chlorophenyl phenyl ether	LT 11	LT 23	LT 18
2,4-Dinitrotoluene	LT 11	LT 23	LT 18
1,2-Diphenylhydrazine	*	*	*
Diethylphthalate	LT 11	LT 23	LT 18
N-nitrosodiphenylamine	LT 11	LT 23	LT 18
Hexachlorobenzene	LT 11	LT 23	LT 18
4-Bromophenyl phenyl ether	LT 11	LT 23	LT 18
Phenanthrene	LT 11	LT 23	LT 18
Anthracene	LT 11	LT 23	LT 18
Di-n-buyl phthalate	LT 11 (1)(B)	LT 23	LT 18
Fluoranthene	LT 11	LT 23	LT 18
Pyrene	LT 11	LT 23	LT 18
Benzidine	*	*	*
Butyl benzyl phthalate	LT 11	LT 23	LT 18
Bis(2-ethylhexy) phthalate	LT 11	LT 23	LT 18
Chrysene	LT 11	LT 23	LT 18
Benzo(a)anthracene	LT 11	LT 23	LT 18
3,3-Dichlorobenzidine	LT 21	LT 46	LT 37
Di-n-octylphthalate	LT 11	LT 23	LT 18
Benzo(b)fluoranthene	LT 11	LT 23	LT 18
Benzo(k)fluoranthene	LT 11	LT 23	LT 18
Benzo(a)pyrene	LT 11	LT 23	LT 18
Indeno (1,2,3-cd)pyrene	LT 11	LT 23	LT 18
Dibeno(a,h)anthracene	LT 11	LT 23	LT 18
Benzo(g,h,i)perylene	LT 11	LT 23	LT 18
N-Nitrosodimethyl Amine	*	*	*
Benzyl Alcohol	LT 11	LT 23	LT 18
2-Methyl Phenol	LT 11	LT 23	LT 18
4-Methyl Phenol	LT 11	800	LT 18
Benzoic Acid	LT 53	5000	LT 92
4-Chloroaniline	LT 11	LT 23	LT 18
2-Methylnaphthalene	LT 11	LT 23	LT 18
2,4,5-Trichlorophenol	LT 53	LT 120	LT 92
2-Nitroaniline	LT 53	LT 120	LT 92
3-Nitroaniline	LT 53	LT 120	LT 92

TABLE 12
GOWANDA SITE
GROUND WATER QUALITY
SPECIFIC ORGANIC ANALYSES (1)(2)

PARAMETER	WELL 4S	LEACHATE	SUMP
Dibenzofuran	LT 11	LT 23	LT 18
4-Nitroaniline	LT 53	LT 120	LT 92
α -BHC	LT 0.05	LT 0.5	LT 0.05
λ -BHC	LT 0.05	LT 0.5	LT 0.05
β -BHC	LT 0.05	LT 0.5	LT 0.05
Heptachlor	LT 0.05	LT 0.5	LT 0.05
δ -BHC	LT 0.05	LT 0.5	LT 0.05
Aldrin	LT 0.05	LT 0.5	LT 0.05
Heptachlor Epoxide	LT 0.05	LT 0.5	LT 0.05
Endosulfan I	LT 0.05	LT 0.5	LT 0.05
4,4'-DDE	LT 0.1	LT 1	LT 0.1
Dieldrin	LT 0.1	LT 1	LT 0.1
Endrin	LT 0.1	LT 1	LT 0.1
4,4-'DDD	LT 0.1	LT 1	LT 0.1
Endosulfan II	LT 0.1	LT 1	LT 0.1
4,4'-DDT	LT 0.1	LT 1	LT 0.1
Endosulfan Sulfate	LT 0.1	LT 1	LT 0.1
Endrin Aldehyde	LT 0.1	LT 1	LT 0.1
Methoxychlor	LT 0.5	LT 5	LT 0.5
Endrin Ketone	LT 0.1	LT 1	LT 0.1
Chlordane	LT 0.5	LT 5	LT 0.1
Toxaphene	LT 1	LT 10	LT 1
PCB-1221	LT 0.5	LT 5	LT 0.5
PCB-1232	LT 0.5	LT 5	LT 0.5
PCB-1016/1242	LT 0.5	LT 5	LT 0.5
PCB-1248	LT 0.5	LT 5	LT 0.5
PCB-1254	LT 1	LT 10	LT 1
PCB-1260	LT 1	LT 10	LT 1

(1) Concentrations in micrograms/liter (parts per billion). LT means less than the method detection limit for the matrix tested.
(2) Samples collected July 11,12, 1988 with the exception of sump liquid which was collected August 30, 1988
(3) 1400 ppb by Method 8040
* Not included in HSL list
(B) Also detected in Blank

TABLE 13
GOWANDA SITE
LEACHATE WATER QUALITY RESULTS - INORGANIC ANALYSES(1)

Monitoring Well(2)	Date	pH	SPCOND (umhos/cm)	Arsenic	Chromium	Hexavalent Chromium	Zinc	Chloride	Sulfate
2-Shallow	9/9/86	7.1	10,000	---	---	---	---	---	---
2-Shallow	4/13/87	7.6	10,000	0.18	0.96	0.42	---	400	22
4-Shallow	9/9/86	6.8	4300	---	---	---	---	---	---
4-Shallow	4/13/87	7.6	4300	0.0121	0.20	0.075	---	---	---
4-Shallow	7/11/88	6.8	4450	0.022	0.16	0.036	9.4	---	---

(1) Results reported in mg/l (ppm)

(2) Wells 2S and 4S are screened in fill material; consequently, the analytical results for these wells were interpreted with the results for leachate samples.

301312

TABLE 14
GOWANDA SITE
LEACHATE WATER QUALITY
FILTERABLE METALS ANALYSES(1)

Monitoring Well(2)	Sample Date	Arsenic	Chromium	Hexavalent Chromium	Zinc	Calcium	Magnesium	Sodium
2-Shallow	9/9/86	0.124	0.448	0.19	0.045	---	---	---
2-Shallow	4/13/87	---	0.61	---	---	100	260	49
4-Shallow	9/9/86	0.009	0.106	0.006	0.153	---	---	---
4-Shallow	7/11/88	LT 0.005	0.08	0.020	0.02	---	---	---

(1) All samples field filtered through 0.45 micron membrane filter. Results reported in mg/l (ppm).

(2) Wells 2S and 4S are screened in fill material; consequently, the analytical results for those wells will be interpreted with results for leachate samples

301313

APPENDIX B-4

1996 Weston Investigation Results

Table 3-2
Waste Characterization Samples
For Peter Cooper Landfill Site
Gowanda, New York

Sample no.	G-47	G-48	G-50	G-52	G-54	G-56
Date collected	08/30/88	07/11/88	07/11/88	08/30/88	07/12/88	08/30/88
Units	mg/kg (1)	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
COMPOUND						
Chromium	11,400 (2)	52	44,000	(2)	23	(2)
Arsenic	8.42 (2)	11	6.5	(2)	16	(2)
Zinc	921 (2)	71	840	(2)	62	(2)

(1) - Expressed on a dry weight basis.
(2) - See Appendix A for composite waste analyses.

SOURCE: O'BRIEN AND GERE, 1989

TABLE 3-3
RESULTS OF CHROMIUM, HEXAVALENT CHROMIUM
AND ARSENIC ANALYSES IN SOIL
PETER COOPER LANDFILL
GOWANDA, NY
DECEMBER, 1996

SAMPLE ID	SAMPLE LOCATION	AS (ug/kg)	Total Cr (ug/Kg)	Cr(+6) (ug/Kg)
SURFACE SOIL				
001	Bank 0	12,000	**750,000**	5,900 u
002	Bank 70	7,100	**350,000**	6,300 u
003	Bank 100	4,900	**27,000**	5,900 u
004	Bank 200	**25,000**	**32,000**	5,800 u
005	Bank 300	6,600	**620,000**	7,900 u
006	Bank 400	6,700	**210,000**	5,700 u
007	Bank 500	6,700	**94,000**	5,800 u
008	Wetland 1	5,100	10,00 u	5,500 u
009	Wetland 2	6,700	**27,000**	5,700 u
SEDIMENT				
012	Sediment 2	6,300	12,000	68,00 u
013	Sediment 3	7,000	11,000	6,100 u
014	Sediment 4	4,800	10,000 u	6,100 u
015	Sediment 5	5,700	10,000 u	6,200 u
011	Sediment 6	5,600	11,000	7,400 u
LANDFILL WASTE				
010	HA-01	**20,000**	**13,000,000**	7,000 u
032	HA MW-02D	6,200	**3,000,000**	9,200 u
033	HA MW-03	7,500	**2,900,000**	5,800 u
034	HA MW-04	6,800	**6,800,000**	6,800 u
038	HA SB-70	33,000	**11,000,000**	10,000 u
036	HA SB-71	10,000	**27,000,000**	8,300 u
037	HASB-71DUP	11,000	**37,000,000**	8,400 u
039	HA SB-72	11,000	**27,000,000**	9,200 u
SUBSURFACE SOIL				
035	HA MW-05	4,600	**26,000**	5,500 u
040	HA MW-73	5,600	**240,000**	9,100 u
041	HA SB-74	**17,000**	**460,000**	5,600 u
042	HA SB-75	5,300	**23,000**	5,700 u
043	HASB-76	**19,000**	**73,000**	6,000 u

Boldface values are above the U.S.EPA Soil Screening Levels for Potential impact to Groundwater
ug/Kg=micrograms per kilogram
u= at or below Method Detection Limit (MDL) - MDL shown
NA=sample note analyzed for that parameter
Source: Roy F. Weston, 1996

301316

TABLE 3-4
SUMMARY OF BNA ANALYSIS FOR WATER AND SOIL
PETER COOPER LANDFILL SITE
GOWANDA, NY

	GROUNDWATER			SEDIMENT			SURFACE SOIL			
COMPOUND	MW-02S	MW-03	MW-06	SED-2	SED-3	SED-6	BANK 0	BANK 70	BANK 400	BANK 500
Non-Chlorinated Phenols										
Phenol	8000 J	99 J								
2-Methylphenol	69 J									
4-Methylphenol	42000 J	1200 J								
Base-Neutrals										
Bis (2-ethylhexyl)phthalate				32 J		65 J	75 J			
Di-n-octylphthalate						200 J				
Naphthalene	16 J		1 J							110 J
2-Methylnaphthalene										130 J
Phenanthrene				44 J		50 J	180 J			490
Anthracene										100 J
Carbazole										52 J
Fluoranthene				95 J		110 J	260 J		55 J	950
Pyrene				55 J		68 J	210 J			730
Benzo(a)anthracene				32 J	28 J	65 J	130 J	61 J		370 J
Chrysene	9 J			57 J	25 J	55 J	190 J		74 J	430
Benzo(b)fluoranthene				41 J		34 J	120 J			350 J

301317

TABLE 3-4
SUMMARY OF BNA ANALYSIS FOR WATER AND SOIL
PETER COOPER LANDFILL SITE
GOWANDA, NY

	GROUNDWATER			SEDIMENT			SURFACE SOIL			
COMPOUND	MW-02S	MW-03	MW-06	SED-2	SED-3	SED-6	BANK 0	BANK 70	BANK 400	BANK 500
Benzo(k)fluoranthene				49 J			120 J			480
Benzo(a)pyrene				41 J		40 J	130 J			440
Indeno(1,2,3-cd)pyrene				25 J			65 J			250 J
Dibenzo(a,h)anthracene										73 J
Benzo(g,h,i)perylene				23 J			73 J			270 J
Total Estimated TICs	9175 J	490 J	582 J	5480 J	18780 J	24200 J	17480 J	13960 J	25980 J	7870 J

Aqueous sample analytes reported in micrograms per liter (ug/L)
Solid sample analyes reported in micrograms per kilogram (ug/Kg)
J - values are considered estimated
TIC - Tentatively identified compound

SOURCE: ROY F. WESTON 1996

TABLE 3-4
SUMMARY OF BNA ANALYSIS FOR WATER AND SOIL
PETER COOPER LANDFILL SITE
GOWANDA, NY

SURFACE SOILS (cont)				LANDFILL WASTE					SUBSURFACE SOIL		
COMPOUND	Wetland1	Wetland 2	HA 1	HA MW-02D	HA MW-03	HA MW-04	HA SB-70	HA SB-71	HA SB-74	HA SB-75	HA SB-76
Non-Chlorinated Phenols											
Phenol					790						
4-Methylphenol				6400 J							
Chlorinated Phenols											
4-Chloro-3-methylphenol				3600 J							
Base-Neutrals											
Bis(2ethylhexyl)phthalate										76 J	
Naphthalene				8600 J							
Phenanthrene	64 J		3500J	4700 J		3600 J	12000 J	3800 J	970 J		
Fluoranthene	96 J	56 J	4200J	3100 J		3000 J	26000 J	3000 J	1100 J	70 J	
Pyrene	76 J	43 J	4500J	2800 J			18000 J	2700 J	960 J	59 J	430 J
Benzo(a)anthracene			3200J	1700 J			13000 J		640 J		
Chrysene	54 J	42 J	3600J	2200 J			13000 J		790 J		

Table 3-5
Surface Water Quality Results
For Peter Cooper Landfill Site
Gowanda, New York

Sample no.	11	11	11	11	11	11
Date collected	9/86	4/87	7/88	7/88	8/88	8/88
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
COMPOUND						
Arsenic	ND	ND	ND	ND	ND	ND
Chromium	0.006	ND	0.01	ND	ND	ND
Hex. chromium	ND	ND	ND	---	ND	ND
Zinc	0.039	0.11	ND	ND	ND	0.01
Calcium	---	37	---	---	---	---
Magnesium	---	6.2	---	---	---	---
Sample no.	12	12	12	12	12	12
Date collected	9/86	4/87	7/88	7/88	8/88	8/88
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
COMPOUND						
Arsenic	ND	ND	ND	ND	ND	ND
Chromium	0.012	ND	0.01	0.01	0.01	ND
Hex. chromium	0.011	ND	ND	---	ND	ND
Zinc	0.036	0.014	ND	ND	ND	ND
Calcium	---	38	---	---	---	---
Magnesium	---	6.3	---	---	---	---
Sample no.	13	13	13	13	13	13
Date collected	9/86	4/87	7/88	7/88	8/88	8/88
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
COMPOUND						
Arsenic	ND	ND	ND	ND	ND	ND
Chromium	0.019	0.008	ND	ND	ND	ND
Hex. chromium	0.016	ND	ND	---	ND	ND
Zinc	0.033	0.015	ND	0.09	0.01	ND
Calcium	---	38	---	---	---	---
Magnesium	---	6.2	---	---	---	---
Sample no.	34		35			
Date collected	4/87		4/87			
Units	mg/l		mg/l			
COMPOUND						
Arsenic	ND		ND			
Chromium	0.008		0.006			
Hex. chromium	ND		ND			
Zinc	0.043		0.034			
Calcium	100		120			
Magnesium	16		15			

Footnotes: ND - Not found above detection limit, non-detection. --- refers to no analysis reported.
SOURCE: O'BRIEN AND GERE 1989

TABLE 3-6
RESULTS OF CHROMIUM, HEXAVALENT CHROMIUM AND ARSENIC ANAYSES IN WATER
PETER COOPER AND FILL
GOWANDA, NY
DECEMBER, 1996

Sample ID	Sample Location	As (ug/L)	Total Cr (ug/L)	Cr+6 (ug/L)	Total Suspended Solids (mg/L)
		GROUNDWATER			
017	MW-02S	**100**	**350**	15	190
017B	MW-02S Dissolved	**100**	**340**	NA	NA
018	MW-02D	**33**	**74**	8	15
018C	MW-02D Dissolved	**34**	**73**	NA	NA
025	MW-03	**100**	**1100**	**60**	310
025B	Mw-03 Dissolved	**52**	**890**	NA	NA
024	MW-04S	**36**	**310**	16	110
024B	MW-04S Dissolved	**13**	**270**	NA	NA
023	MW-04D	**37**	8	8	110
023B	MW-04 Dissolved	**34**	4	NA	NA
019	MW-05	**2**	4	8	270
019B	MW-05 Dissolved	**2 u**	4	NA	NA
020	MW-06	**33**	47	8	83
020B	MW-06-Dissolved	**32**	26	NA	NA
022	MW-06 DUP	**35**	**61**	8	NA
022B	W-06 DUP Dissolve	**28**	23	NA	NA
		SURFACE WATER			
026	STREAMWATER 1	4.6	9	8	NA
027	STREAMWATER 2	2.3	7	8	NA
028	STREAMWATER 3	3.1	8	8	NA
029	STREAMWATER 4	4.2	8	8	NA
030	STREAMWATER 5	2.8	9	8	NA
031	STREAMWATER 6	3.1	6	8	NA

Boldface values are above the NYSDEC Ambient Water Quality Standards
ug/L = micrograms per Liter
mg/L = milligrams per Liter
u = below Method Detection Limit (MDL) - MDL shown
NA = sample not analyzed for that parameter
Source: Roy F. Weston, 1996

Table 3-7
Ground Water Quality Results - Filterable Metals
For Peter Cooper Landfill Site
Gowanda, New York

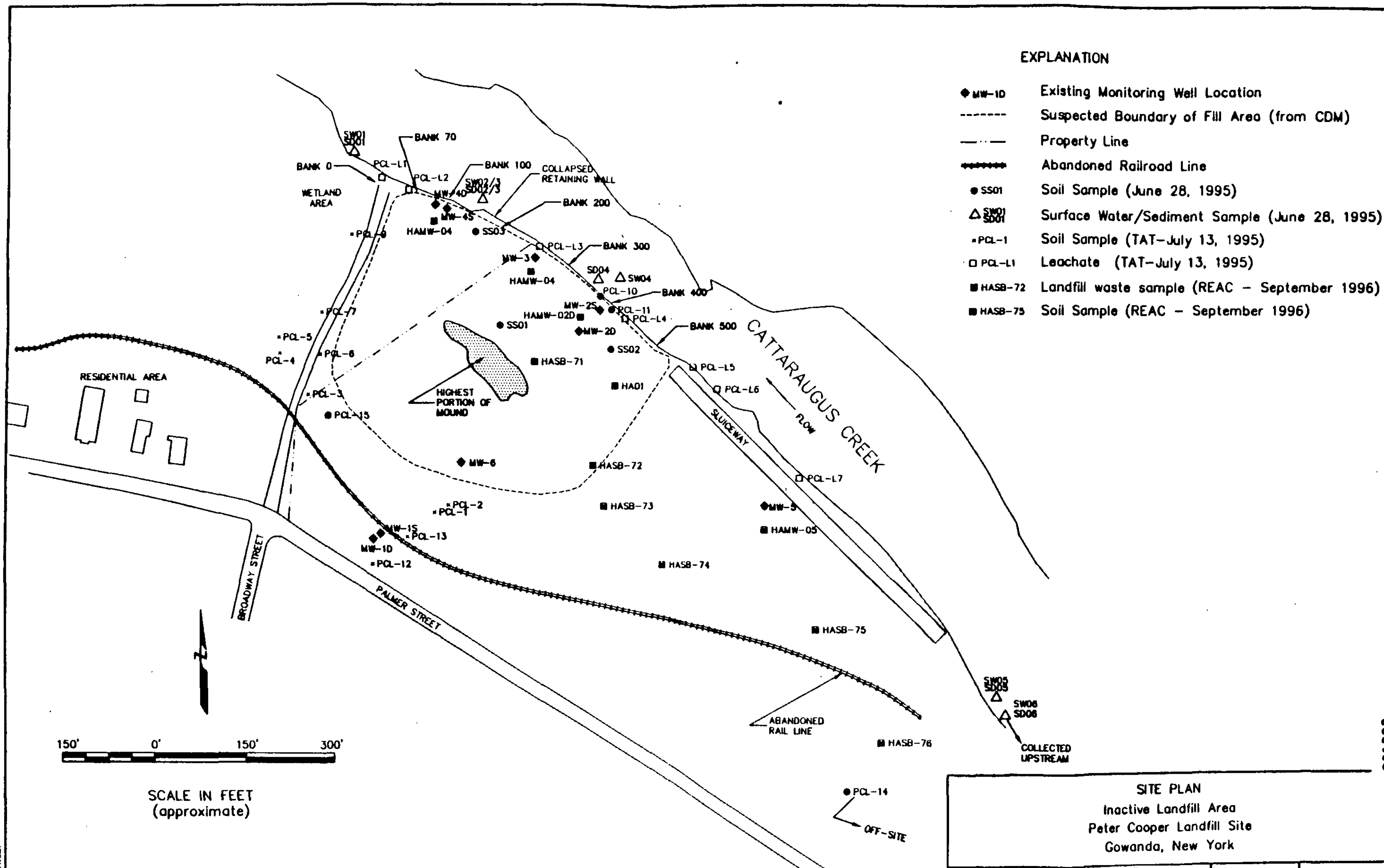
See footnote 1 below.

Sample no.		MW-1R(S)	MW-1D	MW-1D	MW-1D
Date collected		7/12/88	9/09/86	4/13/87	7/12/88
Units		mg/l	mg/l	mg/l	mg/l
COMPOUND					
Arsenic		ND	ND	---	ND
Chromium		0.01	0.008	---	ND
Hex. chromium		ND	0.006	---	ND
Zinc		0.22	0.019	---	0.02
Sample no.	MW-2D		MW-4D	MW-4D	MW-4D
Date collected	9/09/86		9/09/86	4/13/87	7/12/88
Units	mg/l		mg/l	mg/l	mg/l
COMPOUND					
Arsenic	0.055		ND	---	0.027
Chromium	0.079		0.014	0.009	ND
Hex. chromium	0.018		ND	---	---
Zinc	0.039		0.016	---	0.02
Calcium	---		---	4.8	---
Magnesium	---		---	0.98	---
Sodium	---		---	170	---
Sample no.	MW-5		MW-6	MW-6	MW-6
Date collected	9/09/86		9/09/86	4/13/87	7/11/88
Units	mg/l		mg/l	mg/l	mg/l
COMPOUND					
Arsenic	ND		0.036	---	0.014
Chromium	ND		0.033	0.024	0.04
Hex. chromium	ND		ND	---	ND
Zinc	---		0.033	---	ND
Calcium	---		---	92	---
Magnesium	---		---	92	---
Sodium	---		---	15	---

Footnotes: ND - Not found above detection limit, non-detection. --- refers to no analysis reported.
S refers to shallow well depth. D refers to deep well depth.
Footnote 1: All samples field filtered through a 0.45 micron membrane filter.

SOURCE: O'BRIEN AND GERE 1989

TAB3-7.WK4



Note: Base map from CDM Federal Programs Corp. taken from Roy F. Weston.

SITE PLAN
Inactive Landfill Area
Peter Cooper Landfill Site
Gowanda, New York

Benchmark	GEOMATRIX	Project No. 005771.000.0	Figure A-2

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APPENDIX C

APPENDIX C

Geophysical Survey Methods and Results

GEOPHYSICAL DATA COLLECTION METHODOLOGY

The geophysical surveys at the Inactive Landfill Area consisted of surface and downhole techniques. The surface geophysical investigation utilized shallow investigating EM equipment (EM31). The downhole geophysical survey utilized EM induction logging tools (EM39).

Surface EM Techniques

The Geonics EM-31 device was used to map the apparent electrical conductivity of shallow soils from the ground surface to a depth of 15 feet. A reference grid was installed over the area that was geophysically surveyed. The grid consisted of alternating orange and yellow pin flags spaced to facilitate data acquisition along lines spaced 12.5 feet apart. Select grid coordinates were marked to assure that grid coordinates could be reoccupied if necessary. Surface features were annotated on-site to assist with geophysical data interpretation.

The terrain conductivity (quadrature) component of the EM field is a measurement of the apparent ground conductivity. All readings were taken with the instrument oriented parallel to the direction of travel, in the vertical dipole mode and with the instrument at waist height. The depth of investigation with the instrument in this configuration is approximately 15 feet. Readings were automatically stored in a solid state memory data logger during the survey. The data logger was interfaced to a portable computer and the data were transferred to a floppy disk for subsequent processing and interpretation.

The terrain conductivity data were initially edited and then plotted as profile lines for interpretation. A contour map of the data was then constructed and utilized for final interpretation. The geophysical data are presented in final form as a color contour map in the Appendix. The color contour map allow for a complete and rapid illustration of detected anomalies that are associated with anomalously conductive materials.

The EM instrument was calibrated daily following the instructions outlined in the operations manual. Calibration was performed in an area believed to be free of anthropogenic features, fill or other sources of potential signal interference. The instrument was returned to the calibration area at the beginning and end of each day of data collection to monitor instrument drift and insure against equipment malfunction. None were observed during this investigation.

Preliminary data reduction and analysis was performed using the instrument manufacturer's DAT31 software. Final data reduction and interpretation were performed using GEOSOFT software. GEOSOFT was used to edit, grid and filter the data. Data are color contoured and presented in plan view.

Downhole Geophysical Techniques - EM Induction Logging

Landfill leachate usually promotes an increase in the total dissolved solids (TDS) concentration of ground water. The elevated values of TDS create higher than background values of electrical conductance. EM conductivity logging was performed for the purpose of mapping formation conductivity. Electromagnetic surveys map the distribution of conductivity in the subsurface. For this technique to locate a contaminant plume it is necessary that the plume exhibit an anomalous conductivity response. The EM instrument will also respond to changes in overburden lithology and one must be able to recognize and distinguish between anomalies due to a plume vs lithology changes for this technique to be successful.

The EM probe measures the bulk electrical conductivity of soils and ground water in the vicinity of the borehole. The probe uses a process of magnetic induction to create EM eddy currents in the surrounding soils. The strength and phase of these currents are measured and are proportional to the conductivity of the soil and fluid. The process is not influenced by PVC casing, allowing the probe to measure soil and fluid conductivity in both screened and unscreened intervals of the borehole. The Geonics EM39 probe was used in this investigation. The Geonics EM39 induction probe measures the apparent conductivity (in units of milliSiemens per meter (mS/m)) of the formation. The induction probe can measure the vertical extent of a contaminant plume where the ground water has a higher specific conductance than background conditions. The induction probe measures these zones of high electrical conductivity approximately one to two feet from the probe which ensures the response is related to the geologic formation. There is a negligible effect from the specific conductance of the ground water in the monitoring well on the instrument response. The measured conductivity is proportional to the conductivity of the pore fluid and soil matrix. Sands typically exhibit low conductivity, while clays exhibit higher conductivity owing to their structure and composition. Fresh meteoric water exhibits low conductivity while leachate contaminated fluids and brine rich bedrock fluids exhibit high conductivity.

Data were acquired with the Mount Sopris MGX Logging System. It is a portable digital borehole geophysical logging system designed for shallow (1,000 feet or less) environmental and engineering projects. The system is computer driven with a Pentium notebook computer using the manufacturer's software. The system consists of a motorized winch with a digital depth encoder attached to a component console. Downhole conductivity data are graphically displayed on a computer screen during data acquisition such that anomalous responses can be immediately identified and revisited, if necessary.

GEOPHYSICAL SURVEY RESULTS

The geophysical conductivity data from the surface EM31 survey are presented in the attached color contour map in Figure A and the results from the downhole EM39 survey are presented in Figure B.

Surface terrain conductivity values at the site measured with the EM31 were observed to range from below 5 mS/m to over 400 mS/m. These large variations in conductivity may be related to any one or combination of the following conditions:

- A change in soil/fill type. For example, an increase in relative clay content may increase the measured conductivity;
- A change in soil moisture. Moisture content would be expected to increase in areas of low topographic elevation as more saturated sediments lie within the depth of investigation of the EM instrument;
- A change in pore fluid specific conductance. For example, the presence of salt-impacted water within the pore space of the shallow soil will increase the measured conductivity primarily due to the presence of chloride ions; or
- Interference from surface metallic anthropogenic features such as metal debris and other miscellaneous metallic objects that were observed on site.

It is likely that a significant component of the conductivity variations observed with the surface EM data set is due to the presence of railroad ballast material observed scattered widely across the surface of the site.

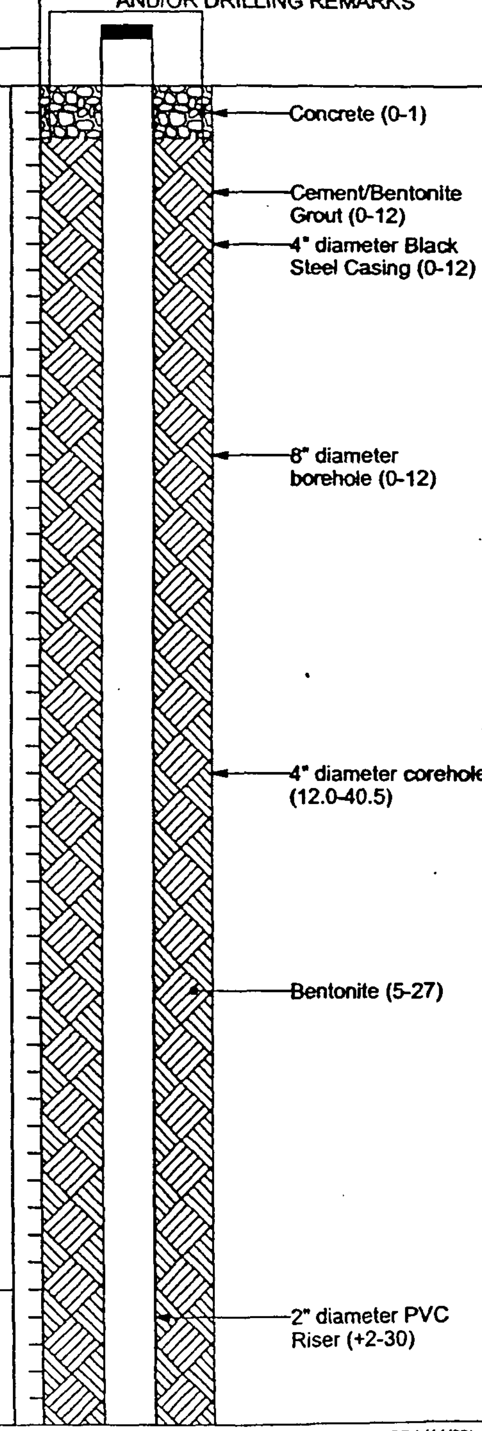
The results of the downhole geophysical survey are presented in Figure B. The figures include the gamma and conductivity logs plotted in two columns on the left of the page, followed by a summary of the core description.

In general, the correlation between the conductivity log with the geologic descriptions found in the borehole logs are good. It is unlikely that variations in the conductivity are related to pore fluid quality, rather these variations are more likely related to lithologic variations. The resistive (low conductivity) zone at approximately 25 ft corresponds with notes in the geologic log indicating a more massive/competent rock.

PROJECT: Peter Cooper Inactive Landfill RI/FS Gowanda, New York		Log of Well No. MW-4D2		
BORING LOCATION: See RI Figures for Boring Locations		TOP OF CASING ELEVATION: 766.4		DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling		DATE STARTED: 9/28/00		DATE FINISHED: 10/10/00
DRILLING METHOD: HSA (4 1/4" I.D.)/HQ Coring		TOTAL DEPTH: 40.5 feet bgs		SCREEN INTERVAL: 30-40
DRILLING EQUIPMENT: CME-75		DEPTH TO WATER: FIRST	COMPL.	CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stainless Steel Split Spoons/ HQ Coring		LOGGED BY: JV		
HAMMER WEIGHT: 140	DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa		REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 Inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. — Surface Elevation: 765.1
0–5					**OVERBURDEN:** (see stratigraphy for well MW-4D)
5–22.5					**BEDROCK: SHALE:** grey, horizontal to near horizontal bedding planes, thinly bedded (1-2 mm), thistle in places, moderately soft to soft, occassional horizontal fractures,
12					Run #1 - 12' to 15.5' Rec 100% RQD 32%
13					Run #2 - 15.5' to 20.5' Rec 100% RQD 63%
14					Run #3 - 20.5' to 25.5' Rec 100% RQD 75%
18					-soft, fractured
19					-soft, fractured
20					-horizontal fracture
22					-soft, fractured
23					-darker grey, silty, harder, massive

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM MW4D2.GPJ (11/02)

Project No. 5771 Geomatrix Consultants Figure

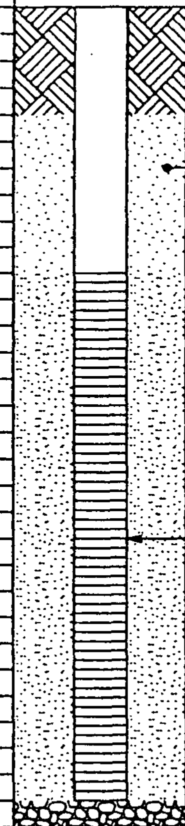
301329

PROJECT: Peter Cooper Inactive Landfill RI/FS
Gowanda, New York

Log of Well No. MW-4D2 (cont'd)

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ 6 inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.
26					
27					
28					
29					-soft, fractured -soft, fractured
30					
31					
32					-soft, fractured
33					Run #4 - 25.5' to 30.5' Rec 98% RQD 78%
34					Run #5 - 30.5' to 35.5' Rec 97% RQD 67%
35					Run #6 - 35.5' to 40.5' Rec 100% RQD 80%
36					No water loss
37					-softer, fissile (37-39)
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					
53					
54					
55					

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM MW4D2.GPJ (11/02)

Project No. 5771 | Geomatrix Consultants | Figure (cont.)

301330

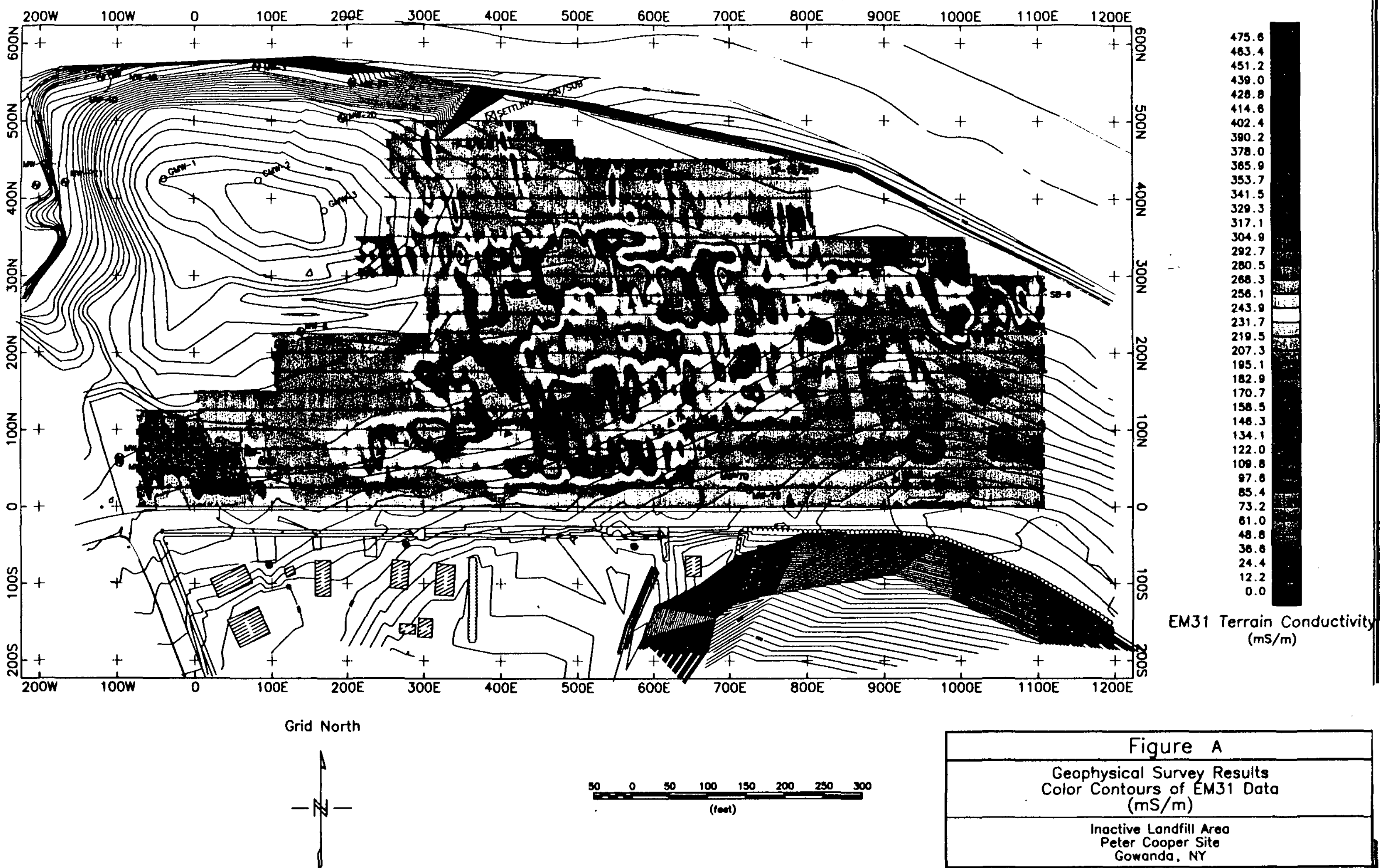


Figure A

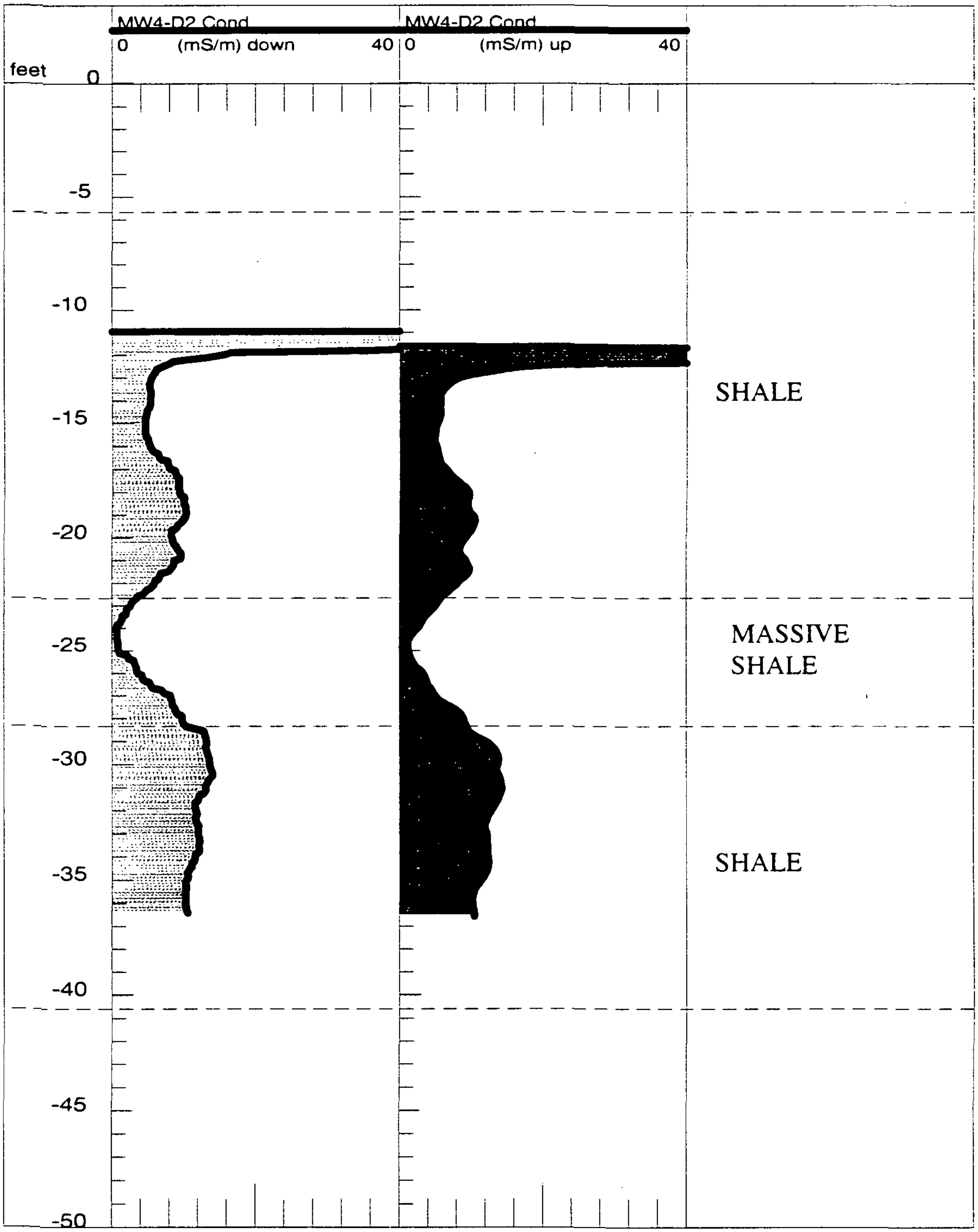
Geophysical Survey Results
Color Contours of EM31 Data
(mS/m)

Inactive Landfill Area
Peter Cooper Site
Gowanda, NY

Geomatrix Consultants, Inc.

301331

Well Name: MW-4D2
File Name: D:\PROJ\PETERCOO\LOGGING\MW2DOWN.HDR
Location: Peter Cooper Site, Gowanda, NY
Elevation: 0 Reference: Ground Surface



GEOMATRIX	DOWNHOLE CONDUCTIVITY LOG MW-4D2 Peter Cooper Inactive Landfill Area	Project No. 5771 Figure **B**

301332

APPENDIX D

APPENDIX D

Soil Descriptions from Landfill Cover Evaluation and Test Pits

INACTIVE LANDFILL
SUBSURFACE SOIL SAMPLING FIELD LOGS

Date	*Test Pit #*	*Layers (fbg)*	*Brief Description of Lithology*	*Depth Samples Collected*	*PID Reading (ppm)*	*Comments, Including Water Conditions*
10/09/00	TP-1/SUB	0-0.5	Black cindery fill material w/gravel and rootlets.		0	Very little topsoil/cover soils
		0.5-1	Light brown sand and gravel with slag pieces and small coal chunks			
		1-7.5	Various fill layers of slag, ballast, ash, coal, lt. brown sand, and red-brown sand	6.5-7.0 ft.		Water in hole at 7.5 ft
10/09/00	TP-2/SUB	0-1	Brown silt and sand fill, small round stone		0	
		1-2	Grey dry silt fill with round stone, some wood debris			
		2-3	Black cindery and gravelly ballast fill with some brick fragments			
		3-4	Grey & brown silt with little round stone			
		4-10	Black ash/cinder fill with gravel, ash pieces 3-6" diameter			Odor detected
		10-12.5	Grey fine sand with silt, moist, native material	12.5 ft		No water encountered
10/09/00	TP-3/SUB	0-0.5	Brown topsoil material with round and angular gravel		0	
		0.5-2	Grey silt fill with round & angular stone, some large boulders, 2-3 ft diameter			Railroad tie at 2 ft
		2-9.5	Black cinders & ballast, angular stone small to medium size 1/2"-1"dia	8.5-9.0 ft		Water in hole at 9.5 ft, odor detected
10/09/00	TP-4/SUB	0-0.5	Black cinders, very little topsoil material		0	
		0.5-4.5	Fill layers black ash/cinders, clinkers and gravel, rust-colored gravel/sand, slag at 4.5 ft, refactory brick pieces			
		4.5-8	Grey silty clay, fill with round gravel, some staining & mixing of black ash/cinder material	7.0 ft		Tar/petroleum oder detected, water in hole at 8 ft

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INACTIVE LANDFILL
SUBSURFACE SOIL SAMPLING FIELD LOGS

Date	*Test Pit #*	*Layers (fbg)*	*Brief Description of Lithology*	*Depth Samples Collected*	*PID Reading (ppm)*	*Comments, Including Water Conditions*
10/10/00	TP-5/SUB	0-0.5	Brown sandy loam & topsoil with organic plant material		0	
		0.5-1.5	Light brown silt with gravel and small stone			
		1.5-10	Grey silt & some clay, round & flat stone, some woody debris	9.5 ft		Backhoe scraped rock or concrete settling basin structure, no fill detected, water ponding in hole at 10 ft
10/10/00	TP-6/SUB	0-0.5	Brown sandy loam topsoil with rootlets		2.1	
		0.5-1.5	Brown sand & silt cover soil with round gravel slightly moist			
		1.5-6	Black ash & sludge material, very brittle, gravel and wood debris	5 ft		Material saturated at 6 ft, odor detected
10/06/00	TP-7/SUB	0-2	Lt. brown clayey silt with round stone some, rust staining in clay		0	
		2-2.5	Rust-colored medium sand with round and angular stone/gravel			
		2.5-3	Grey clayey silt "cover type" soils			
		3-4.5	Black cindery ballast-type material, angular gravel	3-4.5 ft		Water in hole at 4.5 ft. slight odor detected
10/06/00	TP-8/SUB	0-0.5	Black & brown topsoil, organic rootlet material mixed with some cindery gravel		0	
		0.5-1	Black cindery material, small gravel, ballast-like material			
		1-2	Light brown/tan sand & round gravel, some cinders/brick fragments			
		2-5	Black cinders, round gravel, some slag pieces/ railroad ballast & coal tar/creosote pieces	4.5 ft		Water in hole at 5 ft

301336

INACTIVE LANDFILL
SUBSURFACE SOIL SAMPLING FIELD LOGS

Date	*Test Pit #*	*Layers (fbg)*	*Brief Description of Lithology*	*Depth Samples Collected*	*PID Reading (ppm)*	*Comments, Including Water Conditions*
10/06/00	TP-9/SUB	0-0.5	Light brown topsoil, rootlet material with some round stone and sand		0	
		0.5-3	Light brown silt with some sand, slightly moist			
		3-6	Round cobbles, 2-4" diameter and small stone mixed with coarse brown sand, moist			
		6-6.5	Layer of coarse black sand			
		6.5-7.5	Light brown/tan medium/coarse sand with some silt	6.5 ft		Saturated soil at 7.5 ft
10/12/00	TP-10	0-1	Topsoil material, silt, some round stone/gravel, refusal at sluiceway base	Surface	0	Sample collected from sluiceway entrance
10/10/00	Settling Basin/SUB	0-3	Lt. brown silt with clay, round stone & gravel, shale pieces			
		3-8	Grey silt & clay with round stone, 1-6" diameter, woody plant material	7.0 ft.		Scraped concrete at 8 ft., possible settling basin floor. No fill detected Water ponding in bottom of hole at 8 ft
10/04/00	TP-1/G	0-1.5	Light brown cover soil, sand and some clay, round gravel. Moist		0	
		1.5-6	Black sludge-like material with wood debris. Bedrock encountered at 6 fbgs.		100	Odor detected, Scraped rock at 6 ft
10/04/00	TP-2/G	0-2.5	Topsoil & cover soil - Lt brown sand, fine to med., round gravel, small to med.-sized		0	
		2.5-6	Black sludge with weathered rock pieces and wood debris. Weathered bedrock encountered at 6 fbgs.		15	Scraped rock at 6 ft, water in hole at 6 ft

INACTIVE LANDFILL
SUBSURFACE SOIL SAMPLING FIELD LOGS

Date	*Test Pit #*	*Layers (fbg)*	*Brief Description of Lithology*	*Depth Samples Collected*	*PID Reading (ppm)*	*Comments, Including Water Conditions*
10/04/00	TP-3/G	0-4	Various-sized gravel, round base-type fill, grey round gravel and sand			
		4-6	Black sludge mixed with gravel and round stone, small to medium size. Wet			Water entering hole at 4ft
		6-7	Round gravel and stone 1"-6" diameter, with some black sludge intermixed			Test pit walls slumping in at 6-7 ft. Stop digging at 7.0 ft
10/04/00	TP-4/G	0-0.75	Topsoil with sand, some gravel, organic matter			
		0.75	Geotextile fabric material encounted			
		0.75-3	Sand and gravel fill with red brick fragments Dry			
		3-7	Lt. brown/tan sand w/ wood pieces, 0-1 ft long, gravel, some lg. stone, >12" diam.			Water in hole at 7 ft
10/04/00	TP-5/G	0-1	Light brown sand and gravel with organic matter, some clay			
		1-4	Brown sand with wood material, some round gravel			
		4-12	Black sludge like material intermixed with grey sand, sand stain impacted by black sludge. Woody material also mixed with sludge material. Sand content increasing with depth.			Water in hole at 12 ft

301338

Test Hole No.	*Cover Soil Thickness (inches)*	*Test Hole Depth (inches)*	*Depth Range (inches)*	*Description of Lithology*
TH-1	13	> 13	0-13" 13-?"	Grayish Brown silty sand, trace gravel & sand Waste cinders
TH-2	18	30	0-18" 18-30"	Gray sandy silt, trace clay, gravel Dark brown sand & gravel fill with little brick, wood
TH-3	18	44	0-18" 18-32" 32-44"	Gray silt & fine sand Brown sandy waste material Black waste with sand & brick
TH-4	22	32	0-22" 22-32"	Olive gray sandy silt, trace clay & gravel Brown and rust colored fill with wood, glass, gravel
TH-5	7	10	0-7" 7-10"	Gray silt and sand, trace clay and gravel Black sludge, very strong odor
TH-6	12	13	0-12" 12-13"	Gray & dark gray silt and sand, trace clay and gravel Black sludge
TH-7	48	53	0-48" 48-53"	Gray silt and sand, trace clay and gravel Black sludge
TH-8	38	43	0-38" 38-43"	Olive gray sandy silt, trace clay & gravel Black sludge
TH-9	18	21	0-18" 18-21"	Gray silty sand with trace clay and gravel Black sludge
TH-10	14.4	16.8	0-14.4" 14.4-16.8"	Olive brown to gray silt with trace clay, little sand Grayish black sandy material with odor
TH-11	18	> 18	0-18" 18-?"	Gray silt and sand, trace gravel Black waste
TH-12	15	> 15	0-15" 15-?"	Silt and fine sand, trace gravel Black waste
TH-13	18	24	0-18" 18-24"	Gray fine sand and silt with trace gravel Black sludge
TH-14	18	> 18	0-18" 18-?"	Sand and gray silt, trace gravel Black sludge with odor
TH-15	23	26	0-23" 23-26"	Gray silt and sand, trace clay and gravel Black sludge
TH-16	32	34	0-32" 32-34"	Gray silt and sand, trace clay and trace-little gravel Black sludge
TH-17	31.2	31.2	0-31.2" 31.2"	Brownish gray sandy silt with little gravel & silty sand Refusal on metal, likely bottom of 'cover'
TH-18	17	20	0-17" 17-20"	Brownish gray/gray sandy silt w/trace clay & gravel Black waste
TH-19	12	> 12	0-12" 12-?"	Gray/brown fine sand and silt, trace gravel Black waste sludge with odor
TH-20	24	26	0-24" 24-26"	Gray sand and silt Black sludge
TH-21	18	> 18	0-18" 18-?"	Silt and fine sand, trace gravel Black sludge waste
TH-22	22	25	0-22" 22-25"	Gray sandy silt with trace clay and gravel Black sludge
TH-23	41	44	0-41" 41-44"	Gray silt and fine sand, little gravel, trace clay Black sludge
TH-24	20	25	0-20" 20-25"	Gray sandy silt with trace clay and gravel Cinders

APPENDIX E

APPENDIX E

Boring Logs and Well Completion Details

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG

[redacted]

REPORT OF BORING NO. MW-1R SHEET 1 OF

PROJECT LOCATION: Gowanda, N.Y.

CLIENT: Peter Cooper

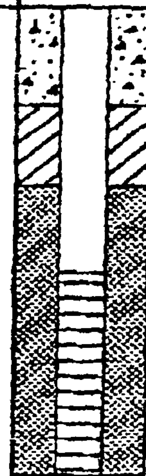
SAMPLER
TYPE: Split Spoon
HAMMER: 140 lbs.
FALL: 30"

GROUND WATER
DEPTH DATE 4/13/87 ELEV. 772.37
DEPTH DATE 5/14/87 ELEV. 771.37

FILE NO.: 1171.005.130

BORING CO.: Parratt-Wolfe
FOREMAN: Mark Beck
OBG GEOLOGIST: Peter Bogardus

BORING LOCATION: Upgradient
GROUND ELEVATION: 777.40
DATES: STARTED: 12/17/87 ENDED: 12/17/87

DEPTH	SAMPLE No.	SAMPLE DEPTH	BLOWS /6"	PENETRN/ RECOVERY	"N" VALUE	SAMPLE DESCRIPTION	STRATUM CHANGE DEPTH	EQUIPMENT INSTALLED	FIELD TESTING SAL. 0/00	FIELD TESTING SP. COND.	FIELD TESTING HNU	R M K S*
0						Not Sampled (See IB)						
5												
10												
15												

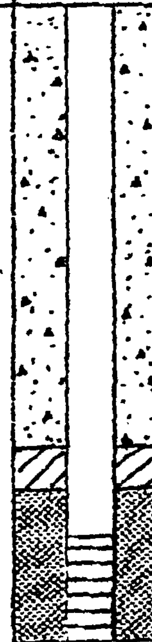
5' of screen installed from 10.4 - 5.4
7' of sand pack from 10.5 - 3.5
2' of Bentonite pellets from 3.5 - 1.5
1.5 of cement/bentonite grout 1.5 - 0

09/24/99 12:02 TX/RX NO.0764 P.003

301342

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG File Name: PC001B.BL	Report of Boring No. MW-1D Sheet 1 of 1
Project Location: Gowanda, NY Client: Peter Cooper	SAMPLER Type: SPLIT SPOON Hammer: 140 lbs. Fall: 30"	Ground Water Depth 766.28 Date 12/15/86 Depth 766.19 Date 4/13/86 File No. 1171-005-130
Boring Co.: Parratt-Wolff Foreman: Mark Beck OBG Geologist: Peter Bogardus	Boring Location: UPGRADIENT Ground Elevation: 779.00 Dates: Started:08/19/86	Ended:08/19

Depth	Sample "N" Value	Sample Penetrn/ Recovery	Sample Depth	Sample Blows /6"	Sample Description	Stratum Change Depth	Equipment Installed	Field Testing Sal. O/OO	Field Testing Sp. Cond.	Field Testing HNU
0										0
5	12	12	5-6.5	3-12 14	Moist silt and fine sand Fine gravel, Fine to Coarse sand, some silt Wet at 7'					.2
10	59+	12	9.2-10	28-30/3	Bedrock Grey weathered shale, set casing at 12'					1.5
15										
20										
25					Hard 25-27					
30										
35					Hard 34					
					B.O.B.					

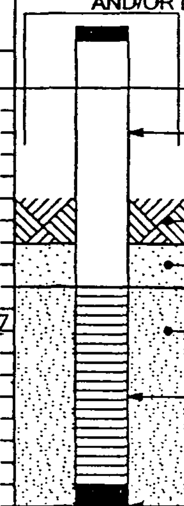


Casing installed at 12.1' with 2' of stick-up
5' of Screen installed from 36' to 31'
8' of packed sand from 36' to 28'
2' of bentonite slurry from 28' to 26'
26' of bentonite grout cement installed from 26' to surface

PROJECT: Peter Cooper RI/FS Gowanda, New York	Log of Well No. MW-2S(R)	
BORING LOCATION: 10 feet E. of MW-2S - Replacement Well for MW-2S	TOP OF CASING ELEVATION: 770.9	DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 7/11/00	DATE FINISHED: 7/11/00
DRILLING METHOD: HSA (4 1/4" I.D.)	TOTAL DEPTH: 8.7 feet bgs	SCREEN INTERVAL: 4.5 to 8.5
DRILLING EQUIPMENT: CME-55 - ATV	DEPTH TO WATER: FIRST 5.5 feet / COMPL.	CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stiainless Steel Split Spoon	LOGGED BY: CAL	
HAMMER WEIGHT: 140 lb. DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa	REG. NO.

DEPTH (feet)	Sample No.	Sample	Blows/ 6 inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 768.2
0–0.5					**TOPSOIL**: dark brown, dry to moist, organic roots present
1	1		21		**SILT with GRAVEL (ML)**; dark brown, dry, 75% fines, 10% coarse angular to subangular gravel, 5% fine subangular gravel, 10% fine sand, low plasticity [FILL]
3	2		59		**POORLY GRADED SAND with SILT and GRAVEL**; black, moist to wet, 50% fine to medium sand, 30% coarse angular to subangular gravel, 10% fine subangular to rounded gravel, 10% low plasticity fines. [FILL], strong septic type odor No sample 2-4'; cobbles, rig chattered
5	3				
7	4		>158		
8	5		>100		**BEDROCK**; gray; very fissile; shale/shaley limestone

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM MW2SR.GPJ (11/02)

Project No. 5771 | Geomatrix Consultants | Figure

301344

O'BRIEN & GERE ENGINEERS, INC.

TEST BORING LOG
File Name: PD002B.BL

Report of Boring No. MW-2[illegible]
Sheet 1 of 1

Project Location: Gowanda, NY
Client: Peter Cooper

SAMPLER
Type: SPLIT SPOON
Hammer: 140 lbs.
Fall: 30"

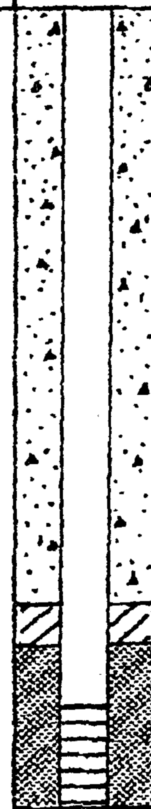
Ground Water Depth 755.51 Date 12/17/8[illegible]
Depth 755.64 Date 4/13/86

File No. 1171-005-130

Boring Co.: Parratt-Wolfe
Foreman: Mark Beck
OBG Geologist: Peter Bogardus

Boring Location: on mound
Ground Elevation: 781.14
Dates: Started:08/19/86 Ended:08/1[illegible]

Depth	Sample "N" Value	Sample Penetrn/ Recovery	Sample Depth	Sample Blows /6"	Sample Description	Stratum Change Depth	Equipment Installed	Field Testing Sal. 0/00	Field Testing Sp. Cond.	Field Testing HNU
0	7	6"	0-2	3-3 4-3	Grey moist silt ___3					.2
	5	6"	2-4	5-3 2-8	Black moist tanning hides					.6
5	27	6"	4-6	2-10 17-6						1.6
	13	6"	6-8	7-7 6-6	Black moist - dry cinders					.6 .7
	6	6"	8-10	2-2 4-14	Wet black hide and fine wood chunks					2.1
10	15	NR	10-12	10-8 7-9						.7
	11	6"	12-14	6-6 5-7	Same as above granular					
15	39	6"	14-16	14-19 20-22	Grey moist silty sand, trace of clay					
			16-18		Bedrock					
					Grey black shale 19' set casing at 22'					
20										
					Grey weathered shale					
25										
30										
35					___38 B.O.B.					
40										
45										
50										
55										



Casing set at 22', total well depth 38'
5' of screen installed from 38' to 33'
8' of packed sand from 38' to 30'
2' of bentonite slurry installed from 30' to 28'
28' of bentonite grout cement installed from 28' to surface

301345

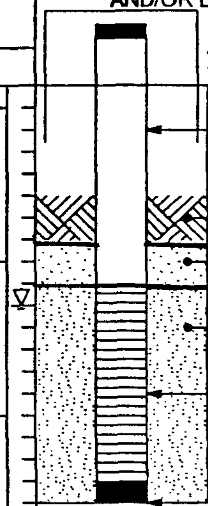
PROJECT: Peter Cooper RI/FS Gowanda, New York	**Log of Well No. MW-3(R)**

BORING LOCATION: 10 feet E. of MW-3 - Replacement Well for MW-3	TOP OF CASING ELEVATION: 770.7	DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 7/11/00	DATE FINISHED: 7/11/00
DRILLING METHOD: HSA (4 1/4" I.D.)	TOTAL DEPTH: 9.2 feet bgs	SCREEN INTERVAL: 4.5 to 9.0
DRILLING EQUIPMENT: CME-55 - ATV	DEPTH TO WATER: FIRST 5.0 feet | COMPL.	CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stiainless Steel Split Spoon	LOGGED BY: CAL	
HAMMER WEIGHT: 140 lb. DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa	REG. NO.

DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ 6 Inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 768.1
0–0.8					**TOPSOIL**; dark brown; dry to moist; organic; roots present
1	1		5		**SILT with SAND (ML)**; black, moist, 70% medium-low plasticity fines, 20% fine sand, 20% wood and miscellaneous fill material (hair, wood, fly ash, etc) [FILL], strong septic odor
3	2		8		
4					**POORLY GRADED SAND with SILT (SP-SM)**; black, wet, 80% fine to medium sand, 10% low plasticity fines, trace wood fragments, loose to medium dense, 10% coarse gravel [NATIVE], strong septic type odor
5	3		10		
7	4		47		
7.5					**BEDROCK**; gray; very fissile, shale/shaley limestone
8	5		>137		

Depth scale: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM MW2SR.GPJ (11/02)

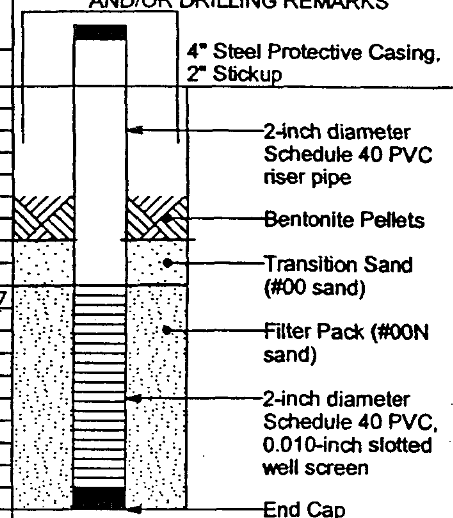
Project No. 5771 | Geomatrix Consultants | Figure

301346

PROJECT: Peter Cooper RI/FS Gowanda, New York	**Log of Well No. MW-4S(R)**	
BORING LOCATION: 8 feet W. of MW-4S - Replacement Well for MW-4S	TOP OF CASING ELEVATION: 767.0	DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 7/13/00	DATE FINISHED: 7/13/00
DRILLING METHOD: HSA (4 1/4" I.D.)	TOTAL DEPTH: 9.0 feet bgs	SCREEN INTERVAL: 4.5 to 9.0
DRILLING EQUIPMENT: CME-55	DEPTH TO WATER: FIRST 5.0 feet | COMPL.	CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stiainless Steel Split Spoon	LOGGED BY: CAL	
HAMMER WEIGHT: 140 lb. DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa	REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Blows/ 6 inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. — Surface Elevation: 765.2
0–1				**TOPSOIL**; dark brown, organic material **FILL**
1	1	7		
2–3	2	18		**SILTY Sand with Gravel (SM); black (1 GLEY 2.5/N)**; wet; 40% fine to medium sand; 20% coarse gravel, 10% fine gravel; 30% low plasticity fines
5	3	>103		
6				Water bearing zone 4-5.5' bgs **BEDROCK (weathered)** at 5.5' bgs; light grey (1 GLEY 7/N); dry; intensley weathered shale, powdery, fissile
7	4			
8.5	5	>100		
9				Bottom of Boring 9' bgs

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM MW2SR.GPJ (11/02)

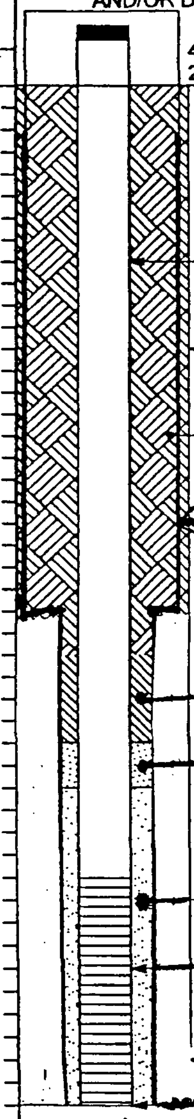
Project No. 5771 | Geomatrix Consultants | Figure

301347

PROJECT: Peter Cooper RI/FS Gowanda, New York		Log of Well No. MW-4D(R)	
BORING LOCATION: 8 feet East of MW-4D - Replacement well for MW-4D		TOP OF RISER ELEVATION: 766.36	DATUM:
DRILLING CONTRACTOR: Nothnagle Drilling		DATE STARTED: 7/12/00	DATE FINISHED: 7/12/00
DRILLING METHOD: HSA (4 1/4" I.D.)/HQ Coring		TOTAL DEPTH: 23.0 fbgs	SCREEN INTERVAL: 18 to 23 fbgs
DRILLING EQUIPMENT: CME-55		DEPTH TO WATER: | FIRST | COMPL.	CASING: 2-inch PVC
SAMPLING METHOD: HQ Coring		LOGGED BY: CAL	
HAMMER WEIGHT: NA	DROP: NA	RESPONSIBLE PROFESSIONAL: Richard H. Frappa, P.G.	REG. NO. PA-0969

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/foot	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 765.00
0					FILL
2					**SILTY Sand with Gravel (SM); black (1 GLEY 2.5/N);** wet; 40% fine to medium sand; 20% coarse gravel, 10% fine gravel, 30% low plasticity fines
5.5					**WEATHERED BEDROCK; SHALE**
10					**COMPETENT BEDROCK; dark grey (1 GLEY 4/N); SHALE**; fresh to slightly weathered, moderately soft, laminations (1-2 mm in thickness), fracture frequency (~3 feet), moderately fractured and spaced, thin and slightly opened fractures, partly healed fractures, (clay infilling visible), no HCL reaction
16					Run 1 - From: 12 feet To: 17 feet Recovery 100%; RQD 36%
19					dry fracture fillings more evident
20.5					Run 2 - From: 17 feet To: 22 feet Recovery 94%; RQD 34%
23					Run 3 - From: 22 feet To: 23 feet Recovery 83%; RQD 38% Bottom of Boring at 23 feet bgs
25					Average drill rate - 2 min/ft

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS

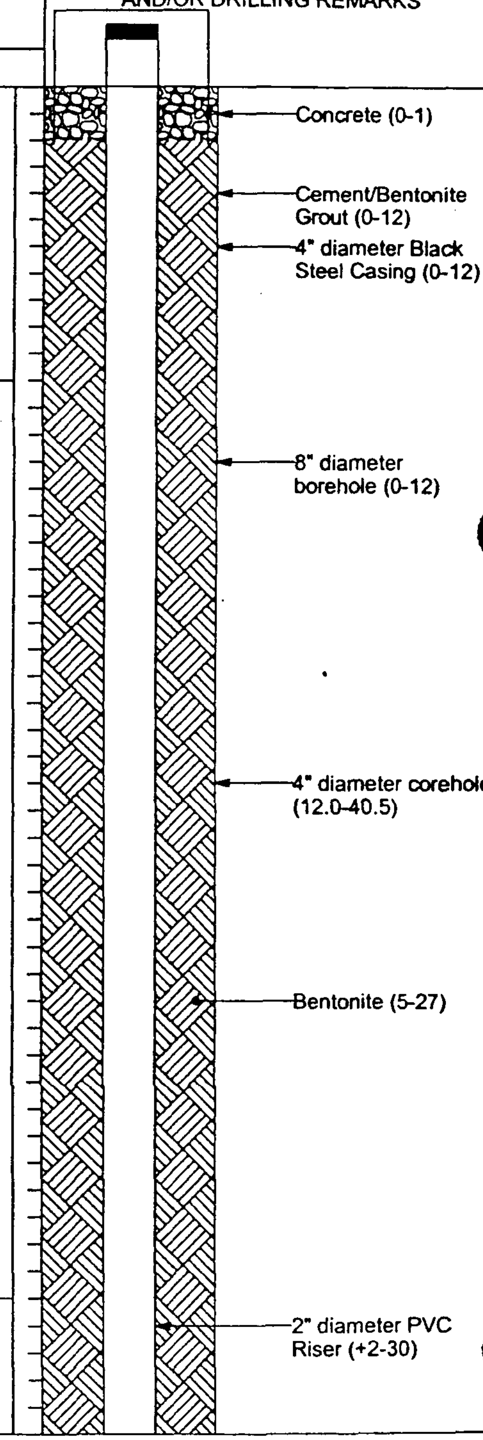


WELL_OVM MW4DR.GPJ (10/00)

PROJECT: Peter Cooper Inactive Landfill RI/FS Gowanda, New York	**Log of Well No. MW-4D2**
BORING LOCATION: See RI Figures for Boring Locations	TOP OF CASING ELEVATION: 766.4 | DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 9/28/00 | DATE FINISHED: 10/10/00
DRILLING METHOD: HSA (4 1/4" I.D.)/HQ Coring	TOTAL DEPTH: 40.5 feet bgs | SCREEN INTERVAL: 30-40
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST | COMPL. | CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stainless Steel Split Spoons/ HQ Coring	LOGGED BY: JV
HAMMER WEIGHT: 140 | DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa | REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 765.1
					OVERBURDEN: (see stratigraphy for well MW-4D)
1					
2					
3					
4					
5					
6					**BEDROCK: SHALE:** grey, horizontal to near horizontal bedding planes, thinly bedded (1-2 mm), thistle in places, moderately soft to soft, occassional horizontal fractures,
7					
8					
9					
10					
11					
12					Run #1 - 12' to 15.5' Rec 100% RQD 32%
13					Run #2 - 15.5' to 20.5' Rec 100% RQD 63%
14					Run #3 - 20.5' to 25.5' Rec 100% RQD 75%
15					
16					
17					
18					-soft, fractured
19					-soft, fractured
20					-horizontal fracture
21					
22					-soft, fractured
23					-darker grey, silty, harder, massive
24					
25					

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM MW4D2.GPJ (11/02)

Project No. 5771 | Geomatrix Consultants | Figure

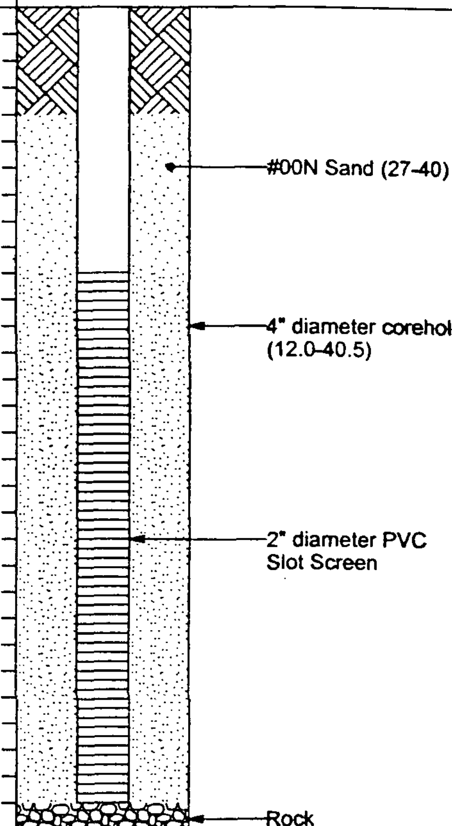
301349

PROJECT: Peter Cooper Inactive Landfill RI/FS
Gowanda, New York

Log of Well No. MW-4D2 (cont'd)

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.
26					
27					
28					
29					-soft, fractured
					-soft, fractured
30					
31					
32					-soft, fractured
					Run #4 - 25.5' to 30.5' Rec 98% RQD 78%
33					
					Run #5 - 30.5' to 35.5' Rec 97% RQD 67%
34					
35					Run #6 - 35.5' to 40.5' Rec 100% RQD 80%
36					No water loss
37					-softer, fissile (37-39)
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					
53					
54					
55					

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG File Name: PC0048.BL	Report of Boring No. MW-5 Sheet 1 of 1
Project Location: Gowanda, NY Client: Peter Cooper	SAMPLER Type: SPLIT SPOON Hammer: 140 lbs. Fall: 30"	Ground Water Depth 772.33 Date 12/15/86 Depth 771.60 Date 4/13/86 File No. 1171-005-130

Boring Co.: Parratt-Wolff Foreman: Mark Beck OBG Geologist: Peter Bogardus	Boring Location: east of fill area Ground Elevation: 778.98 Dates: Started:08/20/86 Ended:08/20/

Depth	Sample "N" Value	Sample Penetrn/ Recovery	Sample Depth	Sample Blows /6"	Sample Description	Stratum Change Depth	Equipment Installed	Field Testing Sal. 0/00	Field Testing So. Cond.	Field Testing HNU
0	-	12	0-2		Dry brown silt and gravel, root hairs (fill) 3'					
5	11	14	5-7	8-5 6-3	Black dry cinders, some silt pieces of wood 5'					.4
10	18	14	10-12	10-8 11-6	Orange - red, fine to coarse sand and fine gravel, chunks of cement and wood wet at 8' - hard at 10' 10'					2
15	50+	12	15-16	50/0	Wet sand and gravel, chunks of cement, iron oxide stain. 15'					.1
					Grey Weathered Shale 17'					
20					B.O.B.					
25										
30										
35										
40										
45										
50										
55										

2' of screen installed from 15' to 13'
2.5' of packed sand installed from 15' to 12.5'
2.5' of bentonite pellets installed from 12.5' to 10'
10' of bentonite grout cement installed from 10' to surface
4" protective guard pipe installed

Log of Well No. MW-5D

PROJECT: Peter Cooper RI/FS Gowanda, New York	**Log of Well No. MW-5D**
BORING LOCATION: See RI Figures for Boring Locations	TOP OF CASING ELEVATION: 781.0 / DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 9/26/00 / DATE FINISHED: 9/27/00
DRILLING METHOD: HSA (4 1/4" I.D.)/HQ Coring	TOTAL DEPTH: 28.5 feet bgs / SCREEN INTERVAL: 18.5-28.5
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST 8 feet / COMPL. / CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stainless Steel Split Spoon/ HQ Coring	LOGGED BY: JV
HAMMER WEIGHT: 140 lbs / DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa / REG. NO.

DEPTH (feet)	Sample No.	Blows/ 6 Inches	OVM (ppm)
1	1	13	0
3	2	16	0
5	3	7	0
7	4	6	0
9	5	88	0
11	6	15	0
13	7	59	0

DESCRIPTION
NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.

Surface Elevation: 779.3

ORGANIC SILT (OL/OH): olive brown 2.5Y 4/3, wet, 75% fines, 10% organic matter/roots, 5-10% gravel, 5-10% fine sand, high plasticity, soft

SILT and FINE SAND (SM-ML): olive 5Y 5/6, dry to slightly moist, 45-50% fines, 45-50% fine sand, 0-5% gravel, medium plasticity, firm, fill
-grades to grey 10YR 5/1, more gravel

ORGANIC SILT (OL/OH): greenish black 1 FOR GLEY 2.5/1 5GY, moist to wet, 75% fines/organic matter, 10-15% sand, 5-10% gravel, slight septic odor, fill, [Sludge?]

MIXED FILL: moist, 25% wood pieces, 25% gravel, 25% sand, 25% medium plasticity fines

SILT and SAND (SM-ML): black 1 FOR GLEY 2.5/N, wet to saturated, 50% coarse sand/fine gravel with metal slag pieces, 50% fines, slight odor
-pieces of railroad track

WEATHERED SHALE/BEDROCK: dark grey 1 FOR GLEY 4/N,dry, slight odor

BEDROCK: SHALE: light grey to grey, horizontal to near horizontal bedding planes, thinly bedded (1-2 mm), fissile in places, moderately soft to soft, occassional horizontal fractures, turbidation rare
-water bearing fractures
Run # 1 - 15 to 20 feet Rec 86%, RQD 7%, 20% Water loss

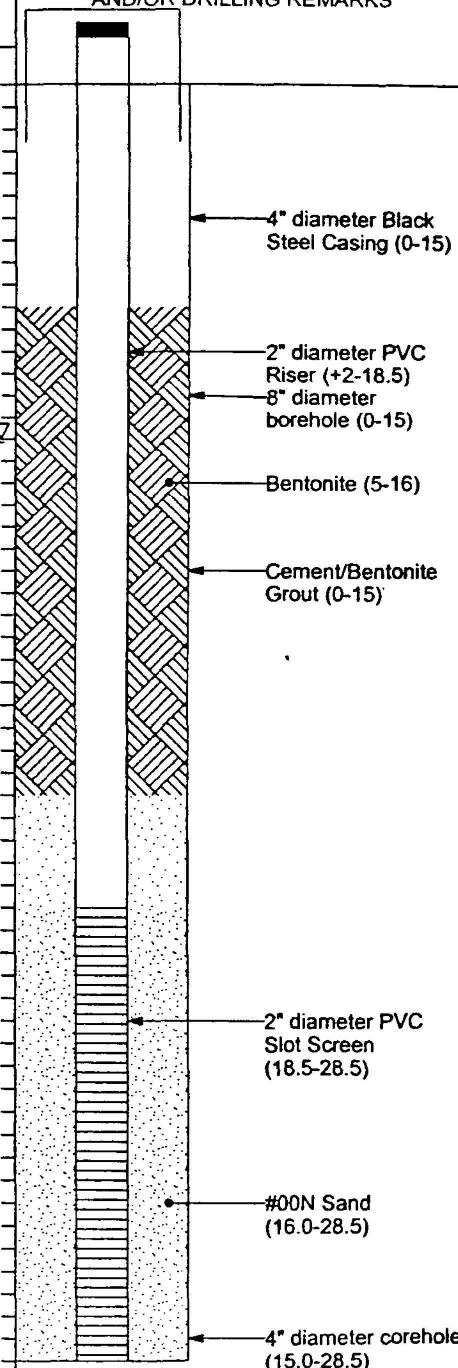
-silty, more massive (20-24)
Run #2 - 20 to 25 feet Rec 90%, RQD 79%, 100% water loss

-water bearing fractures

Run # 3 - 25 to 27 feet Rec 100%, RQD 46%, 50% water loss

-water bearing fractures
Run #4 - 27 to 28.5 feet Rec 100%, RQD 34%, 50% water loss

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM MW5D.GPJ (11/02)

Project No. 5771 | Geomatrix Consultants | Figure

301352

O'BRIEN & GERE ENGINEERS, INC.	TEST BORING LOG File Name: PC005B.BL	Report of Boring No. MW-6 Sheet 1 of 1
Project Location: Gowanda, NY Client: Peter Cooper	SAMPLER Type: SPLIT SPOON Hammer: 140 lbs. Fall: 30"	Ground Water Depth 773.4 Date 12/15/8 Depth 773.01 Date 4/13/6 File No. 1171-005-130

Boring Co.: Parratt-Wolfe
Foreman: Mark Beck
OBG Geologist: Peter Bogardus

Boring Location: edge of fill material
Ground Elevation: 781.38
Dates: Started:08/20/86 Ended:08/20/86

Depth	Sample "N" Value	Sample Penetrn/ Recovery	Sample Depth	Sample Blows /6"	Sample Description	Stratum Change Depth	Equipment Installed	Field Testing Sal. 0/00	Field Testing Sp. Cond.	Field Testing HNU	Rmks
0			0-2		Dry brown silt and fine sand, root hairs, medium sand and gravel 3'						
3-5	7	6"	3-5	3-5 2-5	Odor present, no return					.2	
5-6	1	12"	5-6	WOH 1-WOH	Grey-black silt same coarse gravel, trace of clay 7'					2.1	
8-10	9	12"	8-10	5-4 5-6	Wet black cinder fuel odor, sandy 10'					1.1	
10	8	12"	10-12	7-5 3-6	Same as above, piece of shale stuck in nose					1.1	
	1	8"	13-15	WOH WOH	Black gravel wet, odor, silt and clay in nose 15'					6.8	
15	2		15-17	WOH-1 1	Grey wet silt, and fine sand, trace clay, fine to medium sand					1.3	
20	45	12"	18-20	18-19 26-25	18' Grey Weathered Shale					1.2	
25											
30											
35											
40											
45											
50											
55											

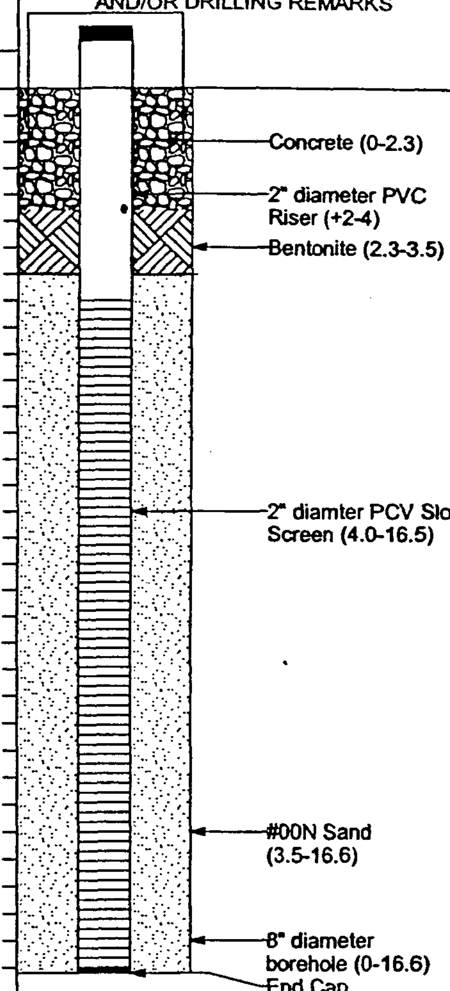
4' of screen installed from 18' to 14'
3.8' of packed sand installed from 18' to 14.2'
2' of bentonite pellets installed from 14.2' to 12.2'
12.2' of bentonite grout cement installed from 12.2' to surface

301353

Log of Well No. MW-7S

PROJECT: Peter Cooper RI/FS Gowanda, New York	Log of Well No. MW-7S
BORING LOCATION: See RI Figures for Boring Locations	TOP OF CASING ELEVATION: 787.8 / DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 9/26/00 / DATE FINISHED: 9/26/00
DRILLING METHOD: HSA (4 1/4" I.D.)	TOTAL DEPTH: 16.6 feet bgs / SCREEN INTERVAL: 4.0-16.5
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST / COMPL. / CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stainless Steel Split Spoons	LOGGED BY: JV
HAMMER WEIGHT: 140 lbs. DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa / REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 Inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
					Surface Elevation: 786.1	
0–25					See log for MW-7D for soil description	



WELL_OVM MW7S.GPJ (11/02)

Project No. 5771 | Geomatrix Consultants | Figure

301354

Log of Well No. MW-7D

PROJECT: Peter Cooper RI/FS Gowanda, New York	**Log of Well No. MW-7D**
BORING LOCATION: See RI Figures for Boring Locations	TOP OF CASING ELEVATION: 787.4 / DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 9/27/00 / DATE FINISHED: 9/28/00
DRILLING METHOD: HSA (4 1/4" I.D.)/HQ Coring	TOTAL DEPTH: 35.5 feet bgs / SCREEN INTERVAL: 25.5-35.5
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST / COMPL. / CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stainless Steel Split Spoons/HQ Coring	LOGGED BY: JV
HAMMER WEIGHT: 140 lbs. DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa / REG. NO.

DEPTH (feet)	Sample No.	Blows/ 6 inches	OVM (ppm)
1	1	12	0
3	2	33	0.2
5	3	15	60
7	4	3	10
9	5	3	3
11	6	2	10
13	7	4	10
15	8	2	50
17	9	68	50

DESCRIPTION
NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.

Surface Elevation: 785.8

SILT (ML): dark olive brown 2.5Y 3/3, moist, 90-95% fines, 0-5% roots/organic matter, 0-5% fine sand, medium plasticity
-less organic matter

WELL GRADED SAND with GRAVEL (SW): dark olive grey 5Y 3/2, dry, 80% sand, 15-20% gravel, 0-5% low plasticity fines, fill

WOOD/FILL: dark brown 10YR 3/3, moist, 80% wood/lumber pieces, 10-20% gravel, 0-10% sand, slight odor, fill

WELL GRADED SAND with GRAVEL (SW): greenish grey 1 FOR GLEY 6/1, dry, 80-90% sand, 10-20% gravel, 0-5% low plasticity fines, fill
-moist (4.5-6.0)

SILT (ML): dark greenish grey 1 FOR GLEY 3/1 10GY, wet, 80-90% fines, 10-20% fine sand 0-5% fine gravel, trace rootlets, high plasticity, soft, odor

SILT (ML): dark grey 1 FOR GLEY 4/N, 90-95% fines, 0-5% fine sand, 0-5% fine gravel, high plasticity, soft, odor

SILT with GRAVEL (ML): very dark grey 1 FOR GLEY 3/N, wet, 50-70% fines, 25-30% gravel, trace wood pieces, slight odor, trace sheen

SILT with CLAY (ML): wet, 0-95% fines, 0-5% fine sand, 0-5% fine gravel, high plasticity, soft

CLAY/WEATHERED BEDROCK: moist to dry, firm to hard, laminated

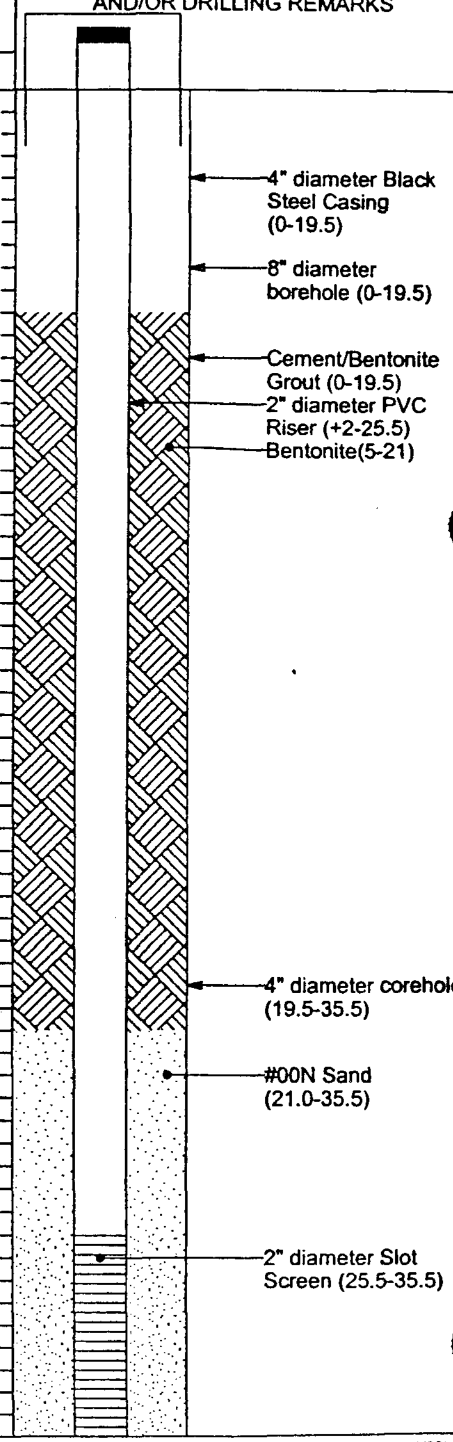
BEDROCK: SHALE: grey, horizontal to near horizontal bedding planes, thinly bedded (1-2 mm), moderately soft to soft, occassional horizontal fractures

Run # 1 - 19.5 to 20.5 feet Rec 75% RQD 33%

Run # 2 - 20.5 to 25.5 feet Rec 100% RQD 58%

Run # 3 - 25.5 to 30.5 feet Rec 97% RQD 82%

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM MW7D.GPJ (11/02)

Project No. 5771 | Geomatrix Consultants | Figure

301355

PROJECT: Peter Cooper RI/FS
Gowanda, New York

Log of Well No. MW-7D (cont'd)

DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ 6 Inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
31					Run # 4 - 30.5 to 35.5 feet Rec 98% RQD 48%	
32					Little water loss	
33						
34						
35					-coarser grained (35.0-35.2)	
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
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62						
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64						
65						
66						

PROJECT: Peter Cooper RI/FS Gowanda, New York		Log of Well No. MW-8S	
BORING LOCATION: See RI Figures for Boring Locations		TOP OF CASING ELEVATION: 777.4	DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling		DATE STARTED: 9/28/00	DATE FINISHED: 9/28/00
DRILLING METHOD: HSA (4 1/4" I.D.)		TOTAL DEPTH: 16.0 feet bgs	SCREEN INTERVAL: 6-16
DRILLING EQUIPMENT: CME-75		DEPTH TO WATER: FIRST / COMPL.	CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stainless Steel Split Spoons		LOGGED BY: JV	
HAMMER WEIGHT: 140 lbs.	DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa	REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 778.1	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
1					See log for MW-8D for soil description	8" diameter borehole (0-16)
2						
3						Bentonite (2.5-5.0)
4						2" diameter PVC Riser (+2-6)
5						
6						
7						
8						
9						
10						#00N Sand (5-16)
11						
12						
13						
14						2" diameter Slot Screen (6-16)
15						
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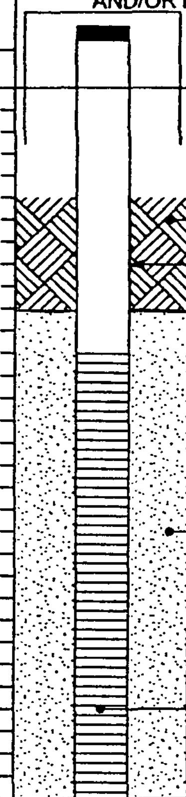


WELL_OVM MW8S.GPJ (11/02)

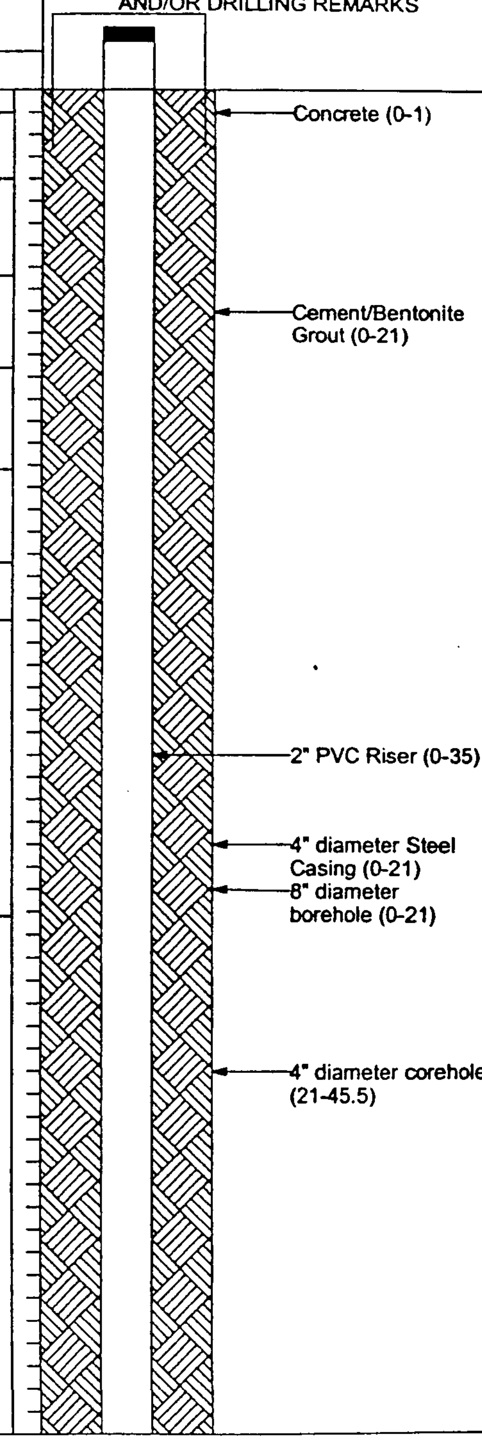
Project No. 5771 | Geomatrix Consultants | Figure

301357

PROJECT: Peter Cooper RI/FS Gowanda, New York	**Log of Well No. MW-8D**
BORING LOCATION: See RI Figures for Boring Locations	TOP OF CASING ELEVATION: 777.6 / DATUM: fmsl
)RILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 9/28/00 / DATE FINISHED: 9/29/00
DRILLING METHOD: HSA (4 1/4" I.D.)/ HQ Coring	TOTAL DEPTH: 45.5 feet bgs / SCREEN INTERVAL: 35-45
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST / COMPL. / CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stainless Steel Split Spoons/ HQ Coring	LOGGED BY: JV
HAMMER WEIGHT: 140 lb / DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa / REG. NO.

DEPTH (feet)	Sample No.	Blows/ 6 Inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 778.0
1	1	15	0	**POORLY GRADED SAND with GRAVEL (SP):** dark brown 10YR 3/3, dry, 70-75% fine sand, 25% fine gravel, 0-5% low plasticity fines, fill, [GRAVELLY FILL]
2				**SANDY SILT (ML):** very dark brown 10YR 2/2, dry 75% fines, 20% fine sand, 5% gravel, medium plasticity, soft, fill
3	2	12	0	
4				**SILT with CLAY (ML):** yellowish brown 10YR 5/4, dry to slightly moist, 80-90% fines, 10-20% sand, high plasticity, soft
5	3	19	0	
6				**WELL GRADED SAND with GRAVEL (SW):** dark yellowish brown 10YR 3/6, dry, 75% sand, 20% gravel, 5% low plasticity fines, fill, [GRAVELLY FILL]
7	4	21	0	**GRAVELLY SILT with SAND (ML):** yellowish brown 10YR 5/8, moist, 50% fines, 25-40% gravel, 10-25% fine sand, medium plasticity, soft
8				
9	5	58	0	-moist to wet
10				**WELL GRADED GRAVEL with SAND (GW):** grey 1 FOR GLEY 5/N, wet to saturated, 75% angular gravel, 15-25% well graded sand, 10-15% low plasticity fines
11	6	22	0	**CLAY (CL):** grey 5YR 6/1, dry, 100% fines, high plasticity, firm to hard
12				**CLAY with SILT (CL):** grey 5YR 6/1, dry, 90% high plasticity fines, 10% well graded gravel, hard
13	7	>100	0	
14				-grades to grey 1 FOR GLEY 5/1
15	8	>100	0	
16				
17	9	>100	0	
18				
19	10	>100	0	**WEATHERED SHALE BEDROCK**
20				
21				
22				Run # 1 - 21' to 25.5' Rec 11% RQD 0%
23				
24				
25				
26				Run # 2 - 25.5' to 30.5' Rec 40% RQD 0%
27				
28				
29				
30				

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



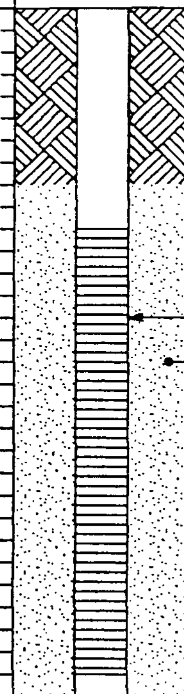
WELL_OVM MW8D.GPJ (11/02)

PROJECT: Peter Cooper RI/FS
Gowanda, New York

Log of Well No. MW-8D (cont'd)

DEPTH (feet)	SAMPLES: Sample No.	SAMPLES: Sample	SAMPLES: Blows/ 6 inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
31–34					**BEDROCK: SHALE:** grey, horizontal to near horizontal bedding planes, thinly bedded (1-2 mm), moderately soft to soft, occassional horizontal fractures -weathered rock/fractured zone, clay deposits (31.0, 32.0, 33.5, 37.5) Run # 3 - 30.5' to 35.5' Rec 80% RQD 24%	
36					Run # 4 - 35.5' to 40.5' Rec 97% RQD 77%	
37–38						2" diameter Slot Screen (35-45) #00N Sand (34-45.5)
41					Run # 5 - 40.5' to 45.5' Rec 100% RQD 80%	
42					No water loss -soft, fissile (41.0-41.2 and 42.1-42.3)	
45					-soft (45.0-45.1)	

Depth scale: 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66



PROJECT: Peter Cooper RI/FS Gowanda, New York	# Log of Well No. MWFP-1D	
BORING LOCATION: See RI Figures for Boring Locations	TOP OF CASING ELEVATION: 787.3	DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 10/3/00	DATE FINISHED: 10/5/00
DRILLING METHOD: HSA (4 1/4" I.D.)/ HQ Coring	TOTAL DEPTH: 22.5 feet bgs	SCREEN INTERVAL: 12.5-22.5
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST / COMPL.	CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stainless Steel Split Spoon/ HQ Coring	LOGGED BY: JV	
HAMMER WEIGHT: 140 lb / DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa	REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 inches	OVM (ppm)
1	1	X	49	3
3	2	X	>100	
5	3	X	>100	3

DESCRIPTION
NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.

Surface Elevation: 785.2

ORGANIC SILT (OL/OH): very dark greyish brown 2.5Y 3/2, moist, 80% fines, 10% fine sand, 10% organic matter, high plasticity

POORLY GRADED SAND with GRAVEL (SP): olive brown 2.5Y 4/4, dry, 75% fine sand, 20% gravel, 5% low plasticity fines, slight musty/organic odor, fill

WEATHERD SHALE BEDROCK

BEDROCK: SHALE: grey, horizontal to near horizontal bedding planes, thinly bedded (1-2 mm), fissile in places, moderately soft to soft, occassional horizontal fractures

Run # 1 - 8.5' to 9.5' Rec 100% RQD 46%
Run # 2 - 9.5' to 14.5' Rec 97% RQD 75%

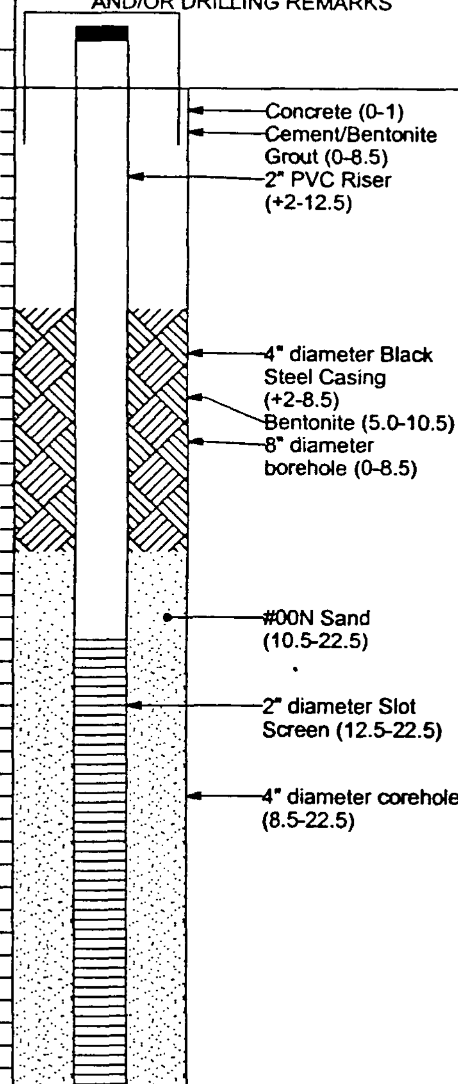
Run # 3 - 14.5' to 15.5' Rec 100% RQD 62%

Run # 4 - 15.5' to 19.5' Rec 94 % RQD 25%

Run # 5 - 19.5' to 22.5' Rec 100% RQD 90%

Minimal water loss

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM MWFP10.GPJ (11/02)

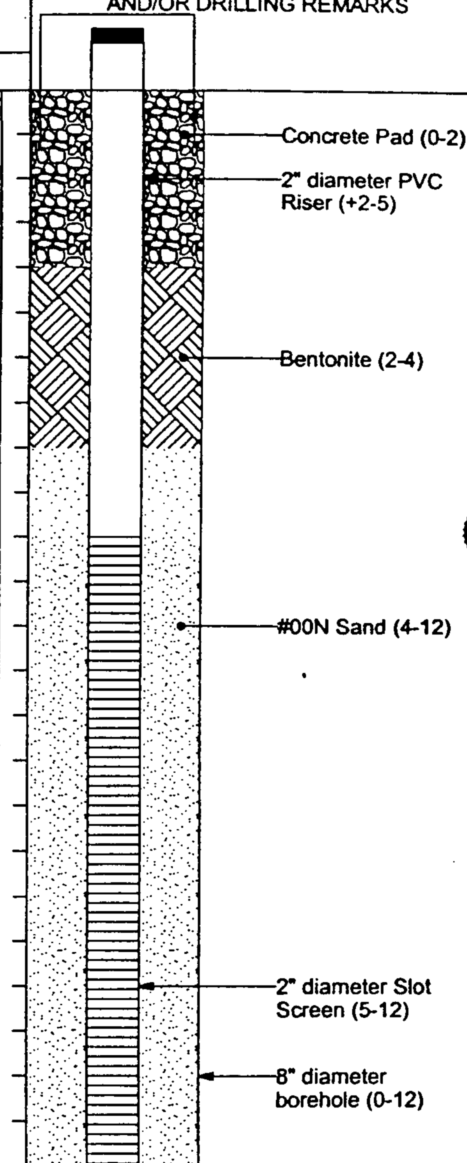
Project No. 5771	Geomatrix Consultants	Figure

301360

PROJECT: Peter Cooper RI/FS Gowanda, New York	**Log of Well No. MWFP-2S**
BORING LOCATION: See RI Figures for Boring Locations	TOP OF CASING ELEVATION: 785.2 / DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 10/3/00 / DATE FINISHED: 10/3/00
DRILLING METHOD: HSA (4 1/4" I.D.)	TOTAL DEPTH: 12.0 feet bgs / SCREEN INTERVAL: 5-12
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST / COMPL. / CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stainless Steel Split Spoons	LOGGED BY: JV
HAMMER WEIGHT: 140 lb / DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa / REG. NO.

DEPTH (feet)	SAMPLES Sample No.	Blows/ 6 Inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 784.3
0				**SILT AND FINE SAND (SM-ML):** very dark greyish brown 10YR 3/2, dry, 40-50% fines, 40-50% fine sand, 5% gravel, 5% organic matter/roots, medium plasticity
1	1	18	0	**SAND with GRAVEL (SW):** very dark brown 10YR 2/2, dry to slightly moist, 80% sand, fine to medium grained, 15% gravel, 5% low plasticity fines, some coal pieces
2				**SILTY SAND (SM):** very dark brown 10YR 2/2, moist, 65% fine to medium grained sand, 20% low plasticity fines, 15% gravel, trace coal
3	2	10	0	
4				
5	3	7	0	**WEATHERED BRICK:** very pale brown 10YR 7/4, moist **SILTY SAND (SM):** very dark brown 10YR 2/2, moist, 65% fine to medium grained sand, 20% low plasticity fines, 15% gravel, trace coal
6				-more fines
7	4	5	0	**SILT with GRAVEL (ML):** dark reddish grey 5YR 3/2, moist to wet, 60% fines (peat-like decayed wood), 20% gravel, 10% fine sand, 10% wood pieces, medium plasticity, slight musty odor, fill
8				
9	5	3	0	**SILT with GRAVEL (ML):** black 1 FOR GLEY 2.5/N, wet, 60% fines, 25% well graded angular gravel, 15% well graded sand, medium plasticity, trace wood pieces, slight coal-like odor, soft, fill
10				
11	6	26	0	**WEATHERED BEDROCK**
12				
13				
14				
15				

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



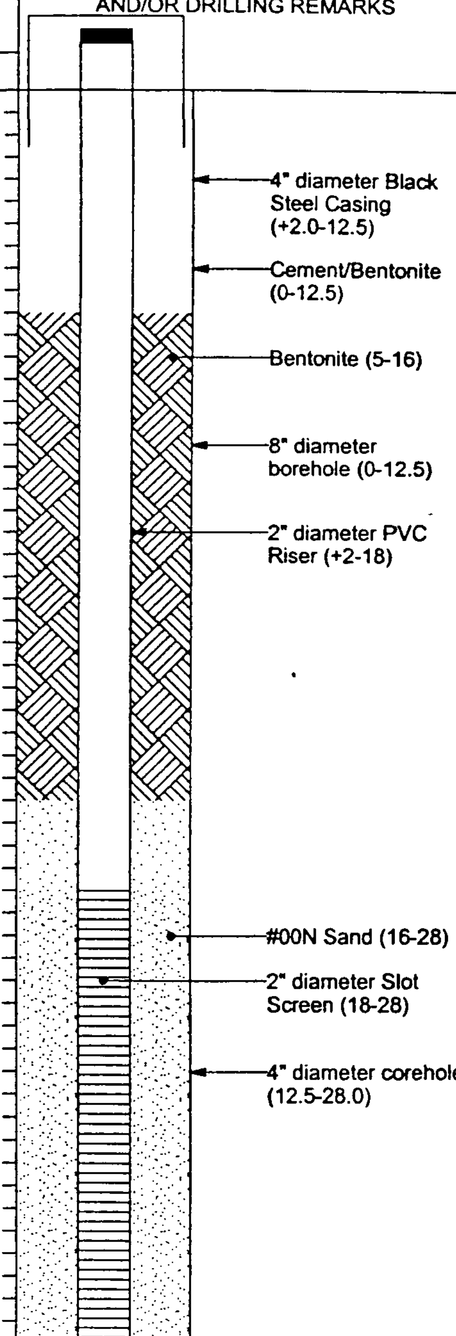
WELL_OVM MWFP2S.GPJ (11/02)

PROJECT: Peter Cooper RI/FS Gowanda, New York	**Log of Well No. MWFP-2D**

BORING LOCATION: See RI Figures for Boring Locations	TOP OF CASING ELEVATION: 786.0	DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 10/3/00	DATE FINISHED: 10/4/00
DRILLING METHOD: HQ Coring	TOTAL DEPTH: 28.0 feet bgs	SCREEN INTERVAL: 18-28
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST / COMPL.	CASING: 2-inch PVC
SAMPLING METHOD: HQ Coring	LOGGED BY: JV	
HAMMER WEIGHT: 140 lbs. DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa	REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 784.1
0–11					**OVERBURDEN:** (see stratigraphy for well MWFP-2S)
11					**BEDROCK: SHALE:** grey to dark grey/black, horizontal to near horizontal bedding planes, thinly bedded (1-2 mm), occassional horizontal fractures
14					-lighter grey (13.5-16.0)
16					-alternating dark grey and grey bedding (16-28) -soft zones (16.5, 17.8, 22.5)
18					Run # 1 - 12.5' to 15.5' Rec 100% RQD 72%
19					Run # 2 - 15.5' to 20.5' Rec 100% RQD 48%
21					Run # 3 - 20.5' to 25.5' Rec 97% RQD 42%
22					Run # 4 - 25.5' to 28.0' Rec 99% RQD 57%
23					No water loss Runs 1-3, lost 10 gallons at Run # 4
26					-several potentially water bearing horizontal fractures (26.0-26.5)
28–30					

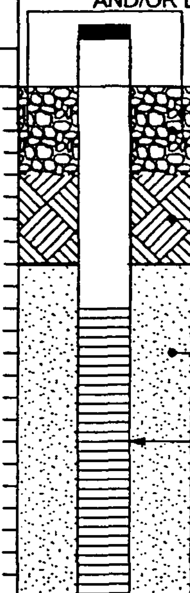
WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM MWFP2D.GPJ (11/02)

Log of Well No. MWFP-3S

PROJECT: Peter Cooper RI/FS Gowanda, New York	
BORING LOCATION: See RI Figures for Boring Locations	TOP OF CASING ELEVATION: 780.7 / DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 10/3/00 / DATE FINISHED: 10/3/00
DRILLING METHOD: HSA (4 1/4" I.D.)	TOTAL DEPTH: 11.5 feet bgs / SCREEN INTERVAL: 5-11.5
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST / COMPL. / CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stainless Steel Split Spoons	LOGGED BY: JV
HAMMER WEIGHT: 140 lbs. / DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa / REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 778.5	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
1–30					See log for well MWFP-3D for soil description.	

WELL_OVM MWFP3S.GPJ (11/02)

Project No. 5771 | Geomatrix Consultants | Figure

301363

PROJECT: Peter Cooper RI/FS Gowanda, New York	**Log of Well No. MWFP-3D**

BORING LOCATION: See RI Figures for Boring Locations	TOP OF CASING ELEVATION: 780.5	DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 10/3/00	DATE FINISHED: 10/4/00
DRILLING METHOD: HSA (4 1/4" I.D.)/ HQ Coring	TOTAL DEPTH: 27.0 feet bgs	SCREEN INTERVAL: 16-26
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST / COMPL.	CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stainless Steel Split Spoons/ HQ Coring	LOGGED BY: JV	
HAMMER WEIGHT: 140 lb — DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa	REG. NO.

DEPTH (feet)	Sample No.	Blows/ 6 inches	OVM (ppm)
1	1	24	200
3	2	20	20
5	3	14	0
7	4	36	0
9	5	32	0
11	6	>100	0

DESCRIPTION
NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.

Surface Elevation: 778.7

ORGANIC SILT (OL/OH): dark greyish brown 2.5Y 4/2, dry to moist, 60% fines, 40% fine sand, 5% gravel, 5% organic matter, medium plasticity

POORLY GRADED SAND (SP): black 2.5Y 2.5/1, moist, 80% fine sand, 10% gravel, 10% low plasticity fines, no odor, contains metal pieces, cinders and ash

SANDY SILT with GRAVEL (ML): grey 2.5Y 6/1, moist, 40% fines, 30% fine sand, 30% gravel, low plasticity, fill, [GRAVELLY FILL]

SILT and FINE SAND (SM-ML): greyish brown 2.5Y 5/2, moist, 45% medium plasticity fines, 45% fine sand, 10% gravel, trace rootlets

POORLY GRADED SAND with GRAVEL: olive brown 2.5Y 4/4, dry, 70% fine sand, 20% gravel, 10% low plasticity fines

SILT and FINE SAND (SM-ML): greyish brown 2.5Y 5/2, moist to wet, 40-50% fines, 40-50% fine sand, 10-20% gravel, medium plasticity
-wet to saturated

SILT with GRAVEL (ML): dark grey 1 FOR GLEY 4/N, moist, 50% fines, 35% gravel, 15% well graded sand, medium plasticity, firm to hard,

BEDROCK: SHALE: dark grey/black to grey, horizontal to near horizontal beding planes, thinly bedded (1-2 mm), fissile in places, moderately soft to soft, occassional horizontal fractures, turbidation rare, silty interbeds
-soft zone, weathered bedrock, mud and clay in fractures (13.5-14.5)
-several horizontal fractures (15.0-15.5)
-several soft zones, weathered bedrock, mud and clay in fractures (16.5-18.5)

Run # 1 - 11' to 14.5' Rec 80% RQD 58%

Run # 2 - 14.5' to 19.5' REC 97% RQD 38%

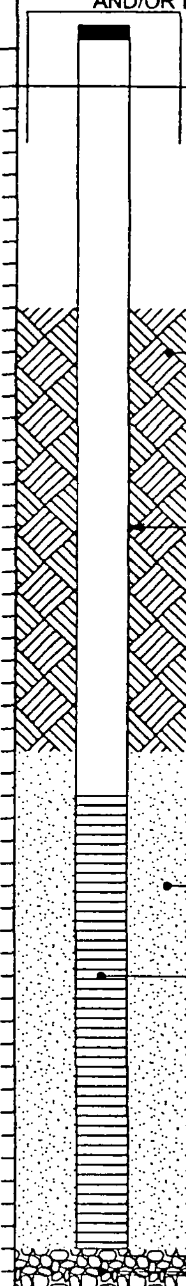
-silty, grey

Run # 3 - 19.5' to 24.5' Rec 100% RQD 78%

Run # 4 - 24.5' to 27' Rec 80% RQD 92%

Total Water loss 75%

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS

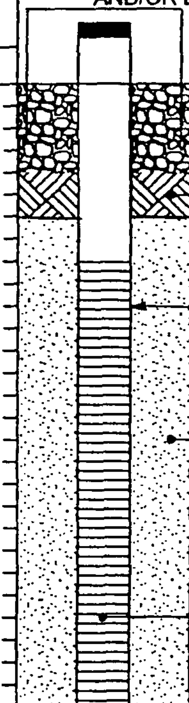


PROJECT: Peter Cooper RI/FS Gowanda, New York	**Log of Well No. PZ-1**

BORING LOCATION: See RI Figures for Boring Locations	TOP OF CASING ELEVATION: 772.3	DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 10/10/00	DATE FINISHED: 10/10/00
DRILLING METHOD: HSA (4 1/4" I.D.)	TOTAL DEPTH: 14.0 feet bgs	SCREEN INTERVAL: 4-14
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST | COMPL.	CASING: 2-inch PVC
SAMPLING METHOD: 4' stainless steel barrel with acetate sleeve	LOGGED BY: JV	
HAMMER WEIGHT: 140 lbs. DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa	REG. NO.

DEPTH (feet)	Sample No.	Sample	Blows/ 6 Inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 770.0
0–1.8					**ORGANIC SILT (OL/OH):** dark greyish brown 2.5Y 4/2, 75% fines, 10% fine sand, 10% gravel, 5% organic matter, medium plasticity
2	1			0	**WELL GRADED SAND with SILT and GRAVEL (SW-SM):** dark greyish brown 10YR 4/2, dry to slightly moist, 70% sand, 15% gravel, 15% low plasticity fines, fill
6	2			0	
8					-wet to saturated
8					**WELL GRADED SAND with SILT (SW-SM):** black 1 FOR GLEY 2.5/N, wet to saturated, 80-90% sand, 10-20% low plasticity fines
10	3			0	
13	4			0	**SILT (ML):** black 1 FOR GLEY 2.5/N, wet to saturated, 80-90% fines, 0-10% fine sand, 0-10% gravel, high plasticity, [Sludge Fill]

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



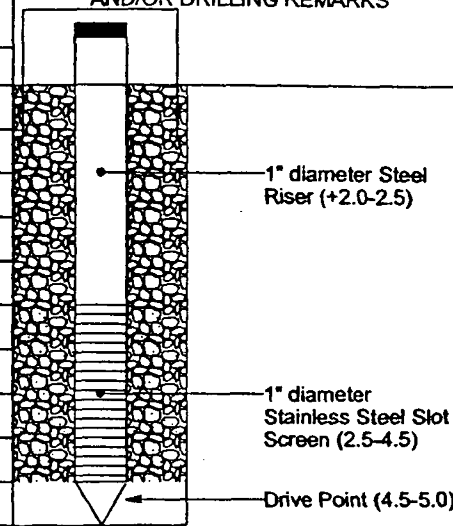
WELL_OVM PZ1.GPJ (11/02)

Project No. 5771	Geomatrix Consultants	Figure

301365

PROJECT: Peter Cooper RI/FS Gowanda, New York		**Log of Well No. DP-1**
BORING LOCATION: See RI Figures for Boring Locations	TOP OF CASING ELEVATION: 761.4	DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 10/10/00	DATE FINISHED: 10/10/00
DRILLING METHOD: Direct Push Drive Point	TOTAL DEPTH: 5.0 feet bgs	SCREEN INTERVAL: 2.5-4.5
DRILLING EQUIPMENT: NA	DEPTH TO WATER: FIRST | COMPL.	CASING: 1-inch stainless steel
SAMPLING METHOD: NA	LOGGED BY: JV	
HAMMER WEIGHT: NA — DROP: NA	RESPONSIBLE PROFESSIONAL: Richard H. Frappa	REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 Inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 759.2	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
1						
2						
3						
4					Drive point- not sampled for lithology	
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

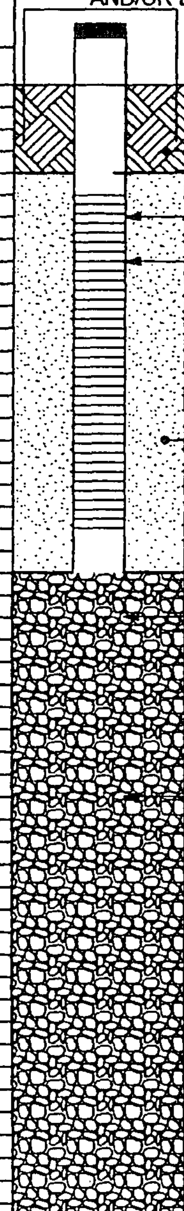


Log of Well No. GMW-1

PROJECT: Peter Cooper RI/FS Gowanda, New York		Log of Well No. GMW-1	
BORING LOCATION: See RI Figures for Boring Locations		TOP OF CASING ELEVATION: 787.8	DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling		DATE STARTED: 10/9/00	DATE FINISHED: 10/9/00
DRILLING METHOD: HSA (4 1/4" I.D.)		TOTAL DEPTH: 20.0 feet bgs	SCREEN INTERVAL: 2.5-10
DRILLING EQUIPMENT: CME-75		DEPTH TO WATER: FIRST | COMPL.	CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stainless Steel Split Spoons		LOGGED BY: JV	
HAMMER WEIGHT: 140 lbs.	DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa	REG. NO.

DEPTH (feet)	Sample No.	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.
		Surface Elevation: 787.1
0–2		**ORGANIC SILT (OL/OH):** dark greyish brown 2.5Y 4/2, 80% fines, 15% fine sand, 0-5% gravel, 0-5% organic matter, medium plasticity
2	1	**SILT (ML):** grey 5YR 5/1, moist, 95% fines, 0-5% fine sand, 0-5% fine gravel, high plasticity, soft
3–16		**SILT (ML):** black 1 FOR GLEY 2.5/N, moist, 80-90% high plasticity fines, 0-10% fine sand, 0-10% gravel, fill, [WASTE]
6	2	-clay layer (5.5-5.7)
8		-wet to saturated
10	3	
12		-moist to wet
14	4	
16		**SILT (ML):** dark greenish grey 1 FOR GLEY 4/1/10Y, moist, 80% fines, 10% fine sand, 10% gravel, high plasticity
18	5	**WELL GRADED GRAVEL (GW):** 100% gravel
		SILT (ML): black 1 FOR GLEY 2.5/N, moist, 80-90% high plasticity fines, 0-10% fine sand, 0-10% gravel, fill, [WASTE]
20		**SILTY SAND (SP-SM):** black 1 FOR GLEY 2.5/N, moist to wet, 70-90% fine sand, 10-30% low plasticity fines [WASTE]
22	6	**SILT and CLAY (ML-CL):** bluish grey 2 FOR GLEY 5/1/5PB, wet to saturated, 95-100% fines, 0-5% fine gravel, high plasticity, soft
24	7	**SILTY SAND (SP-SM):** black 1 FOR GLEY 2.5/N, moist to wet, 70-90% fine sand, 10-30% low plasticity fines [WASTE]
25.5		**SILT and CLAY (ML-CL):** bluish grey 2 FOR GLEY 5/1/5PB, wet to saturated, 95-100% fines, 0-5% fine gravel, high plasticity, soft
27.5		BEDROCK

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS

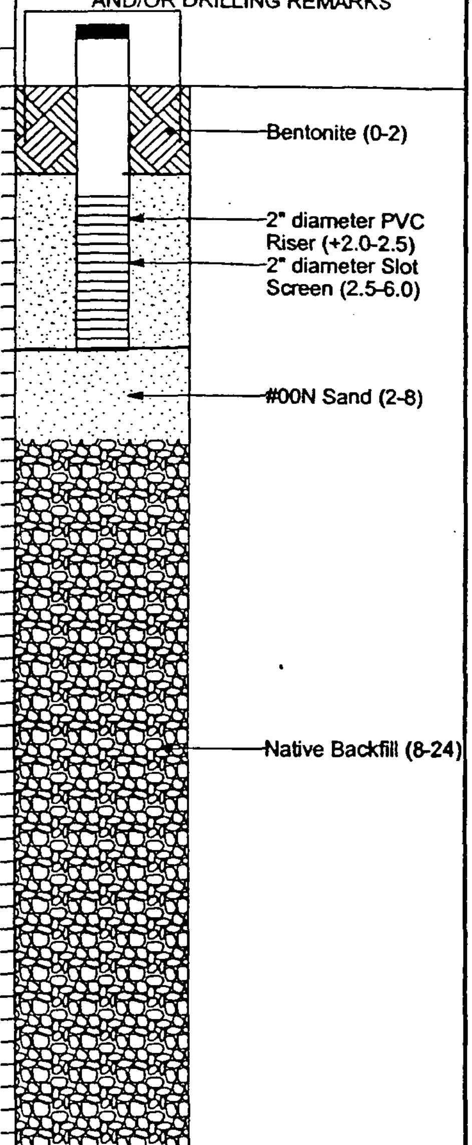


WELL_OVM GP1.GPJ (11/02)

PROJECT: Peter Cooper Inactive Landfill Gowanda, New York	**Log of Well No. GMW-2**
BORING LOCATION: See RI Figures for Boring Locations	TOP OF CASING ELEVATION: 789.5 — DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 10/9/00 — DATE FINISHED: 10/9/00
DRILLING METHOD: HSA (4 1/4 I.D.)	TOTAL DEPTH: 23.9 feet bgs — SCREEN INTERVAL: 2.5-6
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST — COMPL. — CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stainless Steel Split Spoons	LOGGED BY: JH
HAMMER WEIGHT: 140 lbs. — DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa — REG. NO.

DEPTH (feet)	Sample No.	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.
		Surface Elevation: 787.1
0–1		**SILTY SAND (SM):** olive brown 2.5Y 4/4, moist, 80% well graded sand, 20% medium plasticity fines
1–2.5	1	**SILT and CLAY (ML-CL):** gray 2.5Y 5/1, slightly moist , 90-95% fines, 0-5% fine sand, 0-5% fube gravel, trace rootlets
2.5–18	2, 3, 4	**SILT (ML):** black 2.5Y 2.5/1, moist, 80-90% fines, 0-10% fine sand, 0-10% fine gravel, slight odor, trace wood and metal pieces, fill [WASTE] -saturated @ 2.1
18–19	5	**CLAY (CL):** light grey 5YR 7/1, 100% fines, high plasticity
19–21		**SILT and SAND (ML):** yellowish brown 10YR 6/4, moist to wet, 75% fines, 20% well graded sand, 5% fine gravel, trace roots, high plasticity
21–22	6	**POORLY GRADED SAND (SP):** brown 7.5YR 4/2, 100% sand
22–24		**SILT (ML):** very dark grey 5YR 3/1, moist to wet, 80-90% fines, 10-15% fine sand, 5-10% gravel, high plasticity
24–25.5		**GRAVELLY SILT with SAND (ML):** black 5YR 2.5/1, saturated, 50% fines, 35% gravel, 15% well graded sand
25.5		BEDROCK

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



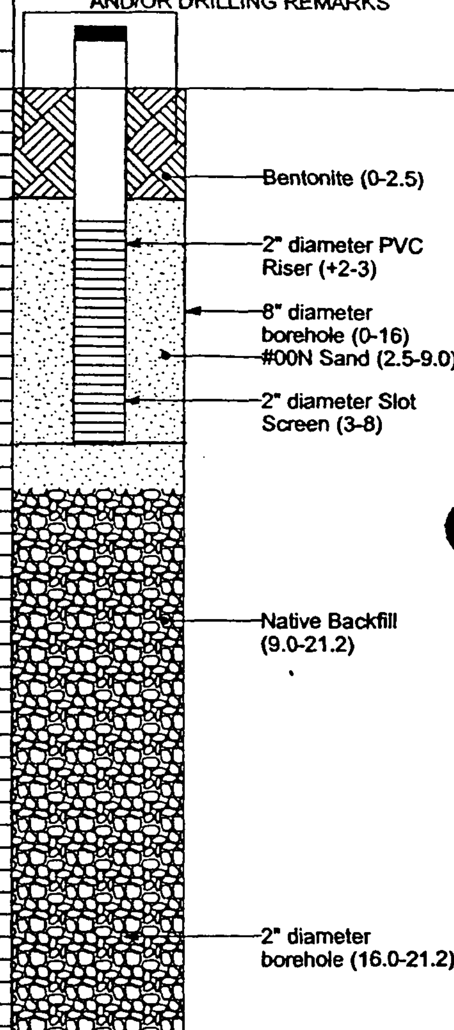
WELL_OVM GP2.GPJ (11/02)

PROJECT: Peter Cooper RI/FS Gowanda, New York	**Log of Well No. GMW-3**

BORING LOCATION: See RI Figures for Boring Locations	TOP OF CASING ELEVATION: 790.3	DATUM: fmsl
DRILLING CONTRACTOR: Nothnagle Drilling	DATE STARTED: 10/9/00	DATE FINISHED: 10/9/00
DRILLING METHOD: HSA (4 1/4" I.D.)	TOTAL DEPTH: 21.2 feet bgs	SCREEN INTERVAL: 3-8
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST / COMPL.	CASING: 2-inch PVC
SAMPLING METHOD: 2" dia. Stainless Steel Split Spoons	LOGGED BY: JV	
HAMMER WEIGHT: 140 lbs. DROP: 30"	RESPONSIBLE PROFESSIONAL: Richard H. Frappa	REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 inches	OVM (ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 788.4
0–1.5					**SILT (ML):** dark olive brown 2.5Y 3/3, moist, 70% fines, 10-15% coarse gravel, 10% fine sand, 0-5% organic matter, medium plasticity, fill
1.5–3.5	1	2–4			**CLAY (CL):** bluish grey 2 FOR GLEY 5/1, dry to slightly moist, 80-90% fines, 10% gravel, 0-10% sand, high plasticity, fill
3.5–14	2	6.9–8			**SILT (ML):** black 1 FOR GLEY 2.5Y/N, moist, 80-90% fines, 0-10% fine sand, 0-10% gravel, trace metal pieces and decayed wood, high plasticity, soft, WASTE -wet to saturated
	3	11–12			
14–14.5	4	15–16			**SILT (ML):** 100% fines, high plasticity, firm
14.5–18					**SILT (ML):** black 1 FOR GLEY 2.5Y/N, wet to saturated, 80-90% fines, 0-10% fine sand, 0-10% gravel, trace metal pieces and decayed wood, high plasticity, soft, fill -more wood
18–21.2	5	18.5–20			**SILT with SAND and GRAVEL (ML):** black 1 FOR GLEY 2.5/N, 40% fines, 30% sand, 30% angular gravel, wet to saturated
21.2	6	21			**BEDROCK**

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM GP3.GPJ (11/02)

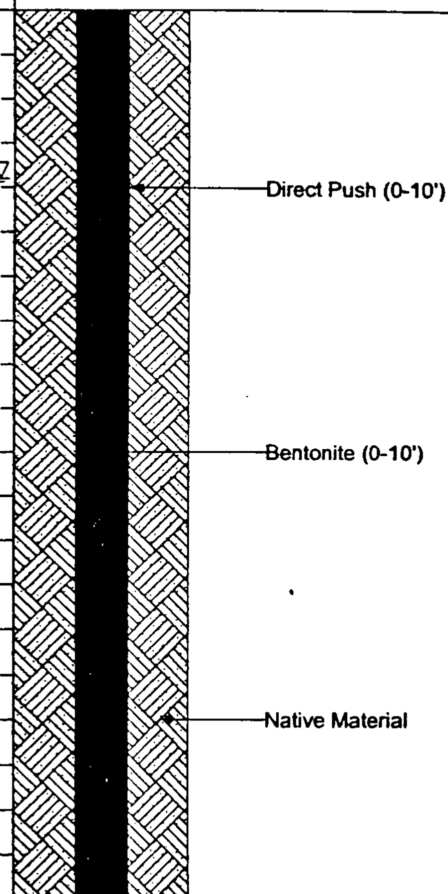
Project No. 5771	Geomatrix Consultants	Figure

301369

PROJECT: Peter Cooper Gowanda, NY		**Log of Well No. SB-1**	
BORING LOCATION:		TOP OF CASING ELEVATION: NA	DATUM:
DRILLING CONTRACTOR: Nothnagle		DATE STARTED: 10/5/00	DATE FINISHED: 10/5/00
DRILLING METHOD: Geoprobe/Direct Push w/ HSA		TOTAL DEPTH: 10.0 feet bgs	SCREEN INTERVAL:
DRILLING EQUIPMENT: CME-75		DEPTH TO WATER: FIRST 1.9 feet; COMPL.	CASING:
SAMPLING METHOD: Geoprobe/Direct Push w/ HSA		LOGGED BY: JMH, JSV	
HAMMER WEIGHT: NA	DROP: NA	RESPONSIBLE PROFESSIONAL: Rick Frappa	REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Blows/ 6 inches	(ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. — Surface Elevation: 789.9
0–1.3				**SANDY SILT with GRAVEL (ML):** grey 10YR 5/1, moist, 50% fines, 25% sand, 25% gravel, medium plasticity, fill
1.3–2.2				**POORLY GRADED SAND with GRAVEL (SP):** brown 10YR 5/3, moist, 75% sand, 20% gravel, 5% low plasticity fines, fill, [gravelly fill]
2	GP-1	NA		**SILT (ML):** greyish brown 10YR 5/2, moist to wet, 90% high plasticity fines, 10% fine sand, fill
2.8–4.5				**WELL GRADED SAND and GRAVEL (SW-GW):** black, 50% sand, 50% angular gravel and metallic slag, fill
4.5–6				**SILT and FINE SAND (SP-ML):** greyish-brown 10YR 5/2, moist to wet, 50% fines, 50% fine sand, medium plasticity, soft, fill
6	GP-2	NA		**WELL GRADED SAND (SW):** greyish-brown 10YR 5/2, 80-100% sand, 0-20% fine gravel, loose, fill
6.5–8.3				**SILT and FINE SAND (SP-ML):** greyish-brown 10YR 5/2, moist to wet, 50% fines, 50% fine sand, medium plasticity, soft, fill
9	GP-3	NA		**WELL GRADED SAND with SILT and GRAVEL (SW-SM):** yellowish-brown 10yr 5/4, 40% sand, 30% gravel, 30% medium plasticity fines, fill, [GRAVELLY FILL]
10				**BEDROCK**

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM SB-1.GPJ (11/02)

Project No. 005771.001 Task A — Geomatrix Consultants — Figure

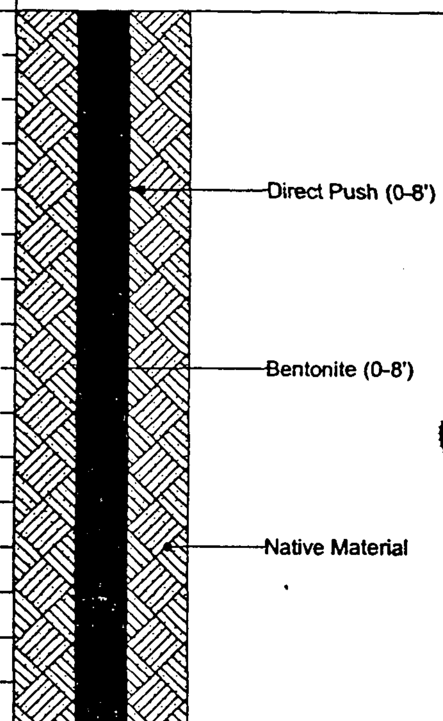
301370

Log of Well No. SB-2

PROJECT: Peter Cooper, Gowanda, NY	
BORING LOCATION:	TOP OF CASING ELEVATION: NA / DATUM:
DRILLING CONTRACTOR: Nothnagle	DATE STARTED: 10/5/00 / DATE FINISHED: 10/5/00
DRILLING METHOD: Geoprobe/Direct Push w/ HSA	TOTAL DEPTH: 8.0 feet bgs / SCREEN INTERVAL:
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST / COMPL. / CASING:
SAMPLING METHOD: Geoprobe/Direct Push w/ HSA	LOGGED BY: JMH, JSV
HAMMER WEIGHT: NA / DROP: NA	RESPONSIBLE PROFESSIONAL: Rick Frappa / REG. NO.

DEPTH (feet)	Sample No.	Blows/ 6 inches	(ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. — Surface Elevation: 784.0
0–1.8				**SANDY SILT with GRAVEL (ML):** dark grey 2.5Y 4/1, moist, 50% fines, 30-40% sand (well graded), 10-20% gravel, medium plasticity, fill -very dark grey 2.5Y 3/1
2	GP-1	NA		**SILT and FINE SAND (SM-ML):** light olive brown 2.5Y 3/1, moist, 40-60% fine sand, 40-60% high plasticity fines, soft
4.5				-very dark grey 2.5Y 3/1
4.7				**SANDY SILT with GRAVEL (ML):** light olive grey 2.5Y 5/3, moist, 50% fines, 25% sand (well graded), 25% angular gravel, low plasticity, fill [GRAVELLY FILL]
6	GP-2	NA		
8				**BEDROCK**

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



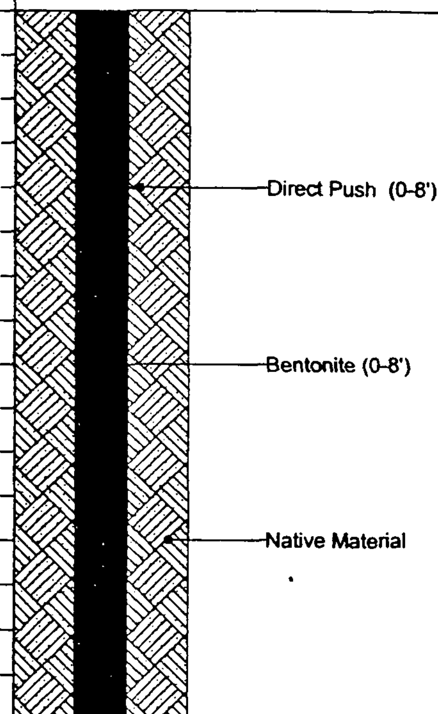
WELL_OVM SB-2.GPJ (11/02)

Log of Well No. SB-3

PROJECT: Peter Cooper, Gowanda, NY	
BORING LOCATION:	TOP OF CASING ELEVATION: NA / DATUM:
DRILLING CONTRACTOR: Nothnagle	DATE STARTED: 10/5/00 / DATE FINISHED: 10/5/00
DRILLING METHOD: Geoprobe/Direct Push w/ HSA	TOTAL DEPTH: 8.0 feet bgs / SCREEN INTERVAL:
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST / COMPL. / CASING:
SAMPLING METHOD: Geoprobe/Direct Push w/ HSA	LOGGED BY: JMH, JSV
HAMMER WEIGHT: NA / DROP: NA	RESPONSIBLE PROFESSIONAL: Rick Frappa / REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 Inches	(ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.
					Surface Elevation: 782.0
0					**CONCRETE FOUNDATION**
					SANDY SILT (ML): olive brown 2.5Y 4/3, 50-60% fines, dry, 30-40% sand, 10% gravel, high plasticity, fill
1					**WELL GRADED SAND (SW):** olive brown 2.5Y 4/3, moist, 80-90% sand, 10-20% fine gravel/course sand
2	GP-1		NA		**SANDY SILT (ML):** olive brown 2.5Y 4/3, 50-60% fines, dry, 30-40% sand, 10% gravel, high plasticity, fill -sand seam (1.6-1.8)
4					-moist to wet
5					**SILT (ML):** light olive brown 2.5Y 5/3, moist to wet, 90-100% high plasticity fines, 0-5% fine sand, 0-5% gravel, fill
6	GP-2		NA		**POORLY GRADED SAND (SP):** dark reddish brown 5YR 3/4, moist to wet, 90-100% medium grained sand, 0-10% low plasticity fines, fill
7					**SILT (ML):** light olive brown 2.5Y 5/3, moist to wet, 90-100% high plasticity fines, 0-5% fine sand, 0-5% gravel, native
8					**SILTY GRAVEL withSAND (GM):** dark bluish grey 2 FOR GLEY 4/1, wet, 50% gravel, 25% well graded sand, 25% medium plasticity fines, native
9					
10					
11					
12					
13					
14					
15					

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



301373

PROJECT: Peter Cooper Gowanda, NY	**Log of Well No. SB-4**
BORING LOCATION:	TOP OF CASING ELEVATION: NA / DATUM:
DRILLING CONTRACTOR: Nothnagle	DATE STARTED: 10/5/00 / DATE FINISHED: 10/5/00
DRILLING METHOD: Geoprobe/Direct Push w/ HSA	TOTAL DEPTH: 12.0 feet bgs / SCREEN INTERVAL:
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST / COMPL. 8 feet / CASING:
SAMPLING METHOD: Geoprobe/Direct Push w/ HSA	LOGGED BY: JMH, JSV
HAMMER WEIGHT: NA / DROP: NA	RESPONSIBLE PROFESSIONAL: Rick Frappa / REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 Inches	(ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 783.6	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0–0.9					**LEAN CLAY with SAND (CL):** grayish brown 2.5Y 5/2, moist, 80% fines, 10-15% fine sand, 5-10% gravel, trace organic matter, medium plasticity, fill	
0.9–1.5					**GRAVELLY SILT (ML):** grayish brown 2.5Y 5/2, moist, 60% fines, 40% gravel, medium plasticity	
1.5–1.7					CONCRETE PIECES	
2	GP-1		NA		**POORLY GRADED SAND with GRAVEL (SP):** black 2.5Y 2.5/1, 80% medium grained sand, 15-20% angular gravel/metal slag pieces, 0-5% low plasticity fines	Direct Push (0-12')
4					-brick pieces	Bentonite (0-12')
6	GP-2		NA			Native Material
8					-wet, odor	
9.5					**SILT with GRAVEL (ML):** greenish grey 1 FOR GLEY 5/1, 80% fines, 20% gravel, medium plasticity, slight odor (native soil)	
10	GP-3		NA			
12						

PROJECT: Peter Cooper Gowanda, NY		Log of Well No. SB-5		
BORING LOCATION:		TOP OF CASING ELEVATION: NA		DATUM:
DRILLING CONTRACTOR: Nothnagle		DATE STARTED: 10/5/00		DATE FINISHED: 10/5/00
DRILLING METHOD: Geoprobe/Direct Push w/ HSA		TOTAL DEPTH: 12.0 feet bgs		SCREEN INTERVAL:
DRILLING EQUIPMENT: CME-75		DEPTH TO WATER: FIRST	COMPL. 4.6 feet	CASING:
SAMPLING METHOD: Geoprobe/Direct Push w/ HSA		LOGGED BY: JMH, JSV		
HAMMER WEIGHT: NA	DROP: NA	RESPONSIBLE PROFESSIONAL: Rick Frappa		REG. NO.

DEPTH (feet)	SAMPLES Sample No.	Sample	Blows/ 6 Inches	(ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 785.4	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0–0.9					**ORGANIC SILT (OL/OH):** dark grey 5Y 5/2, moist, 80% fines, 15% gravel, 5% organic/vegatative matter, high plasticity, fill	
0.9–3.8					**SILT and FINE SAND (SM-ML):** grey 5Y 5/1, moist, 45-50% fines, 45-50% fine sand, 5-10% gravel, fill	
2	GP-1		NA			Direct Push (0-12')
3.8–4.3					**CRUSHED BRICK**	Bentonite (0-12')
4.3–4.6					**WOOD PIECES**	
4.6–5.8					**WELL GRADED SAND and GRAVEL (SW-GW):** dark reddish grey 10R 4/1, moist to wet, 50% sand, 50% angular gravel with metal pieces, loose, fill, [GRAVELLY FILL]	
5.8–9.3					**SILT with SAND (ML):** very dark grey 5Y 3/1, moist, 80-90% fines, 10-20% fine sand, 0-5% wood pieces, medium plasticity, slight organic odor, (native soil)	
6	GP-2		NA			Native Material
9.3–12					**SILT (ML):** dark bluish grey 2 FOR GLEY 4/1, moist to wet, 90-100% fines, 0-10% fine sand, 0-10% wood pieces, high plasticity (native soil)	
10	GP-3		NA			

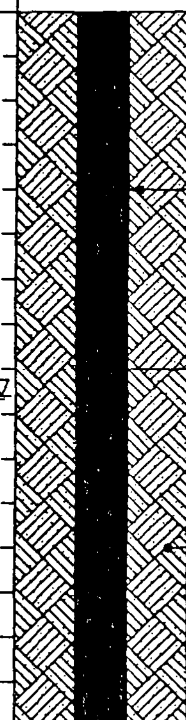
WELL_OVM SB-5.GPJ (11/02)

301375

PROJECT: Peter Cooper Gowanda, NY	**Log of Well No. SB-6**
BORING LOCATION:	TOP OF CASING ELEVATION: NA | DATUM:
DRILLING CONTRACTOR: Nothnagle	DATE STARTED: 10/9/00 | DATE FINISHED: 10/9/00
DRILLING METHOD: Geoprobe/Direct Push w/ HSA	TOTAL DEPTH: 8.0 feet bgs | SCREEN INTERVAL:
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST 4.3 feet | COMPL. | CASING:
SAMPLING METHOD: Geoprobe/Direct Push w/ HSA	LOGGED BY: JMH, JSV
HAMMER WEIGHT: NA | DROP: NA	RESPONSIBLE PROFESSIONAL: Rick Frappa | REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 Inches	(ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 780.3	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0–1.5					**DEBRIS;** SAND and GRAVEL on concrete	
1.5–2	GP-1		NA		**CONCRETE FOUNDATION**	
2–3					**WOOD BOARDS**	Direct Push (0-8')
3–4					**GRAVELLY FILL**	
4					**WELL GRADED SAND with GRAVEL (SW):** black, moist to wet, 60% sand, 30% gravel, 10% medium plasticity fines, black fibrous material (decomposing wood), fill	Bentonite (0-8')
5					**SILT with SAND (ML):** black, wet to saturated, 80% fines, 15% fine sand, 5% gravel, medium plasticity, fill	
6–8	GP-2		NA		**GRAVELLY SILT with SAND (ML):** black, wet to saturated, 50% fines, 35% gravel, 15% fine sand, medium plasticity, soft	Native Material

Depth scale: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15



WELL_OVM SB-6.GPJ (11/02)

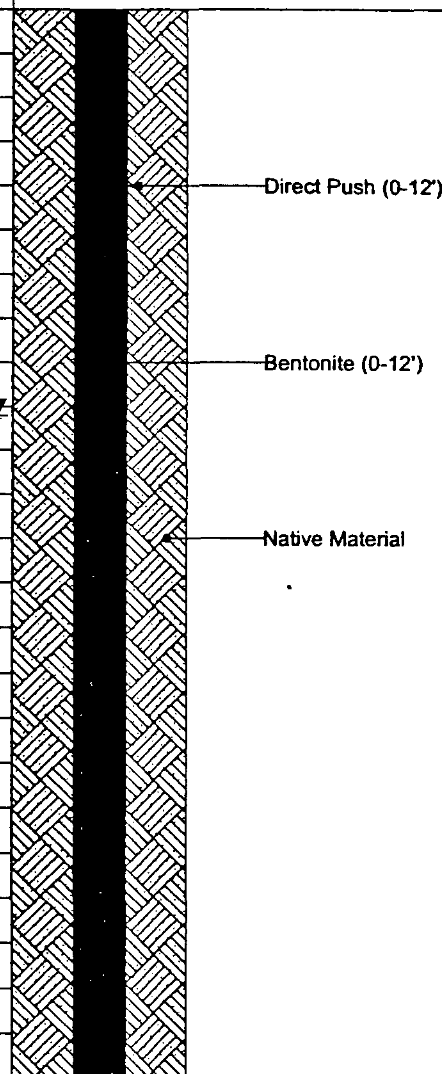
Project No. 005771.001 Task A — Geomatrix Consultants — Figure

Log of Well No. SB-7

PROJECT: Peter Cooper, Gowanda, NY		
BORING LOCATION:	TOP OF CASING ELEVATION: NA	DATUM:
DRILLING CONTRACTOR: Nothnagle	DATE STARTED: 10/6/00	DATE FINISHED: 10/6/00
DRILLING METHOD: Geoprobe/Direct Push w/ HSA	TOTAL DEPTH: 12.0 feet bgs	SCREEN INTERVAL:
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST: / COMPL.: 4.6 feet	CASING:
SAMPLING METHOD: Geoprobe/Direct Push w/ HSA	LOGGED BY: JMH, JSV	
HAMMER WEIGHT: NA / DROP: NA	RESPONSIBLE PROFESSIONAL: Rick Frappa	REG. NO.

DEPTH (feet)	Sample No.	Blows/ 6 inches	(ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. — Surface Elevation: 789.9
0–0.8				**ORGANIC SILT (OL/OH):** grey 2.5Y 5/1, moist, 80-90% fines, 10% fine sand, 0-10% organic/vegatative matter, high plasticity, fill
0.8–2.3				**SILT and FINE SAND with GRAVEL (SP-SM):** dark grey 2.5Y 4/1, moist, 40% fines, 40% fine sand, 20% gravel and brick pieces, trace wood, medium plasticity, fill -grades to black 2.5Y 2.5/1
2	GP-1	NA		
2.3–5.8				**SILT with CLAY (ML/CL):** dark grey 5Y 3/1, 70% fines, 10-15% fine sand, 10-15% gravel, high plasticity, soft, fill
4.3				-brick pieces
6	GP-2	NA		**WELL GRADED SAND with GRAVEL (SW):** black 5Y 2.5/1, 75% sand, 15-20% fine gravel, 5-10% low plasticity fines, fill
8.3				**SILT with SAND (ML):** dark grey 2.5Y 4/1, moist, 70% fines, 20% sand (fine to coarse), 10% gravel, medium plasticity, fill
9.3				**WELL GRADED SAND and GRAVEL (SW-GW):** black 5Y 2.5/1, moist, 50% sand, 50% gravel and metal slag pieces, fill -becomes dark reddish brown 5YR
10	GP-3	NA		
10.5–12				**WELL GRADED SAND and GRAVEL (SW-GW):** black 5Y 2.5/1, moist, 50% sand, 50% gravel and metal slag pieces, fill

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM SB-7.GPJ (11/02)

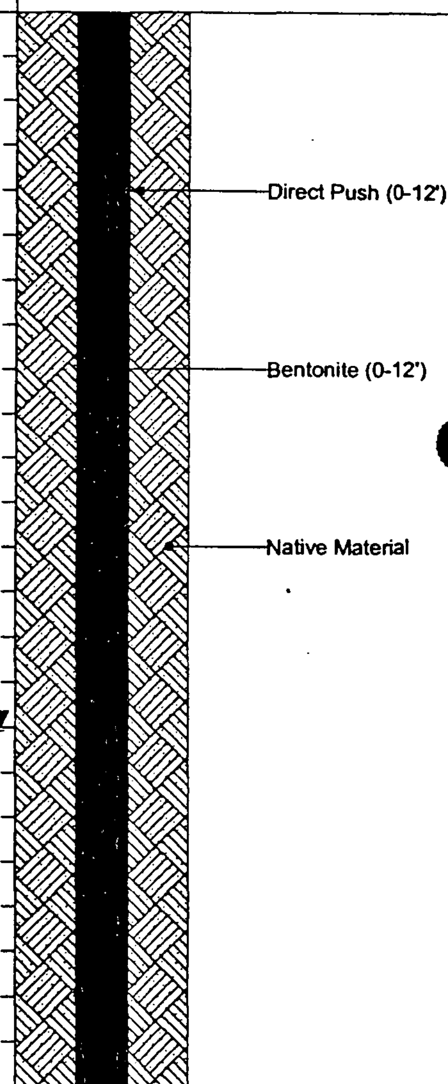
301377

Log of Well No. SB-8

PROJECT: Peter Cooper, Gowanda, NY	
BORING LOCATION:	TOP OF CASING ELEVATION: NA / DATUM:
DRILLING CONTRACTOR: Nothnagle	DATE STARTED: 10/6/00 / DATE FINISHED: 10/6/00
DRILLING METHOD: Geoprobe/Direct Push w/ HSA	TOTAL DEPTH: 12.0 feet bgs / SCREEN INTERVAL:
DRILLING EQUIPMENT: CME-75	DEPTH TO WATER: FIRST / COMPL. 8 feet / CASING:
SAMPLING METHOD: Geoprobe/Direct Push w/ HSA	LOGGED BY: JMH, JSV
HAMMER WEIGHT: NA / DROP: NA	RESPONSIBLE PROFESSIONAL: Rick Frappa / REG. NO.

DEPTH (feet)	Sample No.	Blows/6 inches	(ppm)	DESCRIPTION — NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 787.6
0				**ORGANIC SILT (OL/OH):** dark grey 10YR 4/1, 90% fines, 0-10% fine sand, 0-10% organic/vegatative matter, high plasticity
1				**SILT with FINE SAND and GRAVEL (ML):** dark greyish brown 10YR 4/2, moist, 50-60% fines, 20-25% fine sand, 20-25% gravel, medium plasticity, fill
2	GP-1	NA		
4.5				-dark greenish grey 1 FOR GLEY 4/1, slight odor
5				-wood pieces
6	GP-2	NA		
8				**SILT with SAND (ML):** dark greenish grey 2FOR GLEY, moist to wet, 80% fines, 15-20% sand (coarse and fine grained), 0-5% gravel, soft, (native soil)
9.5				-more silt, dilatent
10	GP-3	NA		
10.5				-grey to black with dark sandy inclusions
12				

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM SB-8.GPJ (11/02)

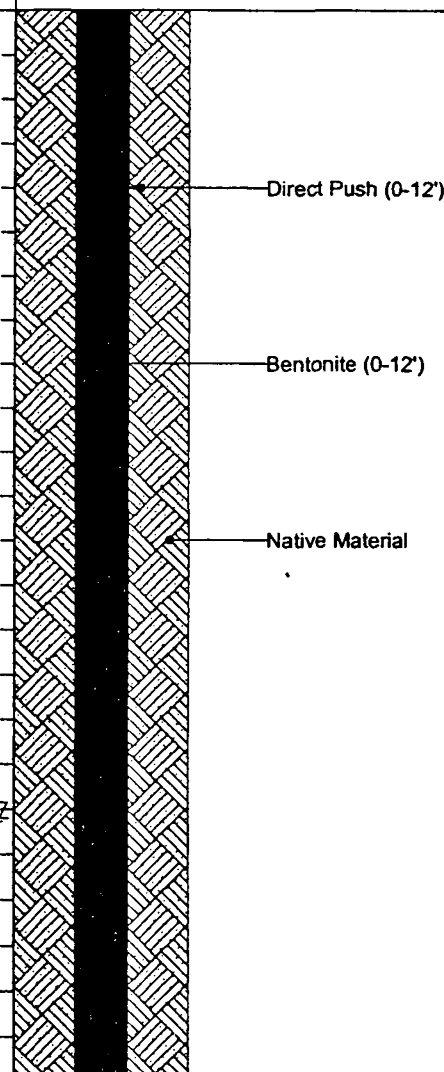
301378

PROJECT: Peter Cooper Gowanda, NY	**Log of Well No. SB-9**

BORING LOCATION:		TOP OF CASING ELEVATION: NA	DATUM:
DRILLING CONTRACTOR: Nothnagle		DATE STARTED: 10/6/00	DATE FINISHED: 10/6/00
DRILLING METHOD: Geoprobe/Direct Push w/ HSA		TOTAL DEPTH: 12.0 feet bgs	SCREEN INTERVAL:
DRILLING EQUIPMENT: CME-75		DEPTH TO WATER: FIRST 9.1 feet | COMPL.	CASING:
SAMPLING METHOD: Geoprobe/Direct Push w/ HSA		LOGGED BY: JMH, JSV	
HAMMER WEIGHT: NA	DROP: NA	RESPONSIBLE PROFESSIONAL: Rick Frappa	REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 Inches	(ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter.
					Surface Elevation: 778.4
0–3					**ORGANIC SILT (OL/OH):** grey 2.5Y 5/1, moist, 75% fines, 10-15% fine sand, 10-15% gravel, 10% organic matter, medium plasticity, fill **WELL GRADED SAND (SW):** black 2.5Y 2.5/1, moist, 80% sand, 10% low plasticity fines, 10% gravel, brick pieces, and metal slag, fill
2	GP-1		NA		
3					WEATHERED ROCK/BOULDER
5					**SILT and FINE SAND (SM-ML):** dark greyish brown 2.5Y 4/2, moist, 40-45% fines, 40-45% fine sand, 10-20% gravel, medium plasticity, trace roots and wood pieces (native soil)
6	GP-2		NA		
9					**SILTY SAND with GRAVEL (SM):** light olive brown 2.5Y 5/4, 80% well graded sand, 10-15% gravel, 10-15% medium plasticity fines **SILTY SAND with GRAVEL (SM):** light olive brown 2.5Y 5/6, wet, 40% well graded sand, 30% gravel, 30% medium plasticity fines
10	GP-3		NA		
12–15					

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



WELL_OVM SB-9.GPJ (11/02)

PROJECT: Peter Cooper Gowanda, NY		Log of Well No. SB-10		
BORING LOCATION:		TOP OF CASING ELEVATION: NA		DATUM:
DRILLING CONTRACTOR: Nothnagle		DATE STARTED: 10/6/00		DATE FINISHED: 10/6/00
DRILLING METHOD: Geoprobe/Direct Push w/ HSA		TOTAL DEPTH: 12.0 feet bgs		SCREEN INTERVAL:
DRILLING EQUIPMENT: CME-75		DEPTH TO WATER: FIRST 8 feet	COMPL.	CASING:
SAMPLING METHOD: Geoprobe/Direct Push w/ HSA		LOGGED BY: JMH, JSV		
HAMMER WEIGHT: NA	DROP: NA	RESPONSIBLE PROFESSIONAL: Rick Frappa		REG. NO.

DEPTH (feet)	SAMPLES: Sample No.	Sample	Blows/ 6 inches	(ppm)	DESCRIPTION NAME (USCS Symbol): color, moist, % by weight, plast., structure, cementation, react. w/HCl, geo. inter. Surface Elevation: 779.3	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0–0.8					**ORGANIC SILT with SAND (OL/OH):** light olive brown 2.5Y 5/3, moist, 40% fines, 40% well graded sand, 15-20% gravel, 0-5% organic matter, fill	
0.8–5.5	GP-1 (2)		NA		**SILTY SAND with GRAVEL (SM):** black 5YR 2.5/1, moist, 70% well graded sand, 15% gravel and metal slag pieces, 15% low plasticity fines, fill, [GRANULAR FILL]	Direct Push (0-12'); Bentonite (0-12')
5.5–8.0	GP-2 (6)		NA		**SILT and FINE SAND (SM-ML):** dark greenish grey 1 FOR GLEY 3/1, moist, 40-60% fines, 40-60% fine sand, medium plasticity, (Native soil) -black staining (7.5-8.0)	Native Material
8.0–9.0					**SILT (ML):** dark greenish grey 1 FOR GLEY 4/1, wet to saturated, 90% fines, 10% fine sand, medium plasticity, soft	
9.0–12.0	GP-3 (10)		NA		**WELL GRADED SAND with GRAVEL and SILT (SM):** greyish brown 2.5Y 5/2, wet to saturated, 75% sand, 15-20% angular gravel, 5-10% medium plasticity fines	

WELL_OVM SB-10.GPJ (11/02)

APPENDIX F

Data Validation Report/Initial Groundwater Sampling Analytical Results for COPC Selection

Data Validation Services
120 Cobble Creek Road P. O. Box 208
North Creek, N. Y. 12853
Phone 518-251-4429

October 18, 2000

Jennifer Hagen
Geomatrix Consultants
336 Harris Hill Rd.
Williamsville, NY 14221

RE: Validation of Peter Cooper Site Data Packages
CAS Submission No. R20003355

Dear Ms. Hagen:

Review has been completed for the data package generated by Columbia Analytical Services, pertaining to samples collected at the Peter Cooper site on August 14, 2000. Five aqueous samples were analyzed for TCL volatiles, TCL semivolatiles, TAL metals, and hexavalent chromium. Matrix spikes/duplicates and a trip blank were also processed. Methodologies utilized are those of the USEPA SW846.

Data validation was performed with guidance from the most current editions of the USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review and the USEPA Region 2 SOPs HW-2 and HW-6. The following items were reviewed:

* Data Completeness
* Custody Documentation
* Holding Times
* Surrogate and Internal Standard Recoveries
* Matrix Spike Recoveries/Duplicate Correlations
* Preparation/Calibration Blanks
* Control Spike/Laboratory Control Samples
* Instrumental Tunes
* Calibration Standards
* Instrument IDLs
* Method Compliance
* Sample Result Verification

Those items showing deficiencies are discussed in the following sections of this report. All others were found to be acceptable as outlined in the above-mentioned validation procedures, and as applicable for the methodology. Unless noted specifically in the following text, reported results are substantiated by the raw data, and generated in compliance with protocol requirements.

In summary, results for most analytes are usable as reported, or with minor qualification as estimated due to typical matrix or processing effects. Results for two semivolatile analytes are not usable due to apparent matrix effect. Edits to, and qualification of, reported results are indicated. These issues are discussed in the following analytical sections.

Data Completeness

No resubmissions were required of the laboratory.

Volatile Analyses by EPA 8260

Holding times, instrumental tunes, internal and surrogate standard recoveries, and blank responses were within required limits.

As indicated by presence in the associated trip blank, detections of carbon disulfide in the samples are considered contamination, and should be edited to nondetection at the CRDL (i.e. "10 U").

The reported value for chlorobenzene in 081400-005 should be derived from the dilution analysis (200 ug/L). All other analyte results for the sample can be used from the initial, undiluted run.

Reported results for bromomethane, acetone, 2-butanone, 2-hexanone, and 4-methyl-2-pentanone should be considered estimated ("J" and "UJ"), possibly biased low, in all samples, due to low responses in the calibration standard (27%D to 34%D). The bias is not expected to be great.

Matrix spikes of 081400-001 showed acceptable accuracy and precision.

Semivolatile Analyses by EPA 8270

Holding times, instrumental tunes, internal and surrogate standard recoveries, and blank responses were within required limits.

The reported values for those analytes flagged in the initial analyses as "E" by the laboratory should be derived from the dilution analyses. All other analyte results for those samples can be used from the initial, undiluted runs.

Reported results for 2,2'-oxybis(2-chloropropane) should be considered estimated ("UJ"), possibly biased low, in all samples, due to low response in the calibration standard (46%D).

Matrix spikes of 081400-001 showed acceptable accuracy and precision, with the exception that pentachlorophenol produced low, erratic recoveries (6% and 30%), and hexachlorocyclopentadiene produced no recovery. Results for those analytes in sample 081400-001 are therefore rejected ("R") and not usable. Phenol produced slightly low recoveries, and the result for phenol in the sample may have a slight low bias. Spiked blank recoveries were acceptable.

The extraction log had incorrect entries for "conc date" and "date done."

Metals and Hexavalent Chromium Analyses

The matrix spike of 081400-001 produced a slightly low recovery for selenium (73%), and results for that element in the samples are considered estimated ("J" and "UJ"), with a possible slight low bias. Duplicate correlations for the metals were acceptable.

The duplicate correlation for hexavalent chromium showed variance with detection at 104 ug/L, versus nondetection at 100 ug/L. Results for this analyte in the samples should therefore be considered estimated ("J").

The results for lead and thallium in the samples are to be qualified estimated ("J" and "UJ"), with a slight low bias, as indicated by low recoveries of the low concentration CRI standard (68% and 76%). No corrective action was required of the laboratory.

The serial dilution determination for 081400-001 was acceptable.

Please do not hesitate to contact me if questions or comments arise during your review of this report.

Very truly yours,

Judy Harry

CAS ASP/CLP BATCHING FORM / LOGIN SHEET

301385

SDG #: 081400-001	BATCH COMPLETE: __yes_________	DATE REVISED:
SUBMISSIO R2003355	DISKETTE REQUESTED: Y___ N__x__.	DATE DUE: 09/12/00
CLIENT: Geomatrix Consultants Inc.	DATE: 08/15/00	PROTOCOL: SW846
CLIENT REP: Janice Jaeger	CUSTODY SEAL: PRESENT/ABSENT:	SHIPPING No.:
PROJECT: PETER COOPER SITE	CHAIN OF CUSTODY: PRESENT/ABSENT:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLE	DATE RECEIVE	pH (SOLIDS)	% SOLIDS	REMARKS AMPLE CONDITIO
401572QC	081400-001	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401573	081400-002	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401574	081400-003	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401575	081400-004	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401576	081400-005	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401577	TRIP BLANK	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			

CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper Site
SUBMISSION #: R2003355

Geomatrix samples were collected on 08/14/00 and received at CAS on 08/15/00 in good condition at cooler temperatures of 1-2 C.

INORGANIC ANALYSIS

Five water samples were analyzed for the TAL Metals by methods 6010B/7000 from SW-846 and Hexavalent Chromium by method 7196.

Job specific QC was performed on 081400-001 as requested. All MS recoveries were within limits except Selenium and has been flagged with an "N". All Blank Spike recoveries were within QC limits. All RPD's were within limits.

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Five water samples and one trip blank were analyzed for new TCL list of Volatiles by method 8260 from SW-846.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within acceptance limits for all samples.

Job specific QC was performed on 081400-001 as requested. All MS/MSD's and Reference Spike recoveries were within limits. All RPD's were within limits.

Chlorobenzene for 081400-005 has been flagged with an "E" as being outside the calibration range of the instrument. The sample was repeated at a dilution and both sets of data have been reported out.

Thr trip blank contained a small hit of Carbon Disulfide.

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were analyzed within required holding times.

No other analytical or QC problems were encountered.

1 Mustard Street, Suite 250 ■ Rochester, NY 14609-6925 ■ Telephone (716) 288-5380 ■ Fax (716) 288-8475

SEMIVOLATILE ORGANICS

Five water samples were analyzed for the new TCL list of Semivolatiles by method 8270 from SW846.

All surrogate standard recoveries were within limits.

Job specific QC was performed on 081400-001 as requested. All MS/MSD recovereis were within limits unless flagged with an "*". All Blank Spike recoveries were within limits. All RPD's were within limits except Pentachlorophenol and has been flagged with an "*".

Several compounds for 081400-002 and 081400-003 have been flagged with an "E" as being outside the calibration range of the instrument. The samples are in the process of being repeated at dilutions and will be reported in the Semivolatile package being sent as an addendum

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were extracted and analyzed within required holding times.

No other analytical or QC problems were encountered.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or his designee, as verified by the following signature. Michael K. P.

CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper Site
SUBMISSION #: R2003355

Geomatrix samples were collected on 08/14/00 and received at CAS on 08/15/00 in good condition at cooler temperatures of 1-2 C.

SEMIVOLATILE ORGANICS

Five water samples were analyzed for the new TCL list of Semivolatiles by method 8270 from SW846.

All Tuning criteria for DFTPP were met.

All initial and continuing calibration criteria were met.

All surrogate standard recoveries were within limits except 081400-002DL and 081400-003DL. All surrogates were diluted out and have been flagged with a "D".

Job specific QC was performed on 081400-001 as requested. All MS/MSD recovereis were within limits unless flagged with an "*". All Blank Spike recoveries were within limits. All RPD's were within limits except Pentachlorophenol and has been flagged with an "*".

Several compounds for 081400-002 and 081400-003 have been flagged with an "E" as being outside the calibration range of the instrument. The samples were repeated at dilutions and both sets of data have been reported out.

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were extracted and analyzed within required holding times.

No other analytical or QC problems were encountered.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or his designee, as verified by the following signature. Michael K. P

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September 12, 2000

Columbia Analytical Services INC.
An Employee-Owned Company

Ms. Jennifer Hagen
Geomatrix Consultants, Inc.
338 Harris Hill Road, Suite 201
Williamsville, NY 14221

Re: Peter Cooper Site
Submission # R2003355
SDG # 081400-001

Dear Ms. Hagen:

Enclosed is the analytical data report for the above referenced facility. A total of six samples were received by our laboratory on August 15, 2000.

Only the sample data has been provided for the Semivolatile analysis. The package would have been delayed if the raw data had been included, so at your request, the package is being sent out as mentioned above. The Semivolatile package will be submitted as an addendum at a later date.

Any problems encountered with this project are addressed in a case narrative section which is presented later in this report.

This report consists of two (2) packages: the sample data package and the sample data summary package. Both packages have been mailed to Judy Harry at your request, with only a copy of the summary package being mailed to Geomatrix. All data presented in this package has been reviewed prior to report submission. If you should have any questions or concerns, please contact me at (716) 288-5380.

Thank you for your continued use of our services.

Sincerely,

COLUMBIA ANALYTICAL SERVICES

Janice M. Jaeger
Project Chemist

RECEIVED SEP 2000 RECEIVED

enc.

cc: Ms. Judy Harry
Data Validation Services
120 Cobblecreek Road
North Creek, NY 12853

RECEIVED SEP 14 2000 RECEIVED

Columbia Analytical Services Inc.

1 Mustard ST.
Suite 250
Rochester, NY 14609

THIS IS AN ANALYTICAL TEST REPORT FOR:

Client : Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Lab Submission # : R2003355
Reported : 09/12/00

Report Contains a total of 65 pages

The results reported herein relate only to the samples received by the laboratory. This report may not be reproduced except in full, without the approval of Columbia Analytical Services.

This package has been reviewed by Columbia Analytical Services' QA Department/Laboratory Director to comply with NELAC standards prior to report submittal.

CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper Site
SUBMISSION #: R2003355

Geomatrix samples were collected on 08/14/00 and received at CAS on 08/15/00 in good condition at cooler temperatures of 1-2 C.

INORGANIC ANALYSIS

Five water samples were analyzed for the TAL Metals by methods 6010B/7000 from SW-846 and Hexavalent Chromium by method 7196.

Job specific QC was performed on 081400-001 as requested. All MS recoveries were within limits except Selenium and has been flagged with an "N". All Blank Spike recoveries were within QC limits. All RPD's were within limits.

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Five water samples and one trip blank were analyzed for new TCL list of Volatiles by method 8260 from SW-846.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within acceptance limits for all samples.

Job specific QC was performed on 081400-001 as requested. All MS/MSD's and Reference Spike recoveries were within limits. All RPD's were within limits.

Chlorobenzene for 081400-005 has been flagged with an "E" as being outside the calibration range of the instrument. The sample was repeated at a dilution and both sets of data have been reported out.

Thr trip blank contained a small hit of Carbon Disulfide.

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were analyzed within required holding times.

No other analytical or QC problems were encountered.

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SEMIVOLATILE ORGANICS

Five water samples were analyzed for the new TCL list of Semivolatiles by method 8270 from SW846.

All surrogate standard recoveries were within limits.

Job specific QC was performed on 081400-001 as requested. All MS/MSD recovereis were within limits unless flagged with an "*". All Blank Spike recoveries were within limits. All RPD's were within limits except Pentachlorophenol and has been flagged with an "*".

Several compounds for 081400-002 and 081400-003 have been flagged with an "E" as being outside the calibration range of the instrument. The samples are in the process of being repeated at dilutions and will be reported in the Semivolatile package being sent as an addendum

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were extracted and analyzed within required holding times.

No other analytical or QC problems were encountered.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or his designee, as verified by the following signature. Michael K. P

CAS ASP/CLP BATCHING FORM / LOGIN SHEET

SDG #: 081400-001	BATCH COMPLETE: __yes_________	DATE REVISED:
SUBMISSIO R2003355	DISKETTE REQUESTED: Y___ N__x__	DATE DUE: 09/12/00
CLIENT: Geomatrix Consultants Inc.	DATE: 08/15/00	PROTOCOL: SW846
CLIENT REP: Janice Jaeger	CUSTODY SEAL: PRESENT/ABSENT:	SHIPPING No.:
PROJECT: PETER COOPER SITE	CHAIN OF CUSTODY: PRESENT/ABSENT:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLE	DATE RECEIVE	pH (SOLIDS)	% SOLIDS	REMARKS AMPLE CONDITIO
401572QC	081400-001	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401573	081400-002	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401574	081400-003	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401575	081400-004	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401576	081400-005	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401577	TRIP BLANK	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			

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Columbia Analytical Services Inc.

Effective 04/01/96

CAS LIST OF QUALIFIERS

(The basis of this proposal are the EPA-CLP Qualifiers)

U - Indicates compound was analyzed for but was not detected. The sample quantitation limit must be corrected for dilution and for percent moisture.

J - Indicates an estimated value. For further explanation see case narrative / cover letter.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range.

A - This flag indicates that a TIC is a suspected aldol-condensation product.

N - Spiked sample recovery not within control limits.
(Flag the entire batch - Inorganic analysis only)

* - Duplicate analysis not within control limits.
(Flag the entire batch - Inorganic analysis only)

- Also used to qualify Organics QC data outside limits.

D - Spike diluted out.

S - Reported value determined by Method of Standard Additions. (MSA)

X - As specified in the case narrative.

CAS Lab ID # for State Certifications

NY ID # in Rochester:	10145	NJ ID # in Rochester:	73004
CT ID # in Rochester:	PH0556	RI ID # in Rochester:	158
MA ID # in Rochester:	M-NY032	NH ID # in Rochester:	294198-A
OH EPA # in Rochester:	VAP	AIHA # in Rochester:	7889

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CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

DATE AUG 14, 2000 PAGE 1 OF 1

PROJECT NAME PETER COOPER SITE
PROJECT MANAGER/CONTACT RICK FRAPPA
COMPANY/ADDRESS GEOMATRIX CONSULTANTS
338 HARRIS HILL SUITE #201, WILLIAMSVILLE NY 14221
TEL (716) 565-0624 FAX (716) 565-0625
SAMPLER'S SIGNATURE [signature]

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	FOR OFFICE USE ONLY LAB I.D.	SAMPLE MATRIX	# OF CONTAINERS	GC/MS VOA's ☒8260 ☐624 ☐95-1	GC/MS SVOA's ☒8270 ☐625 ☐95-2	GC VOA's ☐8021 ☐601/602	PESTICIDES/PCB's ☐8081 ☐608 ☐95-3	STAR'S LIST 8021 VOA's ☐TOTAL ☐TCLP	STAR'S LIST 8270 SVOA's ☐TOTAL ☐TCLP	TCLP ☐METALS ☐VOA's ☐SVOA's ☐H/P	WASTE CHARACTERIZATION ☐React ☐Corros. ☐Ignit.	METALS, TOTAL (TAL) (LIST BELOW)	METALS, DISSOLVED (LIST BELOW)	Cr+6 BY 7196 (TOTAL)	Hg BY 7470				PRESERVATION pH < 2.0	pH > 12	Other
081400-001 (MS/MSD)	8-14-00	1430	401572	WATER	17	X	X							X		X	X		*	VOA's w/ HCl			
081400-002	8-14-00	1615	73	WATER	7	X	X							X		X	X		*	METALS w/ (HNO3)			
081400-003	8-14-00	1630	74	WATER	7	X	X							X		X	X		*	MERCURY w/ HNO3			
081400-004	8-14-00	1725	75	WATER	7	X	X							X		X	X						
081400-005	8-14-00	1830	76	WATER	7	X	X							X		X	X						
TRIP BLANK	8-14-00		77	WATER	3	X	X							X		X	X						

RELINQUISHED BY:
Signature [signature]
Printed Name JENNIFER HAGEN
Firm GEOMATRIX
Date/Time AUG. 15, 2000 8:35

RECEIVED BY:
Signature [signature]
Printed Name Gregory O. Esmerian
Firm CAS
Date/Time 8-15-00 8:35

TURNAROUND REQUIREMENTS
__ 24 hr. __ 48 hr. __ 5 day
X Standard (10-15 working days)
__ Provide Verbal Preliminary Results
__ Provide FAX Preliminary Results
Requested Report Date ______

REPORT REQUIREMENTS
__ 1. Routine Report
__ 2. Routine Rep. w/CASE Narrative
X 3. EPA Level III "B" Validatable Package
__ 4. N.J. Reduced Deliverables Level IV
__ 5. NY ASP/CLP Deliverables
__ 6. Site specific QC.

INVOICE INFORMATION:
P.O. #: 005771.000.0
Bill To: AS ABOVE

SAMPLE RECEIPT:
Shipping Via: HAND DELIVER
Shipping #:
Temperature: 1.2°
Submission No: R2-3355

RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time

RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

RELINQUISHED BY:
Signature
Printed Name
Firm

RECEIVED BY:
Signature
Printed Name
Firm

SPECIAL INSTRUCTIONS/COMMENTS:
METALS
ORGANICS: ☐ TCL ☐ PPL ☐ AE Only ☐ BN Only ☐ Special List

301395

Columbia Analytical Services Inc.
Cooler Receipt And Preservation Check Form

Project/Client Geomatrix Submission Number R2-3355

Cooler received on 8-15-00 by: ME COURIER: CAS UPS FEDEX CD&L CLIENT

1. Were custody seals on outside of cooler? YES NO
2. Were custody papers properly filled out (ink, signed, etc.)? YES NO
3. Did all bottles arrive in good condition (unbroken)? YES NO
4. Did any VOA vials have significant air bubbles? YES NO N/A
5. Were Ice or Ice packs present? YES NO
6. Where did the bottles originate? CAS/ROC CLIENT
7. Temperature of cooler(s) upon receipt: 1° 2°

Is the temperature within 0° - 6° C?:	Yes ☒	Yes ☒	Yes ☐	Yes ☐	Yes ☐
If No, Explain Below	No ☐	No ☐	No ☐	No ☐	No ☐

Date/Time Temperatures Taken: 8-15-00 @ 8:40

Thermometer ID: 161 Temp Blank Sample Bottle Cooler Temp. IR. Gun

If out of Temperature, Client Approval to Run Samples

Cooler Breakdown: Date: 8-15-00 by: ME

1. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? YES NO
2. Did all bottle labels and tags agree with custody papers? YES NO
3. Were correct containers used for the tests indicated? YES NO
4. Air Samples: Cassettes / Tubes Intact Canisters Pressurized Tedlar® Bags Inflated N/A

Explain any discrepancies:

		YES	NO	Sample I.D.	Reagent	Vol. Added
pH	Reagent					
12	NaOH					
2	HNO_3	✓	✓	401 572 573 574 575	HNO_3	3ml
2	H_2SO_4					
5-9*	P/PCBs (608 only)					

YES = All samples OK NO = Samples were preserved at lab as listed PC OK to adjust pH

*If pH adjustment is required, use NaOH and/or H_2SO_4

VOC Vial pH Verification (Tested after Analysis) Following Samples Exhibited pH > 2				

Other Comments:

INTERNAL CHAINS

CLIENT NAME: Geomatrix Consultants Inc.

SDG#: SUBMISSION: R2003355 DATE REC'D: 08/15/00 08:35

	ORDER #	# OF CONTAINERS	RELINQUISHED BY	RECEIVED BY	DATE	TIME	PH	STORAGE LOCATION	SCHEDULED LTS DATE
8260B	401572 QC	6	[illegible]	[illegible]	8-15-00	1400	<2	C1	09/14/00
8260B	401573	3							09/14/00
8260B	401574	3							09/14/00
8260B	401575	3							09/14/00
8260B	401576	3							09/14/00
8260B	401577	3					<2		09/14/00

301397

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INTERNAL CHAINS

CLIENT NAME: Geomatrix Consultants Inc.

SDG#: SUBMISSION: R2003355 DATE REC'D: 08/15/00 08:35

	ORDER #	# OF CONTAINERS	RELINQUISHED BY	RECEIVED BY	DATE	TIME	STORAGE LOCATION	SCHEDULED LTS DATE
METALS	401572 QC	3	HE	Jm	8-15-00	1500	A-1	09/14/00
METALS	401573	1						09/14/00
METALS	401574	1						09/14/00
METALS	401575	1						09/14/00
METALS	401576	1						09/14/00

INTERNAL CHAINS

CLIENT NAME: Geomatrix Consultants Inc.

SDG#: SUBMISSION: R2003355 DATE REC'D: 08/15/00 08:35

	ORDER #	# OF CONTAINERS	RELINQUISHED BY	RECEIVED BY	DATE	TIME	STORAGE LOCATION	SCHEDULED LTS DATE
HG	401572 QC	3	YE	JM	8-15-00	1500	C-3	09/14/00
HG	401573							09/14/00
HG	401574							09/14/00
HG	401575							09/14/00
HG	401576							09/14/00

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INTERNAL CHAINS

CLIENT NAME: Geomatrix Consultants Inc.

SDG#: SUBMISSION: R2003355 DATE REC'D: 08/15/00 08:35

	ORDER #	# OF CONTAINERS	RELINQUISHED BY	RECEIVED BY	DATE	TIME	STORAGE LOCATION	SCHEDULED LTS DATE
HEXAVALENT CHROM	401572 QC	3	HE	JPS	8-15-00	14:15	C-2	09/14/00
HEXAVALENT CHROM	401573	1						09/14/00
HEXAVALENT CHROM	401574	1						09/14/00
HEXAVALENT CHROM	401575	1						09/14/00
HEXAVALENT CHROM	401576	1						09/14/00

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301401 MW-45(R)

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-001

Date Sampled : 08/14/00 14:30 **Order #:** 401572 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 54773

DATE ANALYZED : 08/16/00
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	12	UG/L
BENZENE	10	10 U	UG/L
BROMODICHLOROMETHANE	10	10 U	UG/L
BROMOFORM	10	10 U	UG/L
BROMOMETHANE	10	10 U	UG/L
2-BUTANONE (MEK)	10	10 U	UG/L
METHYL TERT-BUTYL ETHER	10	10 U	UG/L
CARBON DISULFIDE	10	2.3 J	UG/L
CARBON TETRACHLORIDE	10	10 U	UG/L
CHLOROBENZENE	10	68	UG/L
CHLOROETHANE	10	10 U	UG/L
CHLOROFORM	10	10 U	UG/L
CHLOROMETHANE	10	10 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	10	10 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	10	10 U	UG/L
1,2-DIBROMOETHANE	10	10 U	UG/L
1,2-DICHLOROBENZENE	10	6.6 J	UG/L
1,4-DICHLOROBENZENE	10	4.0 J	UG/L
1,3-DICHLOROBENZENE	10	10 U	UG/L
DICHLORODIFLUOROMETHANE	10	10 U	UG/L
1,1-DICHLOROETHANE	10	10 U	UG/L
1,2-DICHLOROETHANE	10	10 U	UG/L
1,1-DICHLOROETHENE	10	10 U	UG/L
TRANS-1,2-DICHLOROETHENE	10	10 U	UG/L
CIS-1,2-DICHLOROETHENE	10	10 U	UG/L
1,2-DICHLOROPROPANE	10	10 U	UG/L
TRANS-1,3-DICHLOROPROPENE	10	10 U	UG/L
CIS-1,3-DICHLOROPROPENE	10	10 U	UG/L
ETHYLBENZENE	10	10 U	UG/L
2-HEXANONE	10	10 U	UG/L
ISOPROPYLBENZENE	10	10 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	10	10 U	UG/L
4-METHYL-2-PENTANONE	10	10 U	UG/L
STYRENE	10	10 U	UG/L
1,1,2,2-TETRACHLOROETHANE	10	10 U	UG/L
TETRACHLOROETHENE	10	10 U	UG/L
TOLUENE	10	2.8 J	UG/L
1,2,4-TRICHLOROBENZENE	10	10 U	UG/L
1,1,1-TRICHLOROETHANE	10	10 U	UG/L
1,1,2-TRICHLOROETHANE	10	10 U	UG/L
TRICHLOROETHENE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-001

Date Sampled : 08/14/00 14:30 **Order #:** 401572 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 54773

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/00			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	10	10 U	UG/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	10 U	UG/L
VINYL CHLORIDE	10	10 U	UG/L
M+P-XYLENE	10	10 U	UG/L
O-XYLENE	10	10 U	UG/L

SURROGATE RECOVERIES	QC LIMITS	RESULT	UNITS
BROMOFLUOROBENZENE	(86 - 115 %)	89	%
TOLUENE-D8	(88 - 110 %)	100	%
DIBROMOFLUOROMETHANE	(86 - 118 %)	100	%

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MW-3

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-002

Date Sampled : 08/14/00 16:15 **Order #:** 401573 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 54773

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/00			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	11	UG/L
BENZENE	10	10 U	UG/L
BROMODICHLOROMETHANE	10	10 U	UG/L
BROMOFORM	10	10 U	UG/L
BROMOMETHANE	10	10 U	UG/L
2-BUTANONE (MEK)	10	10 U	UG/L
METHYL TERT-BUTYL ETHER	10	10 U	UG/L
CARBON DISULFIDE	10	1.2 J	UG/L
CARBON TETRACHLORIDE	10	10 U	UG/L
CHLOROBENZENE	10	10 U	UG/L
CHLOROETHANE	10	10 U	UG/L
CHLOROFORM	10	10 U	UG/L
CHLOROMETHANE	10	10 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	10	10 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	10	10 U	UG/L
1,2-DIBROMOETHANE	10	10 U	UG/L
1,2-DICHLOROBENZENE	10	10 U	UG/L
1,4-DICHLOROBENZENE	10	10 U	UG/L
1,3-DICHLOROBENZENE	10	10 U	UG/L
DICHLORODIFLUOROMETHANE	10	10 U	UG/L
1,1-DICHLOROETHANE	10	10 U	UG/L
1,2-DICHLOROETHANE	10	10 U	UG/L
1,1-DICHLOROETHENE	10	10 U	UG/L
TRANS-1,2-DICHLOROETHENE	10	10 U	UG/L
CIS-1,2-DICHLOROETHENE	10	10 U	UG/L
1,2-DICHLOROPROPANE	10	10 U	UG/L
TRANS-1,3-DICHLOROPROPENE	10	10 U	UG/L
CIS-1,3-DICHLOROPROPENE	10	10 U	UG/L
ETHYLBENZENE	10	1.6 J	UG/L
2-HEXANONE	10	3.0 J	UG/L
ISOPROPYLBENZENE	10	10 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	10	10 U	UG/L
4-METHYL-2-PENTANONE	10	3.8 J	UG/L
STYRENE	10	10 U	UG/L
1,1,2,2-TETRACHLOROETHANE	10	10 U	UG/L
TETRACHLOROETHENE	10	10 U	UG/L
TOLUENE	10	14	UG/L
1,2,4-TRICHLOROBENZENE	10	10 U	UG/L
1,1,1-TRICHLOROETHANE	10	10 U	UG/L
1,1,2-TRICHLOROETHANE	10	10 U	UG/L
TRICHLOROETHENE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-002

Date Sampled : 08/14/00 16:15 **Order #:** 401573 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 54773

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/00			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	10	10 U	UG/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	10 U	UG/L
VINYL CHLORIDE	10	10 U	UG/L
M+P-XYLENE	10	10 U	UG/L
O-XYLENE	10	10 U	UG/L

SURROGATE RECOVERIES	QC LIMITS	RESULT	UNITS
BROMOFLUOROBENZENE	(86 - 115 %)	91	%
TOLUENE-D8	(88 - 110 %)	100	%
DIBROMOFLUOROMETHANE	(86 - 118 %)	102	%

301405

MW-3 dup.

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-003

Date Sampled : 08/14/00 16:30 **Order #:** 401574 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 54773

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/00			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	11	UG/L
BENZENE	10	10 U	UG/L
BROMODICHLOROMETHANE	10	10 U	UG/L
BROMOFORM	10	10 U	UG/L
BROMOMETHANE	10	10 U	UG/L
2-BUTANONE (MEK)	10	10 U	UG/L
METHYL TERT-BUTYL ETHER	10	10 U	UG/L
CARBON DISULFIDE	10	10 U	UG/L
CARBON TETRACHLORIDE	10	10 U	UG/L
CHLOROBENZENE	10	10 U	UG/L
CHLOROETHANE	10	10 U	UG/L
CHLOROFORM	10	10 U	UG/L
CHLOROMETHANE	10	10 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	10	10 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	10	10 U	UG/L
1,2-DIBROMOETHANE	10	10 U	UG/L
1,2-DICHLOROBENZENE	10	10 U	UG/L
1,4-DICHLOROBENZENE	10	10 U	UG/L
1,3-DICHLOROBENZENE	10	10 U	UG/L
DICHLORODIFLUOROMETHANE	10	10 U	UG/L
1,1-DICHLOROETHANE	10	10 U	UG/L
1,2-DICHLOROETHANE	10	10 U	UG/L
1,1-DICHLOROETHENE	10	10 U	UG/L
TRANS-1,2-DICHLOROETHENE	10	10 U	UG/L
CIS-1,2-DICHLOROETHENE	10	10 U	UG/L
1,2-DICHLOROPROPANE	10	10 U	UG/L
TRANS-1,3-DICHLOROPROPENE	10	10 U	UG/L
CIS-1,3-DICHLOROPROPENE	10	10 U	UG/L
ETHYLBENZENE	10	1.9 J	UG/L
2-HEXANONE	10	10 U	UG/L
ISOPROPYLBENZENE	10	10 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	10	10 U	UG/L
4-METHYL-2-PENTANONE	10	4.8 J	UG/L
STYRENE	10	10 U	UG/L
1,1,2,2-TETRACHLOROETHANE	10	10 U	UG/L
TETRACHLOROETHENE	10	10 U	UG/L
TOLUENE	10	16	UG/L
1,2,4-TRICHLOROBENZENE	10	10 U	UG/L
1,1,1-TRICHLOROETHANE	10	10 U	UG/L
1,1,2-TRICHLOROETHANE	10	10 U	UG/L
TRICHLOROETHENE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-003

Date Sampled : 08/14/00 16:30 **Order #:** 401574 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 54773

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/00			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	10	10 U	UG/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	10 U	UG/L
VINYL CHLORIDE	10	10 U	UG/L
M+P-XYLENE	10	10 U	UG/L
O-XYLENE	10	10 U	UG/L

SURROGATE RECOVERIES	QC LIMITS	RESULT	UNITS
BROMOFLUOROBENZENE	(86 - 115 %)	89	%
TOLUENE-D8	(88 - 110 %)	100	%
DIBROMOFLUOROMETHANE	(86 - 118 %)	99	%

301407

MW-2S(R)

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-004

Date Sampled : 08/14/00 17:25 **Order #:** 401575 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 54773

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/00			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	10	10 U	UG/L
BROMODICHLOROMETHANE	10	10 U	UG/L
BROMOFORM	10	10 U	UG/L
BROMOMETHANE	10	10 U	UG/L
2-BUTANONE (MEK)	10	10 U	UG/L
METHYL TERT-BUTYL ETHER	10	10 U	UG/L
CARBON DISULFIDE	10	10 U	UG/L
CARBON TETRACHLORIDE	10	10 U	UG/L
CHLOROBENZENE	10	10 U	UG/L
CHLOROETHANE	10	10 U	UG/L
CHLOROFORM	10	10 U	UG/L
CHLOROMETHANE	10	10 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	10	10 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	10	10 U	UG/L
1,2-DIBROMOETHANE	10	10 U	UG/L
1,2-DICHLOROBENZENE	10	10 U	UG/L
1,4-DICHLOROBENZENE	10	10 U	UG/L
1,3-DICHLOROBENZENE	10	10 U	UG/L
DICHLORODIFLUOROMETHANE	10	10 U	UG/L
1,1-DICHLOROETHANE	10	10 U	UG/L
1,2-DICHLOROETHANE	10	10 U	UG/L
1,1-DICHLOROETHENE	10	10 U	UG/L
TRANS-1,2-DICHLOROETHENE	10	10 U	UG/L
CIS-1,2-DICHLOROETHENE	10	10 U	UG/L
1,2-DICHLOROPROPANE	10	10 U	UG/L
TRANS-1,3-DICHLOROPROPENE	10	10 U	UG/L
CIS-1,3-DICHLOROPROPENE	10	10 U	UG/L
ETHYLBENZENE	10	10 U	UG/L
2-HEXANONE	10	10 U	UG/L
ISOPROPYLBENZENE	10	10 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	10	10 U	UG/L
4-METHYL-2-PENTANONE	10	10 U	UG/L
STYRENE	10	10 U	UG/L
1,1,2,2-TETRACHLOROETHANE	10	10 U	UG/L
TETRACHLOROETHENE	10	10 U	UG/L
TOLUENE	10	3.8 J	UG/L
1,2,4-TRICHLOROBENZENE	10	10 U	UG/L
1,1,1-TRICHLOROETHANE	10	10 U	UG/L
1,1,2-TRICHLOROETHANE	10	10 U	UG/L
TRICHLOROETHENE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-004

Date Sampled : 08/14/00 17:25 **Order #:** 401575 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 54773

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/00			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	10	10 U	UG/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	10 U	UG/L
VINYL CHLORIDE	10	10 U	UG/L
M+P-XYLENE	10	10 U	UG/L
O-XYLENE	10	10 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
BROMOFLUOROBENZENE	(86 - 115 %)	88	%
TOLUENE-D8	(88 - 110 %)	100	%
DIBROMOFLUOROMETHANE	(86 - 118 %)	98	%

301408

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-005

Date Sampled : 08/14/00 18:30 **Order #:** 401576 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 54773

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/00			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	10	1.4 J	UG/L
BROMODICHLOROMETHANE	10	10 U	UG/L
BROMOFORM	10	10 U	UG/L
BROMOMETHANE	10	10 U	UG/L
2-BUTANONE (MEK)	10	10 U	UG/L
METHYL TERT-BUTYL ETHER	10	10 U	UG/L
CARBON DISULFIDE	10	10 U	UG/L
CARBON TETRACHLORIDE	10	10 U	UG/L
CHLOROBENZENE	10	210 E	UG/L
CHLOROETHANE	10	10 U	UG/L
CHLOROFORM	10	10 U	UG/L
CHLOROMETHANE	10	10 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	10	10 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	10	10 U	UG/L
1,2-DIBROMOETHANE	10	10 U	UG/L
1,2-DICHLOROBENZENE	10	10 U	UG/L
1,4-DICHLOROBENZENE	10	5.6 J	UG/L
1,3-DICHLOROBENZENE	10	10 U	UG/L
DICHLORODIFLUOROMETHANE	10	10 U	UG/L
1,1-DICHLOROETHANE	10	10 U	UG/L
1,2-DICHLOROETHANE	10	10 U	UG/L
1,1-DICHLOROETHENE	10	10 U	UG/L
TRANS-1,2-DICHLOROETHENE	10	10 U	UG/L
CIS-1,2-DICHLOROETHENE	10	10 U	UG/L
1,2-DICHLOROPROPANE	10	10 U	UG/L
TRANS-1,3-DICHLOROPROPENE	10	10 U	UG/L
CIS-1,3-DICHLOROPROPENE	10	10 U	UG/L
ETHYLBENZENE	10	10 U	UG/L
2-HEXANONE	10	10 U	UG/L
ISOPROPYLBENZENE	10	10 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	10	10 U	UG/L
4-METHYL-2-PENTANONE	10	10 U	UG/L
STYRENE	10	10 U	UG/L
1,1,2,2-TETRACHLOROETHANE	10	10 U	UG/L
TETRACHLOROETHENE	10	10 U	UG/L
TOLUENE	10	10 U	UG/L
1,2,4-TRICHLOROBENZENE	10	10 U	UG/L
1,1,1-TRICHLOROETHANE	10	10 U	UG/L
1,1,2-TRICHLOROETHANE	10	10 U	UG/L
TRICHLOROETHENE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-005

Date Sampled : 08/14/00 18:30 **Order #:** 401576 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 54773

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/00			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	10	10 U	UG/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	10 U	UG/L
VINYL CHLORIDE	10	10 U	UG/L
M+P-XYLENE	10	10 U	UG/L
O-XYLENE	10	10 U	UG/L

SURROGATE RECOVERIES	QC LIMITS	RESULT	UNITS
BROMOFLUOROBENZENE	(86 - 115 %)	91	%
TOLUENE-D8	(88 - 110 %)	99	%
DIBROMOFLUOROMETHANE	(86 - 118 %)	102	%

MW-6

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-005

Date Sampled : 08/14/00 18:30 **Order #:** 401576 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 54773

DATE ANALYZED : 08/16/00
ANALYTICAL DILUTION: 2.00

ANALYTE	PQL	RESULT	UNITS
ACETONE	10	20 U	UG/L
BENZENE	10	20 U	UG/L
BROMODICHLOROMETHANE	10	20 U	UG/L
BROMOFORM	10	20 U	UG/L
BROMOMETHANE	10	20 U	UG/L
2-BUTANONE (MEK)	10	20 U	UG/L
METHYL TERT-BUTYL ETHER	10	20 U	UG/L
CARBON DISULFIDE	10	20 U	UG/L
CARBON TETRACHLORIDE	10	20 U	UG/L
CHLOROBENZENE	10	200	UG/L
CHLOROETHANE	10	20 U	UG/L
CHLOROFORM	10	20 U	UG/L
CHLOROMETHANE	10	20 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	10	20 U	UG/L
CYCLOHEXANE	10	20 U	UG/L
DIBROMOCHLOROMETHANE	10	20 U	UG/L
1,2-DIBROMOETHANE	10	20 U	UG/L
1,2-DICHLOROBENZENE	10	20 U	UG/L
1,4-DICHLOROBENZENE	10	6.1 J	UG/L
1,3-DICHLOROBENZENE	10	20 U	UG/L
DICHLORODIFLUOROMETHANE	10	20 U	UG/L
1,1-DICHLOROETHANE	10	20 U	UG/L
1,2-DICHLOROETHANE	10	20 U	UG/L
1,1-DICHLOROETHENE	10	20 U	UG/L
TRANS-1,2-DICHLOROETHENE	10	20 U	UG/L
CIS-1,2-DICHLOROETHENE	10	20 U	UG/L
1,2-DICHLOROPROPANE	10	20 U	UG/L
TRANS-1,3-DICHLOROPROPENE	10	20 U	UG/L
CIS-1,3-DICHLOROPROPENE	10	20 U	UG/L
ETHYLBENZENE	10	20 U	UG/L
2-HEXANONE	10	20 U	UG/L
ISOPROPYLBENZENE	10	20 U	UG/L
METHYL ACETATE	10	20 U	UG/L
METHYLCYCLOHEXANE	10	20 U	UG/L
METHYLENE CHLORIDE	10	20 U	UG/L
4-METHYL-2-PENTANONE	10	20 U	UG/L
STYRENE	10	20 U	UG/L
1,1,2,2-TETRACHLOROETHANE	10	20 U	UG/L
TETRACHLOROETHENE	10	20 U	UG/L
TOLUENE	10	20 U	UG/L
1,2,4-TRICHLOROBENZENE	10	20 U	UG/L
1,1,1-TRICHLOROETHANE	10	20 U	UG/L
1,1,2-TRICHLOROETHANE	10	20 U	UG/L
TRICHLOROETHENE	10	20 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-005

Date Sampled : 08/14/00 18:30 **Order #:** 401576 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 54773

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/00			
ANALYTICAL DILUTION: 2.00			
TRICHLOROFLUOROMETHANE	10	20 U	UG/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	20 U	UG/L
VINYL CHLORIDE	10	20 U	UG/L
M+P-XYLENE	10	20 U	UG/L
O-XYLENE	10	20 U	UG/L

SURROGATE RECOVERIES	QC LIMITS	RESULT	UNITS
BROMOFLUOROBENZENE	(86 - 115 %)	88	%
TOLUENE-D8	(88 - 110 %)	99	%
DIBROMOFLUOROMETHANE	(86 - 118 %)	101	%

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : TRIP BLANK

Date Sampled : 08/14/00 **Order #:** 401577 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 54773

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/00			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	10	10 U	UG/L
BROMODICHLOROMETHANE	10	10 U	UG/L
BROMOFORM	10	10 U	UG/L
BROMOMETHANE	10	10 U	UG/L
2-BUTANONE (MEK)	10	10 U	UG/L
METHYL TERT-BUTYL ETHER	10	10 U	UG/L
CARBON DISULFIDE	10	1.1 J	UG/L
CARBON TETRACHLORIDE	10	10 U	UG/L
CHLOROBENZENE	10	10 U	UG/L
CHLOROETHANE	10	10 U	UG/L
CHLOROFORM	10	10 U	UG/L
CHLOROMETHANE	10	10 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	10	10 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	10	10 U	UG/L
1,2-DIBROMOETHANE	10	10 U	UG/L
1,2-DICHLOROBENZENE	10	10 U	UG/L
1,4-DICHLOROBENZENE	10	10 U	UG/L
1,3-DICHLOROBENZENE	10	10 U	UG/L
DICHLORODIFLUOROMETHANE	10	10 U	UG/L
1,1-DICHLOROETHANE	10	10 U	UG/L
1,2-DICHLOROETHANE	10	10 U	UG/L
1,1-DICHLOROETHENE	10	10 U	UG/L
TRANS-1,2-DICHLOROETHENE	10	10 U	UG/L
CIS-1,2-DICHLOROETHENE	10	10 U	UG/L
1,2-DICHLOROPROPANE	10	10 U	UG/L
TRANS-1,3-DICHLOROPROPENE	10	10 U	UG/L
CIS-1,3-DICHLOROPROPENE	10	10 U	UG/L
ETHYLBENZENE	10	10 U	UG/L
2-HEXANONE	10	10 U	UG/L
ISOPROPYLBENZENE	10	10 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	10	10 U	UG/L
4-METHYL-2-PENTANONE	10	10 U	UG/L
STYRENE	10	10 U	UG/L
1,1,2,2-TETRACHLOROETHANE	10	10 U	UG/L
TETRACHLOROETHENE	10	10 U	UG/L
TOLUENE	10	10 U	UG/L
1,2,4-TRICHLOROBENZENE	10	10 U	UG/L
1,1,1-TRICHLOROETHANE	10	10 U	UG/L
1,1,2-TRICHLOROETHANE	10	10 U	UG/L
TRICHLOROETHENE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : TRIP BLANK

Date Sampled : 08/14/00 **Order #:** 401577 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 54773

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/00			
ANALYTICAL DILUTION: 1.00			
TRICHLOROFLUOROMETHANE	10	10 U	UG/L
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	10 U	UG/L
VINYL CHLORIDE	10	10 U	UG/L
M+P-XYLENE	10	10 U	UG/L
O-XYLENE	10	10 U	UG/L

SURROGATE RECOVERIES	QC LIMITS	RESULT	UNITS
BROMOFLUOROBENZENE	(86 - 115 %)	90	%
TOLUENE-D8	(88 - 110 %)	100	%
DIBROMOFLUOROMETHANE	(86 - 118 %)	101	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Project Reference:
Client Sample ID : METHOD BLANK

Date Sampled : **Order #:** 405771 **Sample Matrix:** WATER
Date Received: **Submission #:** **Analytical Run** 54773

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/00			
ANALYTICAL DILUTION: 1.00			
ACETONE	10	10 U	UG/L
BENZENE	10	10 U	UG/L
BROMODICHLOROMETHANE	10	10 U	UG/L
BROMOFORM	10	10 U	UG/L
BROMOMETHANE	10	10 U	UG/L
2-BUTANONE (MEK)	10	10 U	UG/L
METHYL TERT-BUTYL ETHER	10	10 U	UG/L
CARBON DISULFIDE	10	10 U	UG/L
CARBON TETRACHLORIDE	10	10 U	UG/L
CHLOROBENZENE	10	10 U	UG/L
CHLOROETHANE	10	10 U	UG/L
CHLOROFORM	10	10 U	UG/L
CHLOROMETHANE	10	10 U	UG/L
1,2-DIBROMO-3-CHLOROPROPANE	10	10 U	UG/L
CYCLOHEXANE	10	10 U	UG/L
DIBROMOCHLOROMETHANE	10	10 U	UG/L
1,2-DIBROMOETHANE	10	10 U	UG/L
1,2-DICHLOROBENZENE	10	10 U	UG/L
1,4-DICHLOROBENZENE	10	10 U	UG/L
1,3-DICHLOROBENZENE	10	10 U	UG/L
DICHLORODIFLUOROMETHANE	10	10 U	UG/L
1,1-DICHLOROETHANE	10	10 U	UG/L
1,2-DICHLOROETHANE	10	10 U	UG/L
1,1-DICHLOROETHENE	10	10 U	UG/L
TRANS-1,2-DICHLOROETHENE	10	10 U	UG/L
CIS-1,2-DICHLOROETHENE	10	10 U	UG/L
1,2-DICHLOROPROPANE	10	10 U	UG/L
TRANS-1,3-DICHLOROPROPENE	10	10 U	UG/L
CIS-1,3-DICHLOROPROPENE	10	10 U	UG/L
ETHYLBENZENE	10	10 U	UG/L
2-HEXANONE	10	10 U	UG/L
ISOPROPYLBENZENE	10	10 U	UG/L
METHYL ACETATE	10	10 U	UG/L
METHYLCYCLOHEXANE	10	10 U	UG/L
METHYLENE CHLORIDE	10	10 U	UG/L
4-METHYL-2-PENTANONE	10	10 U	UG/L
STYRENE	10	10 U	UG/L
1,1,2,2-TETRACHLOROETHANE	10	10 U	UG/L
TETRACHLOROETHENE	10	10 U	UG/L
TOLUENE	10	10 U	UG/L
1,2,4-TRICHLOROBENZENE	10	10 U	UG/L
1,1,1-TRICHLOROETHANE	10	10 U	UG/L
1,1,2-TRICHLOROETHANE	10	10 U	UG/L
TRICHLOROETHENE	10	10 U	UG/L
TRICHLOROFLUOROMETHANE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 09/12/00

Project Reference:
Client Sample ID : METHOD BLANK

Date Sampled : **Order #:** 405771 **Sample Matrix:** WATER
Date Received: **Submission #:** **Analytical Run** 54773

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 08/16/00			
ANALYTICAL DILUTION: 1.00			
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	10 U	UG/L
VINYL CHLORIDE	10	10 U	UG/L
M+P-XYLENE	10	10 U	UG/L
O-XYLENE	10	10 U	UG/L

SURROGATE RECOVERIES	QC LIMITS	RESULT	UNITS
BROMOFLUOROBENZENE	(86 - 115 %)	87	%
TOLUENE-D8	(88 - 110 %)	97	%
DIBROMOFLUOROMETHANE	(86 - 118 %)	99	%

QUALITY CONTROL SUMMARY MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
WATER

Spiked Order No. : 401572 Geomatrix Consultants Inc.

Client ID: 081400-001

Test: 8260B

Analytical Units: UG/L

Run Number : 54773

ANALYTE	SPIKE ADDED	SAMPLE CONCENT.	MATRIX SPIKE		MATRIX SPIKE DUP.			QC LIMITS	
			FOUND	% REC.	FOUND	% REC.	RPD	RPD	REC.
BENZENE	50.0	0	52.0	104	55.0	110	6	11	76 - 127
CHLOROBENZENE	50.0	68.0	110	84	120	104	9	13	70 - 130
1,1-DICHLOROETHENE	50.0	0	47.0	94	49.0	98	4	14	61 - 145
TOLUENE	50.0	2.80	55.0	104	58.0	110	5	13	76 - 125
TRICHLOROETHENE	50.0	0	48.0	96	51.0	102	6	14	71 - 120

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD: 8260B

LABORATORY REFERENCE SPIKE SUMMARY

REFERENCE ORDER #: 405772 ANALYTICAL RUN # : 54773

ANALYTE	TRUE VALUE	% RECOVERY	QC LIMITS
DATE ANALYZED : 8/16/2000			
ANALYTICAL DILUTION: 1.0			
ACETONE	20	98	21 - 165
BENZENE	20	98	37 - 151
BROMODICHLOROMETHANE	20	90	35 - 155
BROMOFORM	20	67	45 - 169
BROMOMETHANE	20	81	10 - 242
2-BUTANONE (MEK)	20	92	25 - 162
METHYL TERT-BUTYL ETHER	20	81	45 - 148
CARBON DISULFIDE	20	87	45 - 148
CARBON TETRACHLORIDE	20	93	70 - 140
CHLOROBENZENE	20	92	37 - 160
CHLOROETHANE	20	104	53 - 149
CHLOROFORM	20	92	51 - 138
CHLOROMETHANE	20	110	10 - 273
1,2-DIBROMO-3-CHLOROPROPANE	20	58	50 - 150
CYCLOHEXANE	20	101	45 - 148
DIBROMOCHLOROMETHANE	20	78	53 - 149
1,2-DIBROMOETHANE	20	78	50 - 150
1,2-DICHLOROBENZENE	20	93	18 - 190
1,4-DICHLOROBENZENE	20	98	18 - 190
1,3-DICHLOROBENZENE	20	97	18 - 190
DICHLORODIFLUOROMETHANE	20	121	60 - 140
1,1-DICHLOROETHANE	20	94	59 - 155
1,2-DICHLOROETHANE	20	88	49 - 155
1,1-DICHLOROETHENE	20	92	10 - 234
TRANS-1,2-DICHLOROETHENE	20	94	54 - 156
CIS-1,2-DICHLOROETHENE	20	92	54 - 156
1,2-DICHLOROPROPANE	20	98	10 - 210
TRANS-1,3-DICHLOROPROPENE	20	81	17 - 183
CIS-1,3-DICHLOROPROPENE	20	87	10 - 227
ETHYLBENZENE	20	98	37 - 162
2-HEXANONE	20	81	22 - 155
ISOPROPYLBENZENE	20	106	60 - 140
METHYL ACETATE	20	70	60 - 140
METHYLCYCLOHEXANE	20	99	60 - 140
METHYLENE CHLORIDE	20	92	10 - 221
4-METHYL-2-PENTANONE	20	64	46 - 157
STYRENE	20	101	66 - 144
1,1,2,2-TETRACHLOROETHANE	20	80	46 - 157
TETRACHLOROETHENE	20	92	64 - 148
TOLUENE	20	95	47 - 150
1,2,4-TRICHLOROBENZENE	20	84	60 - 140

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD: 8260B

LABORATORY REFERENCE SPIKE SUMMARY

REFERENCE ORDER #: 405772   ANALYTICAL RUN # : 54773

ANALYTE	TRUE VALUE	% RECOVERY	QC LIMITS
DATE ANALYZED : 8/16/2000			
ANALYTICAL DILUTION: 1.0			
1,1,1-TRICHLOROETHANE	20	95	52 - 162
1,1,2-TRICHLOROETHANE	20	80	52 - 150
TRICHLOROETHENE	20	89	71 - 157
TRICHLOROFLUOROMETHANE	20	92	17 - 181
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	20	93	45 - 148
VINYL CHLORIDE	20	105	10 - 251
M+P-XYLENE	40	93	71 - 135
O-XYLENE	20	90	71 - 135

MW-4S(R)

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-001

Date Sampled : 08/14/00 14:30 **Order #:** 401572 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.00			
ACENAPHTHENE	10	10 U	UG/L
ACENAPHTHYLENE	10	10 U	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	10 U	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	10 U	UG/L
BENZO(A)PYRENE	10	10 U	UG/L
BENZO(B)FLUORANTHENE	10	10 U	UG/L
BENZO(G,H,I)PERYLENE	10	10 U	UG/L
BENZO(K)FLUORANTHENE	10	10 U	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	10 U	UG/L
DI-N-BUTYLPHTHALATE	10	1.4 J	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	10 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	10 U	UG/L
4-CHLOROANILINE	10	10 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	10 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	10 U	UG/L
2-CHLORONAPHTHALENE	10	10 U	UG/L
2-CHLOROPHENOL	10	10 U	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	10 U	UG/L
CHRYSENE	10	10 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	10 U	UG/L
DIBENZOFURAN	10	10 U	UG/L
3,3'-DICHLOROBENZIDINE	10	10 U	UG/L
2,4-DICHLOROPHENOL	10	10 U	UG/L
DIETHYLPHTHALATE	10	10 U	UG/L
DIMETHYL PHTHALATE	10	10 U	UG/L
2,4-DIMETHYLPHENOL	10	10 U	UG/L
2,4-DINITROPHENOL	25	25 U	UG/L
2,4-DINITROTOLUENE	10	10 U	UG/L
2,6-DINITROTOLUENE	10	10 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	10 U	UG/L
FLUORANTHENE	10	10 U	UG/L
FLUORENE	10	10 U	UG/L
HEXACHLOROBENZENE	10	10 U	UG/L
HEXACHLOROBUTADIENE	10	10 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	10 U	UG/L
HEXACHLOROETHANE	10	10 U	UG/L
ISOPHORONE	10	10 U	UG/L
2-METHYLNAPHTHALENE	10	10 U	UG/L

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-001

Date Sampled : 08/14/00 14:30 **Order #:** 401572 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.00			
4,6-DINITRO-2-METHYLPHENOL	25	25 U	UG/L
4-CHLORO-3-METHYLPHENOL	10	10 U	UG/L
2-METHYLPHENOL	10	10 U	UG/L
4-METHYLPHENOL	10	10 U	UG/L
NAPHTHALENE	10	2.2 J	UG/L
2-NITROANILINE	25	25 U	UG/L
3-NITROANILINE	25	25 U	UG/L
4-NITROANILINE	25	25 U	UG/L
NITROBENZENE	10	10 U	UG/L
2-NITROPHENOL	10	10 U	UG/L
4-NITROPHENOL	25	25 U	UG/L
N-NITROSODIPHENYLAMINE	10	10 U	UG/L
DI-N-OCTYL PHTHALATE	10	10 U	UG/L
PENTACHLOROPHENOL	25	25 U	UG/L
PHENANTHRENE	10	10 U	UG/L
PHENOL	10	10 U	UG/L
4-BROMOPHENYL-PHENYLETHER	10	10 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	10 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	10 U	UG/L
PYRENE	10	10 U	UG/L
2,4,6-TRICHLOROPHENOL	10	10 U	UG/L
2,4,5-TRICHLOROPHENOL	25	25 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141 %)	62	%
NITROBENZENE-d5	(35 - 114 %)	73	%
PHENOL-d6	(10 - 94 %)	27	%
2-FLUOROBIPHENYL	(43 - 116 %)	73	%
2-FLUOROPHENOL	(21 - 110 %)	32	%
2,4,6-TRIBROMOPHENOL	(10 - 123 %)	74	%

COLUMBIA ANALYTICAL SERVICES

MW-3

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/13/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-002

Date Sampled : 08/14/00 16:15 **Order #:** 401573 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.0			
ACENAPHTHENE	10	10 U	UG/L
ACENAPHTHYLENE	10	10 U	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	10 U	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	10 U	UG/L
BENZO(A)PYRENE	10	10 U	UG/L
BENZO(B)FLUORANTHENE	10	10 U	UG/L
BENZO(G,H,I)PERYLENE	10	10 U	UG/L
BENZO(K)FLUORANTHENE	10	10 U	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	10 U	UG/L
DI-N-BUTYLPHTHALATE	10	1.8 J	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	10 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	10 U	UG/L
4-CHLOROANILINE	10	10 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	10 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	10 U	UG/L
2-CHLORONAPHTHALENE	10	10 U	UG/L
2-CHLOROPHENOL	10	10 U	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	10 U	UG/L
CHRYSENE	10	10 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	10 U	UG/L
DIBENZOFURAN	10	10 U	UG/L
3,3'-DICHLOROBENZIDINE	10	10 U	UG/L
2,4-DICHLOROPHENOL	10	10 U	UG/L
DIETHYLPHTHALATE	10	10 U	UG/L
DIMETHYL PHTHALATE	10	10 U	UG/L
2,4-DIMETHYLPHENOL	10	3.2 J	UG/L
2,4-DINITROPHENOL	25	25 U	UG/L
2,4-DINITROTOLUENE	10	10 U	UG/L
2,6-DINITROTOLUENE	10	10 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	10 U	UG/L
FLUORANTHENE	10	10 U	UG/L
FLUORENE	10	10 U	UG/L
HEXACHLOROBENZENE	10	10 U	UG/L
HEXACHLOROBUTADIENE	10	10 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	10 U	UG/L
HEXACHLOROETHANE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/13/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-002

Date Sampled : 08/14/00 16:15 **Order #:** 401573 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.0			
ISOPHORONE	10	10 U	UG/L
2-METHYLNAPHTHALENE	10	10 U	UG/L
4,6-DINITRO-2-METHYLPHENOL	25	25 U	UG/L
4-CHLORO-3-METHYLPHENOL	10	1.4 J	UG/L
2-METHYLPHENOL	10	35	UG/L
4-METHYLPHENOL	10	1100 E	UG/L
NAPHTHALENE	10	7.7 J	UG/L
2-NITROANILINE	25	25 U	UG/L
3-NITROANILINE	25	25 U	UG/L
4-NITROANILINE	25	25 U	UG/L
NITROBENZENE	10	10 U	UG/L
2-NITROPHENOL	10	10 U	UG/L
4-NITROPHENOL	25	25 U	UG/L
N-NITROSODIPHENYLAMINE	10	10 U	UG/L
DI-N-OCTYL PHTHALATE	10	10 U	UG/L
PENTACHLOROPHENOL	25	25 U	UG/L
PHENANTHRENE	10	10 U	UG/L
PHENOL	10	180 E	UG/L
4-BROMOPHENYL-PHENYLETHER	10	10 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	10 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	10 U	UG/L
PYRENE	10	10 U	UG/L
2,4,6-TRICHLOROPHENOL	10	10 U	UG/L
2,4,5-TRICHLOROPHENOL	25	25 U	UG/L

SURROGATE RECOVERIES	QC LIMITS	RESULT	UNITS
TERPHENYL-d14	(33 - 141)	67	%
NITROBENZENE-d5	(35 - 114)	84	%
PHENOL-d6	(10 - 94)	28	%
2-FLUOROBIPHENYL	(43 - 116)	85	%
2-FLUOROPHENOL	(21 - 110)	30	%
2,4,6-TRIBROMOPHENOL	(10 - 123)	74	%

COLUMBIA ANALYTICAL SERVICES

MW-3
(dil. 20)

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/13/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-002

Date Sampled : 08/14/00 16:15 **Order #:** 401573 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 0

DATE EXTRACTED :
DATE ANALYZED : 09/12/00
ANALYTICAL DILUTION: 20.0

ANALYTE	PQL	RESULT	UNITS
ACENAPHTHENE	10	200 U	UG/L
ACENAPHTHYLENE	10	200 U	UG/L
ACETOPHENONE	10	200 U	UG/L
ANTHRACENE	10	200 U	UG/L
ATRAZINE	10	200 U	UG/L
BENZALDEHYDE	10	200 U	UG/L
BENZO(A)ANTHRACENE	10	200 U	UG/L
BENZO(A)PYRENE	10	200 U	UG/L
BENZO(B)FLUORANTHENE	10	200 U	UG/L
BENZO(G,H,I)PERYLENE	10	200 U	UG/L
BENZO(K)FLUORANTHENE	10	200 U	UG/L
1,1'-BIPHENYL	10	200 U	UG/L
BUTYL BENZYL PHTHALATE	10	200 U	UG/L
DI-N-BUTYLPHTHALATE	10	200 U	UG/L
CAPROLACTAM	10	200 U	UG/L
CARBAZOLE	10	200 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	200 U	UG/L
4-CHLOROANILINE	10	200 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	200 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	200 U	UG/L
2-CHLORONAPHTHALENE	10	200 U	UG/L
2-CHLOROPHENOL	10	200 U	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	200 U	UG/L
CHRYSENE	10	200 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	200 U	UG/L
DIBENZOFURAN	10	200 U	UG/L
3,3'-DICHLOROBENZIDINE	10	200 U	UG/L
2,4-DICHLOROPHENOL	10	200 U	UG/L
DIETHYLPHTHALATE	10	200 U	UG/L
DIMETHYL PHTHALATE	10	200 U	UG/L
2,4-DIMETHYLPHENOL	10	200 U	UG/L
2,4-DINITROPHENOL	25	500 U	UG/L
2,4-DINITROTOLUENE	10	200 U	UG/L
2,6-DINITROTOLUENE	10	200 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	200 U	UG/L
FLUORANTHENE	10	200 U	UG/L
FLUORENE	10	200 U	UG/L
HEXACHLOROBENZENE	10	200 U	UG/L
HEXACHLOROBUTADIENE	10	200 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	200 U	UG/L
HEXACHLOROETHANE	10	200 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/13/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-002

Date Sampled : 08/14/00 16:15 **Order #:** 401573 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 0

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED :			
DATE ANALYZED : 09/12/00			
ANALYTICAL DILUTION: 20.0			
ISOPHORONE	10	200 U	UG/L
2-METHYLNAPHTHALENE	10	200 U	UG/L
4,6-DINITRO-2-METHYLPHENOL	25	500 U	UG/L
4-CHLORO-3-METHYLPHENOL	10	200 U	UG/L
2-METHYLPHENOL	10	200 UD	UG/L
4-METHYLPHENOL	10	920 D	UG/L
NAPHTHALENE	10	200 U	UG/L
2-NITROANILINE	25	500 U	UG/L
3-NITROANILINE	25	500 U	UG/L
4-NITROANILINE	25	500 U	UG/L
NITROBENZENE	10	200 U	UG/L
2-NITROPHENOL	10	200 U	UG/L
4-NITROPHENOL	25	500 U	UG/L
N-NITROSODIPHENYLAMINE	10	200 U	UG/L
DI-N-OCTYL PHTHALATE	10	200 U	UG/L
PENTACHLOROPHENOL	25	500 U	UG/L
PHENANTHRENE	10	200 U	UG/L
PHENOL	10	200 UD	UG/L
4-BROMOPHENYL-PHENYLETHER	10	200 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	200 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	200 U	UG/L
PYRENE	10	200 U	UG/L
2,4,6-TRICHLOROPHENOL	10	200 U	UG/L
2,4,5-TRICHLOROPHENOL	25	500 U	UG/L

SURROGATE RECOVERIES	QC LIMITS	RESULT	UNITS
TERPHENYL-d14	(33 - 141)	D	%
NITROBENZENE-d5	(35 - 114)	D	%
PHENOL-d6	(10 - 94)	D	%
2-FLUOROBIPHENYL	(43 - 116)	D	%
2-FLUOROPHENOL	(21 - 110)	D	%
2,4,6-TRIBROMOPHENOL	(10 - 123)	D	%

COLUMBIA ANALYTICAL SERVICES

MW-3 dup.

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/13/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-003

Date Sampled : 08/14/00 16:30 **Order #:** 401574 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 55144

DATE EXTRACTED : 08/17/00
DATE ANALYZED : 09/08/00
ANALYTICAL DILUTION: 1.0

ANALYTE	PQL	RESULT	UNITS
ACENAPHTHENE	10	10 U	UG/L
ACENAPHTHYLENE	10	10 U	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	10 U	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	10 U	UG/L
BENZO(A)PYRENE	10	10 U	UG/L
BENZO(B)FLUORANTHENE	10	10 U	UG/L
BENZO(G,H,I)PERYLENE	10	10 U	UG/L
BENZO(K)FLUORANTHENE	10	10 U	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	10 U	UG/L
DI-N-BUTYLPHTHALATE	10	1.9 J	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	10 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	10 U	UG/L
4-CHLOROANILINE	10	10 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	10 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	10 U	UG/L
2-CHLORONAPHTHALENE	10	10 U	UG/L
2-CHLOROPHENOL	10	10 U	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	10 U	UG/L
CHRYSENE	10	10 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	10 U	UG/L
DIBENZOFURAN	10	10 U	UG/L
3,3'-DICHLOROBENZIDINE	10	10 U	UG/L
2,4-DICHLOROPHENOL	10	10 U	UG/L
DIETHYLPHTHALATE	10	10 U	UG/L
DIMETHYL PHTHALATE	10	10 U	UG/L
2,4-DIMETHYLPHENOL	10	3.6 J	UG/L
2,4-DINITROPHENOL	25	25 U	UG/L
2,4-DINITROTOLUENE	10	10 U	UG/L
2,6-DINITROTOLUENE	10	10 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	10 U	UG/L
FLUORANTHENE	10	10 U	UG/L
FLUORENE	10	10 U	UG/L
HEXACHLOROBENZENE	10	10 U	UG/L
HEXACHLOROBUTADIENE	10	10 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	10 U	UG/L
HEXACHLOROETHANE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/13/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-003

Date Sampled : 08/14/00 16:30 **Order #:** 401574 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.0			
ISOPHORONE	10	10 U	UG/L
2-METHYLNAPHTHALENE	10	10 U	UG/L
4,6-DINITRO-2-METHYLPHENOL	25	25 U	UG/L
4-CHLORO-3-METHYLPHENOL	10	10 U	UG/L
2-METHYLPHENOL	10	33	UG/L
4-METHYLPHENOL	10	950 E	UG/L
NAPHTHALENE	10	7.4 J	UG/L
2-NITROANILINE	25	25 U	UG/L
3-NITROANILINE	25	25 U	UG/L
4-NITROANILINE	25	25 U	UG/L
NITROBENZENE	10	10 U	UG/L
2-NITROPHENOL	10	10 U	UG/L
4-NITROPHENOL	25	25 U	UG/L
N-NITROSODIPHENYLAMINE	10	10 U	UG/L
DI-N-OCTYL PHTHALATE	10	10 U	UG/L
PENTACHLOROPHENOL	25	25 U	UG/L
PHENANTHRENE	10	10 U	UG/L
PHENOL	10	150	UG/L
4-BROMOPHENYL-PHENYLETHER	10	10 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	10 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	10 U	UG/L
PYRENE	10	10 U	UG/L
2,4,6-TRICHLOROPHENOL	10	10 U	UG/L
2,4,5-TRICHLOROPHENOL	25	25 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141)	67	%
NITROBENZENE-d5	(35 - 114)	86	%
PHENOL-d6	(10 - 94)	27	%
2-FLUOROBIPHENYL	(43 - 116)	88	%
2-FLUOROPHENOL	(21 - 110)	33	%
2,4,6-TRIBROMOPHENOL	(10 - 123)	72	%

MW-3dup
(dil 20)

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/13/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-003

Date Sampled : 08/14/00 16:30 **Order #:** 401574 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 0

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED :			
DATE ANALYZED : 09/12/00			
ANALYTICAL DILUTION: 20.0			
ACENAPHTHENE	10	200 U	UG/L
ACENAPHTHYLENE	10	200 U	UG/L
ACETOPHENONE	10	200 U	UG/L
ANTHRACENE	10	200 U	UG/L
ATRAZINE	10	200 U	UG/L
BENZALDEHYDE	10	200 U	UG/L
BENZO(A)ANTHRACENE	10	200 U	UG/L
BENZO(A)PYRENE	10	200 U	UG/L
BENZO(B)FLUORANTHENE	10	200 U	UG/L
BENZO(G,H,I)PERYLENE	10	200 U	UG/L
BENZO(K)FLUORANTHENE	10	200 U	UG/L
1,1'-BIPHENYL	10	200 U	UG/L
BUTYL BENZYL PHTHALATE	10	200 U	UG/L
DI-N-BUTYLPHTHALATE	10	200 U	UG/L
CAPROLACTAM	10	200 U	UG/L
CARBAZOLE	10	200 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	200 U	UG/L
4-CHLOROANILINE	10	200 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	200 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	200 U	UG/L
2-CHLORONAPHTHALENE	10	200 U	UG/L
2-CHLOROPHENOL	10	200 U	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	200 U	UG/L
CHRYSENE	10	200 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	200 U	UG/L
DIBENZOFURAN	10	200 U	UG/L
3,3'-DICHLOROBENZIDINE	10	200 U	UG/L
2,4-DICHLOROPHENOL	10	200 U	UG/L
DIETHYLPHTHALATE	10	200 U	UG/L
DIMETHYL PHTHALATE	10	200 U	UG/L
2,4-DIMETHYLPHENOL	10	200 U	UG/L
2,4-DINITROPHENOL	25	500 U	UG/L
2,4-DINITROTOLUENE	10	200 U	UG/L
2,6-DINITROTOLUENE	10	200 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	200 U	UG/L
FLUORANTHENE	10	200 U	UG/L
FLUORENE	10	200 U	UG/L
HEXACHLOROBENZENE	10	200 U	UG/L
HEXACHLOROBUTADIENE	10	200 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	200 U	UG/L
HEXACHLOROETHANE	10	200 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/13/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-003

Date Sampled : 08/14/00 16:30 **Order #:** 401574 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 0

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED :			
DATE ANALYZED : 09/12/00			
ANALYTICAL DILUTION: 20.0			
ISOPHORONE	10	200 U	UG/L
2-METHYLNAPHTHALENE	10	200 U	UG/L
4,6-DINITRO-2-METHYLPHENOL	25	500 U	UG/L
4-CHLORO-3-METHYLPHENOL	10	200 U	UG/L
2-METHYLPHENOL	10	200 UD	UG/L
4-METHYLPHENOL	10	780 D	UG/L
NAPHTHALENE	10	200 U	UG/L
2-NITROANILINE	25	500 U	UG/L
3-NITROANILINE	25	500 U	UG/L
4-NITROANILINE	25	500 U	UG/L
NITROBENZENE	10	200 U	UG/L
2-NITROPHENOL	10	200 U	UG/L
4-NITROPHENOL	25	500 U	UG/L
N-NITROSODIPHENYLAMINE	10	200 U	UG/L
DI-N-OCTYL PHTHALATE	10	200 U	UG/L
PENTACHLOROPHENOL	25	500 U	UG/L
PHENANTHRENE	10	200 U	UG/L
PHENOL	10	200 UD	UG/L
4-BROMOPHENYL-PHENYLETHER	10	200 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	200 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	200 U	UG/L
PYRENE	10	200 U	UG/L
2,4,6-TRICHLOROPHENOL	10	200 U	UG/L
2,4,5-TRICHLOROPHENOL	25	500 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141)	D	%
NITROBENZENE-d5	(35 - 114)	D	%
PHENOL-d6	(10 - 94)	D	%
2-FLUOROBIPHENYL	(43 - 116)	D	%
2-FLUOROPHENOL	(21 - 110)	D	%
2,4,6-TRIBROMOPHENOL	(10 - 123)	D	%

MW-25(R)

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-004

Date Sampled : 08/14/00 17:25 **Order #:** 401575 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.00			
ACENAPHTHENE	10	10 U	UG/L
ACENAPHTHYLENE	10	10 U	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	10 U	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	10 U	UG/L
BENZO(A)PYRENE	10	10 U	UG/L
BENZO(B)FLUORANTHENE	10	10 U	UG/L
BENZO(G,H,I)PERYLENE	10	10 U	UG/L
BENZO(K)FLUORANTHENE	10	10 U	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	10 U	UG/L
DI-N-BUTYLPHTHALATE	10	2.9 J	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	10 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	10 U	UG/L
4-CHLOROANILINE	10	10 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	10 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	10 U	UG/L
2-CHLORONAPHTHALENE	10	10 U	UG/L
2-CHLOROPHENOL	10	10 U	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	10 U	UG/L
CHRYSENE	10	10 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	10 U	UG/L
DIBENZOFURAN	10	10 U	UG/L
3,3'-DICHLOROBENZIDINE	10	10 U	UG/L
2,4-DICHLOROPHENOL	10	10 U	UG/L
DIETHYLPHTHALATE	10	10 U	UG/L
DIMETHYL PHTHALATE	10	10 U	UG/L
2,4-DIMETHYLPHENOL	10	10 U	UG/L
2,4-DINITROPHENOL	25	25 U	UG/L
2,4-DINITROTOLUENE	10	10 U	UG/L
2,6-DINITROTOLUENE	10	10 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	10 U	UG/L
FLUORANTHENE	10	10 U	UG/L
FLUORENE	10	10 U	UG/L
HEXACHLOROBENZENE	10	10 U	UG/L
HEXACHLOROBUTADIENE	10	10 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	10 U	UG/L
HEXACHLOROETHANE	10	10 U	UG/L
ISOPHORONE	10	10 U	UG/L
2-METHYLNAPHTHALENE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-004

Date Sampled : 08/14/00 17:25 **Order #:** 401575 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.00			
4,6-DINITRO-2-METHYLPHENOL	25	25 U	UG/L
4-CHLORO-3-METHYLPHENOL	10	10 U	UG/L
2-METHYLPHENOL	10	1.9 J	UG/L
4-METHYLPHENOL	10	8.8 J	UG/L
NAPHTHALENE	10	1.4 J	UG/L
2-NITROANILINE	25	25 U	UG/L
3-NITROANILINE	25	25 U	UG/L
4-NITROANILINE	25	25 U	UG/L
NITROBENZENE	10	10 U	UG/L
2-NITROPHENOL	10	10 U	UG/L
4-NITROPHENOL	25	25 U	UG/L
N-NITROSODIPHENYLAMINE	10	10 U	UG/L
DI-N-OCTYL PHTHALATE	10	10 U	UG/L
PENTACHLOROPHENOL	25	25 U	UG/L
PHENANTHRENE	10	10 U	UG/L
PHENOL	10	4.5 J	UG/L
4-BROMOPHENYL-PHENYLETHER	10	10 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	10 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	10 U	UG/L
PYRENE	10	10 U	UG/L
2,4,6-TRICHLOROPHENOL	10	10 U	UG/L
2,4,5-TRICHLOROPHENOL	25	25 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141 %)	68	%
NITROBENZENE-d5	(35 - 114 %)	84	%
PHENOL-d6	(10 - 94 %)	25	%
2-FLUOROBIPHENYL	(43 - 116 %)	85	%
2-FLUOROPHENOL	(21 - 110 %)	32	%
2,4,6-TRIBROMOPHENOL	(10 - 123 %)	65	%

MW-6

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-005

Date Sampled : 08/14/00 18:30 **Order #:** 401576 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.00			
ACENAPHTHENE	10	10 U	UG/L
ACENAPHTHYLENE	10	10 U	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	10 U	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	10 U	UG/L
BENZO(A)PYRENE	10	10 U	UG/L
BENZO(B)FLUORANTHENE	10	10 U	UG/L
BENZO(G,H,I)PERYLENE	10	10 U	UG/L
BENZO(K)FLUORANTHENE	10	10 U	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	10 U	UG/L
DI-N-BUTYLPHTHALATE	10	1.5 J	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	10 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	10 U	UG/L
4-CHLOROANILINE	10	10 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	10 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	10 U	UG/L
2-CHLORONAPHTHALENE	10	10 U	UG/L
2-CHLOROPHENOL	10	2.1 J	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	10 U	UG/L
CHRYSENE	10	10 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	10 U	UG/L
DIBENZOFURAN	10	10 U	UG/L
3,3'-DICHLOROBENZIDINE	10	10 U	UG/L
2,4-DICHLOROPHENOL	10	10 U	UG/L
DIETHYLPHTHALATE	10	10 U	UG/L
DIMETHYL PHTHALATE	10	10 U	UG/L
2,4-DIMETHYLPHENOL	10	10 U	UG/L
2,4-DINITROPHENOL	25	25 U	UG/L
2,4-DINITROTOLUENE	10	10 U	UG/L
2,6-DINITROTOLUENE	10	10 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	10 U	UG/L
FLUORANTHENE	10	10 U	UG/L
FLUORENE	10	10 U	UG/L
HEXACHLOROBENZENE	10	10 U	UG/L
HEXACHLOROBUTADIENE	10	10 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	10 U	UG/L
HEXACHLOROETHANE	10	10 U	UG/L
ISOPHORONE	10	10 U	UG/L
2-METHYLNAPHTHALENE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-005

Date Sampled : 08/14/00 18:30 **Order #:** 401576 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.00			
4,6-DINITRO-2-METHYLPHENOL	25	25 U	UG/L
4-CHLORO-3-METHYLPHENOL	10	10 U	UG/L
2-METHYLPHENOL	10	10 U	UG/L
4-METHYLPHENOL	10	10 U	UG/L
NAPHTHALENE	10	2.6 J	UG/L
2-NITROANILINE	25	25 U	UG/L
3-NITROANILINE	25	25 U	UG/L
4-NITROANILINE	25	25 U	UG/L
NITROBENZENE	10	10 U	UG/L
2-NITROPHENOL	10	10 U	UG/L
4-NITROPHENOL	25	25 U	UG/L
N-NITROSODIPHENYLAMINE	10	10 U	UG/L
DI-N-OCTYL PHTHALATE	10	10 U	UG/L
PENTACHLOROPHENOL	25	25 U	UG/L
PHENANTHRENE	10	10 U	UG/L
PHENOL	10	10 U	UG/L
4-BROMOPHENYL-PHENYLETHER	10	10 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	10 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	10 U	UG/L
PYRENE	10	10 U	UG/L
2,4,6-TRICHLOROPHENOL	10	10 U	UG/L
2,4,5-TRICHLOROPHENOL	25	25 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141 %)	90	%
NITROBENZENE-d5	(35 - 114 %)	89	%
PHENOL-d6	(10 - 94 %)	22	%
2-FLUOROBIPHENYL	(43 - 116 %)	85	%
2-FLUOROPHENOL	(21 - 110 %)	35	%
2,4,6-TRIBROMOPHENOL	(10 - 123 %)	33	%

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/12/00

Project Reference:
Client Sample ID : METHOD BLANK

Date Sampled : **Order #:** 407787 **Sample Matrix:** WATER
Date Received: **Submission #:** **Analytical Run** 55144

DATE EXTRACTED : 08/17/00
DATE ANALYZED : 09/08/00
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACENAPHTHENE	10	10 U	UG/L
ACENAPHTHYLENE	10	10 U	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	10 U	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	10 U	UG/L
BENZO(A)PYRENE	10	10 U	UG/L
BENZO(B)FLUORANTHENE	10	10 U	UG/L
BENZO(G,H,I)PERYLENE	10	10 U	UG/L
BENZO(K)FLUORANTHENE	10	10 U	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	10 U	UG/L
DI-N-BUTYLPHTHALATE	10	10 U	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	10 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	10 U	UG/L
4-CHLOROANILINE	10	10 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	10 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	10 U	UG/L
2-CHLORONAPHTHALENE	10	10 U	UG/L
2-CHLOROPHENOL	10	10 U	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	10 U	UG/L
CHRYSENE	10	10 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	10 U	UG/L
DIBENZOFURAN	10	10 U	UG/L
3,3'-DICHLOROBENZIDINE	10	10 U	UG/L
2,4-DICHLOROPHENOL	10	10 U	UG/L
DIETHYLPHTHALATE	10	10 U	UG/L
DIMETHYL PHTHALATE	10	10 U	UG/L
2,4-DIMETHYLPHENOL	10	10 U	UG/L
2,4-DINITROPHENOL	25	25 U	UG/L
2,4-DINITROTOLUENE	10	10 U	UG/L
2,6-DINITROTOLUENE	10	10 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	10 U	UG/L
FLUORANTHENE	10	10 U	UG/L
FLUORENE	10	10 U	UG/L
HEXACHLOROBENZENE	10	10 U	UG/L
HEXACHLOROBUTADIENE	10	10 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	10 U	UG/L
HEXACHLOROETHANE	10	10 U	UG/L
ISOPHORONE	10	10 U	UG/L
2-METHYLNAPHTHALENE	10	10 U	UG/L
4,6-DINITRO-2-METHYLPHENOL	25	25 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/12/00

Project Reference:
Client Sample ID : METHOD BLANK

Date Sampled : **Order #:** 407787 **Sample Matrix:** WATER
Date Received: **Submission #:** **Analytical Run** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.00			
4-CHLORO-3-METHYLPHENOL	10	10 U	UG/L
2-METHYLPHENOL	10	10 U	UG/L
4-METHYLPHENOL	10	10 U	UG/L
NAPHTHALENE	10	10 U	UG/L
2-NITROANILINE	25	25 U	UG/L
3-NITROANILINE	25	25 U	UG/L
4-NITROANILINE	25	25 U	UG/L
NITROBENZENE	10	10 U	UG/L
2-NITROPHENOL	10	10 U	UG/L
4-NITROPHENOL	25	25 U	UG/L
N-NITROSODIPHENYLAMINE	10	10 U	UG/L
DI-N-OCTYL PHTHALATE	10	10 U	UG/L
PENTACHLOROPHENOL	25	25 U	UG/L
PHENANTHRENE	10	10 U	UG/L
PHENOL	10	10 U	UG/L
4-BROMOPHENYL-PHENYLETHER	10	10 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	10 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	10 U	UG/L
PYRENE	10	10 U	UG/L
2,4,6-TRICHLOROPHENOL	10	10 U	UG/L
2,4,5-TRICHLOROPHENOL	25	25 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141 %)	105	%
NITROBENZENE-d5	(35 - 114 %)	78	%
PHENOL-d6	(10 - 94 %)	30	%
2-FLUOROBIPHENYL	(43 - 116 %)	68	%
2-FLUOROPHENOL	(21 - 110 %)	41	%
2,4,6-TRIBROMOPHENOL	(10 - 123 %)	59	%

COLUMBIA ANALYTICAL SERVICES

QUALITY CONTROL SUMMARY   MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
WATER

Spiked Order No. : 401572 Geomatrix Consultants Inc.

Client ID: 081400-001

Test: 8270C SEMIVOLATILES

Analytical Units: UG/L

Run Number : 55144

ANALYTE	SPIKE ADDED	SAMPLE CONCENT.	MATRIX SPIKE		MATRIX SPIKE DUP.			QC LIMITS	
			FOUND	% REC.	FOUND	% REC.	RPD	RPD	REC.
ACENAPHTHENE	100	0	68.0	68	77.0	77	12	19	31 - 137
2-CHLOROPHENOL	200	0	66.0	33	75.0	38	13	50	25 - 102
2,4-DINITROTOLUENE	100	0	87.0	87	94.0	94	8	38	28 - 89
4-CHLORO-3-METHYLPHENOL	200	0	87.0	44	92.0	46	6	33	26 - 103
4-NITROPHENOL	200	0	43.0	22	37.0	19	15	50	11 - 114
PENTACHLOROPHENOL	200	0	60.0	30	12.0	6 *	133*	47	17 - 109
PHENOL	200	0	48.0	24*	46.0	23*	4	35	26 - 90
N-NITROSO-DI-N-PROPYLAMINE	100	0	58.0	58	67.0	67	14	38	41 - 126
PYRENE	100	0	92.0	92	95.0	95	3	36	35 - 142

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD: 8270C SEMIVOLATILES

LABORATORY REFERENCE SPIKE SUMMARY

REFERENCE ORDER #: 407788 ANALYTICAL RUN # : 55144

ANALYTE	TRUE VALUE	% RECOVERY	QC LIMITS
DATE ANALYZED : 9/ 8/2000			
ANALYTICAL DILUTION: 1.0			
ACENAPHTHENE	100	79	47 - 145
ACENAPHTHYLENE	100	82	33 - 145
ACETOPHENONE	100	NA	50 - 150
ANTHRACENE	100	93	27 - 133
ATRAZINE	100	NA	50 - 150
BENZALDEHYDE	100	NA	50 - 150
BENZO(A)ANTHRACENE	100	94	33 - 143
BENZO(A)PYRENE	100	90	17 - 163
BENZO(B)FLUORANTHENE	100	93	24 - 159
BENZO(G,H,I)PERYLENE	100	56	10 - 219
BENZO(K)FLUORANTHENE	100	93	11 - 162
1,1'-BIPHENYL	100	NA	50 - 150
BUTYL BENZYL PHTHALATE	100	80	10 - 152
DI-N-BUTYLPHTHALATE	100	85	10 - 118
CAPROLACTAM	100	NA	50 - 150
CARBAZOLE	100	87	10 - 160
INDENO(1,2,3-CD)PYRENE	100	60	10 - 171
4-CHLOROANILINE	100	82	10 - 160
BIS(-2-CHLOROETHOXY)METHANE	100	74	33 - 184
BIS(2-CHLOROETHYL)ETHER	100	67	12 - 158
2-CHLORONAPHTHALENE	100	76	60 - 118
2-CHLOROPHENOL	200	41	23 - 134
2,2'-OXYBIS(1-CHLOROPROPANE)	100	41	36 - 166
CHRYSENE	100	93	17 - 168
DIBENZO(A,H)ANTHRACENE	100	94	10 - 227
DIBENZOFURAN	100	85	10 - 160
3,3'-DICHLOROBENZIDINE	100	96	10 - 262
2,4-DICHLOROPHENOL	100	90	39 - 135
DIETHYLPHTHALATE	100	71	10 - 114
DIMETHYL PHTHALATE	100	37	10 - 112
2,4-DIMETHYLPHENOL	100	63	32 - 119
2,4-DINITROPHENOL	100	78	10 - 191
2,4-DINITROTOLUENE	100	99	39 - 139
2,6-DINITROTOLUENE	100	92	50 - 158
BIS(2-ETHYLHEXYL)PHTHALATE	100	85	10 - 158
FLUORANTHENE	100	97	26 - 137
FLUORENE	100	88	59 - 121
HEXACHLOROBENZENE	100	95	10 - 152
HEXACHLOROBUTADIENE	100	80	24 - 116
HEXACHLOROCYCLOPENTADIENE	100	53	10 - 110
HEXACHLOROETHANE	100	59	40 - 113

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD: 8270C SEMIVOLATILES

LABORATORY REFERENCE SPIKE SUMMARY

REFERENCE ORDER #: 407788 ANALYTICAL RUN # : 55144

ANALYTE	TRUE VALUE	% RECOVERY	QC LIMITS
DATE ANALYZED : 9/ 8/2000			
ANALYTICAL DILUTION: 1.0			
ISOPHORONE	100	81	21 - 196
2-METHYLNAPHTHALENE	100	75	10 - 160
4,6-DINITRO-2-METHYLPHENOL	100	89	10 - 181
4-CHLORO-3-METHYLPHENOL	200	44	22 - 147
2-METHYLPHENOL	100	70	10 - 160
4-METHYLPHENOL	100	68	10 - 160
NAPHTHALENE	100	70	21 - 133
2-NITROANILINE	100	72	10 - 160
3-NITROANILINE	100	85	10 - 160
4-NITROANILINE	100	86	10 - 160
NITROBENZENE	100	70	35 - 180
2-NITROPHENOL	100	88	29 - 182
4-NITROPHENOL	200	18	10 - 132
N-NITROSODIPHENYLAMINE	100	87	11 - 102
DI-N-OCTYL PHTHALATE	100	84	10 - 146
PENTACHLOROPHENOL	200	38	14 - 176
PHENANTHRENE	100	93	54 - 120
PHENOL	200	23	10 - 112
4-BROMOPHENYL-PHENYLETHER	100	93	53 - 127
4-CHLOROPHENYL-PHENYLETHER	100	93	25 - 158
N-NITROSO-DI-N-PROPYLAMINE	100	70	10 - 230
PYRENE	100	99	52 - 115
2,4,6-TRICHLOROPHENOL	100	89	37 - 144
2,4,5-TRICHLOROPHENOL	100	93	10 - 160

METALS

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INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

081400-001

Contract: R2003355

Lab Code: Case No.: SAS No.: SDG NO.: 081400-001

Matrix (soil/water): WATER Lab Sample ID: 401572

Level (low/med): LOW Date Received: 08/15/00

Concentration Units (ug/L or mg/kg dry weight): µG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	437			P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	115			P
7440-39-3	Barium	237			P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	180000			P
7440-47-3	Chromium	337			P
7440-48-4	Cobalt	50.0	U		P
7440-50-8	Copper	20.0	U		P
7439-89-6	Iron	3110			P
7439-92-1	Lead	5.0	U		P
7439-95-4	Magnesium	99800			P
7439-96-5	Manganese	277			P
7439-97-6	Mercury	0.30	U		CV
7440-02-0	Nickel	40.0	U		P
7440-09-7	Potassium	10600			P
7782-49-2	Selenium	5.0	U	N	P
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	29700			P
7440-28-0	Thallium	10.0	U		P
7440-62-2	Vanadium	50.0	U		P
7440-66-6	Zinc	24.8			P

Color Before: YELLOW Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

METALS

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INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.: 081400-002

Contract: R2003355

Lab Code: Case No.: SAS No.: SDG NO.: 081400-001

Matrix (soil/water): WATER Lab Sample ID: 401573

Level (low/med): LOW Date Received: 08/15/00

Concentration Units (ug/L or mg/kg dry weight): µG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	161			P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	34.2			P
7440-39-3	Barium	154			P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	117000			P
7440-47-3	Chromium	433			P
7440-48-4	Cobalt	50.0	U		P
7440-50-8	Copper	20.0	U		P
7439-89-6	Iron	520			P
7439-92-1	Lead	5.0	U		P
7439-95-4	Magnesium	114000			P
7439-96-5	Manganese	66.5			P
7439-97-6	Mercury	0.30	U		CV
7440-02-0	Nickel	40.0	U		P
7440-09-7	Potassium	4650			P
7782-49-2	Selenium	5.0	U	N	P
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	14100			P
7440-28-0	Thallium	10.0	U		P
7440-62-2	Vanadium	50.0	U		P
7440-66-6	Zinc	21.4			P

Color Before: YELLOW Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Columbia Analytical Services, Inc

METALS

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INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

081400-003

Contract: R2003355

Lab Code: Case No.: SAS No.: SDG NO.: 081400-001

Matrix (soil/water): WATER Lab Sample ID: 401574

Level (low/med): LOW Date Received: 08/15/00

Concentration Units (ug/L or mg/kg dry weight): µG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	145			P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	32.8			P
7440-39-3	Barium	152			P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	117000			P
7440-47-3	Chromium	427			P
7440-48-4	Cobalt	50.0	U		P
7440-50-8	Copper	20.0	U		P
7439-89-6	Iron	495			P
7439-92-1	Lead	5.0	U		P
7439-95-4	Magnesium	113000			P
7439-96-5	Manganese	66.2			P
7439-97-6	Mercury	0.30	U		CV
7440-02-0	Nickel	40.0	U		P
7440-09-7	Potassium	4380			P
7782-49-2	Selenium	5.0	U	N	P
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	14400			P
7440-28-0	Thallium	10.0	U		P
7440-62-2	Vanadium	50.0	U		P
7440-66-6	Zinc	20.0	U		P

Color Before: YELLOW Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

081400-004

Contract: R2003355

Lab Code: Case No.: SAS No.: SDG NO.: 081400-001

Matrix (soil/water): WATER Lab Sample ID: 401575

Level (low/med): LOW Date Received: 08/15/00

Concentration Units (ug/L or mg/kg dry weight): µG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	746			P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	163			P
7440-39-3	Barium	279			P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	158000			P
7440-47-3	Chromium	174			P
7440-48-4	Cobalt	50.0	U		P
7440-50-8	Copper	20.0	U		P
7439-89-6	Iron	2080			P
7439-92-1	Lead	5.0	U		P
7439-95-4	Magnesium	98200			P
7439-96-5	Manganese	117			P
7439-97-6	Mercury	0.30	U		CV
7440-02-0	Nickel	40.0	U		P
7440-09-7	Potassium	5920			P
7782-49-2	Selenium	5.0	U	N	P
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	17300			P
7440-28-0	Thallium	10.0	U		P
7440-62-2	Vanadium	50.0	U		P
7440-66-6	Zinc	35.6			P

Color Before: YELLOW Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

081400-005

Contract: R2003355

Lab Code: Case No.: SAS No.: SDG NO.: 081400-001

Matrix (soil/water): WATER Lab Sample ID: 401576

Level (low/med): LOW Date Received: 08/15/00

Concentration Units (ug/L or mg/kg dry weight): µG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	185			P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	30.2			P
7440-39-3	Barium	259			P
7440-41-7	Beryllium	5.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	176000			P
7440-47-3	Chromium	36.8			P
7440-48-4	Cobalt	50.0	U		P
7440-50-8	Copper	20.0	U		P
7439-89-6	Iron	12800			P
7439-92-1	Lead	5.0	U		P
7439-95-4	Magnesium	60700			P
7439-96-5	Manganese	821			P
7439-97-6	Mercury	0.30	U		CV
7440-02-0	Nickel	40.0	U		P
7440-09-7	Potassium	5580			P
7782-49-2	Selenium	5.0	U	N	P
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	5580			P
7440-28-0	Thallium	10.0	U		P
7440-62-2	Vanadium	50.0	U		P
7440-66-6	Zinc	29.1			P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

METALS
-5A-
SPIKE SAMPLE RECOVERY

SAMPLE NO.

081400-001S

Contract: R2003355

Lab Code: Case No.: SAS No.: SDG NO.: 081400-001

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): µG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum	75 - 125	2384.8774		436.8666		2000.00	97.4		P
Antimony	75 - 125	474.3399		60.0000	U	500.00	94.9		P
Arsenic	75 - 125	148.6508		115.2536		40.00	83.5		P
Barium	75 - 125	2153.5161		237.4171		2000.00	95.8		P
Beryllium	75 - 125	46.8271		5.0000	U	50.00	93.7		P
Cadmium	75 - 125	47.8913		5.0000	U	50.00	95.8		P
Calcium		184111.7188		179710.3438		2000.00	220.1		P
Chromium	75 - 125	540.2316		337.3292		200.00	101.5		P
Cobalt	75 - 125	485.3653		50.0000	U	500.00	97.1		P
Copper	75 - 125	240.1883		20.0000	U	250.00	96.1		P
Iron	75 - 125	4203.9355		3112.3345		1000.00	109.2		P
Lead	75 - 125	493.1261		5.0000	U	500.00	98.6		P
Magnesium		103590.2578		99770.8750		2000.00	191.0		P
Manganese	75 - 125	795.4236		276.8601		500.00	103.7		P
Mercury	75 - 125	1.1466		0.3000	U	1.00	114.7		CV
Nickel	75 - 125	476.1078		40.0000	U	500.00	95.2		P
Potassium	75 - 125	29400.0000		10610.0000		20000.00	93.9		P
Selenium	75 - 125	741.6597		5.0000	U	1010.00	73.4	N	P
Silver	75 - 125	48.8937		10.0000	U	50.00	97.8		P
Sodium	75 - 125	49630.0000		29650.0000		20000.00	99.9		P
Thallium	75 - 125	2043.3383		10.0000	U	2000.00	102.2		P
Vanadium	75 - 125	491.0418		50.0000	U	500.00	98.2		P
Zinc	75 - 125	473.7790		24.8416		500.00	89.8		P

Comments:

Columbia Analytical Services, Inc

METALS

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POST DIGEST SPIKE SAMPLE RECOVERY

SAMPLE NO.

081400-001A

Contract: R2003355

Lab Code: Case No.: SAS No.: SDG NO.: 081400-001

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum		2543.57		436.87		2000.0	105.3		P
Antimony		499.59		60.00	U	500.0	99.9		P
Arsenic		154.24		115.25		40.0	97.5		P
Barium		2273.21		237.42		2000.0	101.8		P
Beryllium		49.15		5.00	U	50.0	98.3		P
Cadmium		49.56		5.00	U	50.0	99.1		P
Calcium		184005.53		179710.34		2000.0	214.8		P
Chromium		551.09		337.33		200.0	106.9		P
Cobalt		509.39		50.00	U	500.0	101.9		P
Copper		254.56		20.00	U	250.0	101.8		P
Iron		4209.88		3112.33		1000.0	109.8		P
Lead		519.49		5.00	U	500.0	103.9		P
Magnesium		103097.83		99770.88		2000.0	166.3		P
Manganese		824.20		276.86		500.0	109.5		P
Nickel		507.81		40.00	U	500.0	101.6		P
Potassium		30230.00		10610.00		20000.0	98.1		P
Selenium		1107.10		5.00	U	1010.0	109.6		P
Silver		48.63		10.00	U	50.0	97.3		P
Sodium		50510.00		29650.00		20000.0	104.3		P
Thallium		2194.74		10.00	U	2000.0	109.7		P
Vanadium		519.77		50.00	U	500.0	104.0		P
Zinc		497.15		24.84		500.0	94.5		P

Comments:

METALS
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DUPLICATES

SAMPLE NO.

081400-001D

Contract: R2003355

Lab Code: Case No.: SAS No.: SDG NO.: 081400-001

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate:

Concentration Units (ug/L or mg/kg dry weight): µG/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		436.8666		419.2622		4.1		P
Antimony		60.0000	U	60.0000	U			P
Arsenic		115.2536		111.2349		3.5		P
Barium		237.4171		242.2745		2.0		P
Beryllium		5.0000	U	5.0000	U			P
Cadmium		5.0000	U	5.0000	U			P
Calcium		179710.3438		182414.6719		1.5		P
Chromium		337.3292		346.1164		2.6		P
Cobalt		50.0000	U	50.0000	U			P
Copper		20.0000	U	20.0000	U			P
Iron		3112.3345		3123.8289		0.4		P
Lead		5.0000	U	5.0000	U			P
Magnesium		99770.8750		102995.9453		3.2		P
Manganese		276.8601		283.7223		2.4		P
Mercury		0.3000	U	0.3000	U			CV
Nickel		40.0000	U	40.0000	U			P
Potassium		10610.0000		10370.0000		2.3		P
Selenium		5.0000	U	5.0000	U			P
Silver		10.0000	U	10.0000	U			P
Sodium		29650.0000		29920.0000		0.9		P
Thallium		10.0000	U	10.0000	U			P
Vanadium		50.0000	U	50.0000	U			P
Zinc		24.8416		24.9996		0.6		P

METALS

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LABORATORY CONTROL SAMPLE

Contract: R2003355

Lab Code: Case No.: SAS No.: SDG NO.: 081400-001

Solid LCS Source:

Aqueous LCS Source: CPI

Analyte	Aqueous (ug/L) True	Aqueous (ug/L) Found	Aqueous (ug/L) %R	Solid (mg/kg) True	Solid (mg/kg) Found	C	Limits		%R
Aluminum	2000.0	1825.55	91.3						
Antimony	500.0	464.70	92.9						
Arsenic	40.0	36.54	91.3						
Barium	2000.0	1927.95	96.4						
Beryllium	50.0	47.34	94.7						
Cadmium	50.0	50.57	101.1						
Calcium	2000.0	2041.40	102.1						
Chromium	200.0	192.49	96.2						
Cobalt	500.0	500.50	100.1						
Copper	250.0	243.47	97.4						
Iron	1000.0	1058.55	105.9						
Lead	500.0	511.25	102.3						
Magnesium	2000.0	1987.77	99.4						
Manganese	500.0	515.95	103.2						
Mercury	1.0	1.12	112.0						
Nickel	500.0	494.54	98.9						
Potassium	20000.0	18860.00	94.3						
Selenium	1010.0	1033.18	102.3						
Silver	50.0	47.37	94.7						
Sodium	20000.0	18770.00	93.8						
Thallium	2000.0	2092.56	104.6						
Vanadium	500.0	472.00	94.4						
Zinc	500.0	512.95	102.6						

COLUMBIA ANALYTICAL SERVICES

Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-001

Date Sampled : 08/14/00 14:30 **Order #:** 401572 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355

ANALYTE	METHOD	PQL	RESULT	UNITS	DATE ANALYZED	TIME ANALYZED	DILUTION
HEXAVALENT CHROMIUM	7196A	0.0100	0.104	MG/L	08/15/00	11:39	10.0

COLUMBIA ANALYTICAL SERVICES

Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-002

Date Sampled : 08/14/00 16:15 Order #: 401573 Sample Matrix: WATER
Date Received: 08/15/00 Submission #: R2003355

ANALYTE	METHOD	PQL	RESULT	UNITS	DATE ANALYZED	TIME ANALYZED	DILUTION
HEXAVALENT CHROMIUM	7196A	0.0100	0.0400 U	MG/L	08/15/00	11:39	4.0

COLUMBIA ANALYTICAL SERVICES

Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-003

Date Sampled : 08/14/00 16:30 Order #: 401574 Sample Matrix: WATER
Date Received: 08/15/00 Submission #: R2003355

ANALYTE	METHOD	PQL	RESULT	UNITS	DATE ANALYZED	TIME ANALYZED	DILUTION
HEXAVALENT CHROMIUM	7196A	0.0100	0.0400 U	MG/L	08/15/00	11:39	4.0

COLUMBIA ANALYTICAL SERVICES

Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-004

Date Sampled : 08/14/00 17:25 Order #: 401575 Sample Matrix: WATER
Date Received: 08/15/00 Submission #: R2003355

ANALYTE	METHOD	PQL	RESULT	UNITS	DATE ANALYZED	TIME ANALYZED	DILUTION
HEXAVALENT CHROMIUM	7196A	0.0100	0.103	MG/L	08/15/00	11:39	4.0

COLUMBIA ANALYTICAL SERVICES

Reported: 09/12/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-005

Date Sampled : 08/14/00 18:30   Order #: 401576   Sample Matrix: WATER
Date Received: 08/15/00   Submission #: R2003355

ANALYTE	METHOD	PQL	RESULT	UNITS	DATE ANALYZED	TIME ANALYZED	DILUTION
HEXAVALENT CHROMIUM	7196A	0.0100	0.0400 U	MG/L	08/15/00	11:39	4.0

COLUMBIA ANALYTICAL SERVICES

INORGANIC QUALITY CONTROL SUMMARY

Report Date : 09/12/00
CAS Order # : 401572 - 081400-001
Client : Geomatrix Consultants Inc.
PETER COOPER SITE
Reported Units: MG/L
Run # : 54111

	PRECISION			ACCURACY			
	ORIGINAL	DUPLICATE	RPD	FOUND	ADDED	% REC.	LIMITS
HEXAVALENT CHROMIUM	0.104	0.100 U	NC	0.824	1.00	72	70 - 130

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INORGANIC BLANK SPIKE SUMMARY

CAS Submission #: R2003355
Client: Geomatrix Consultants Inc.
PETER COOPER SITE

BLANK SPIKES

	BLANK	FOUND	ADDED	% REC	LIMITS	RUN	UNITS
HEXAVALENT CHROMIUM	0.0100 U	0.0980	0.100	98	70 - 130	54111	MG/L

September 27, 2000

Columbia Analytical Services INC.
An Employee-Owned Company

Ms. Jennifer Hagen
Geomatrix Consultants, Inc.
338 Harris Hill Road, Suite 201
Williamsville, NY 14221

Re: Peter Cooper Site
Submission # R2003355
SDG # 081400-001
8270 Addendum

Dear Ms. Hagen:

Enclosed is the analytical data report for the above referenced facility. A total of six samples were received by our laboratory on August 15, 2000.

This data package contains only the Semivolatile analysis. The rest of the parameters were mailed to you on September 24, 2000.

Any problems encountered with this project are addressed in a case narrative section which is presented later in this report.

This report consists of two (2) packages: the sample data package and the sample data summary package. Both packages have been mailed to Judy Harry at your request, with only a copy of the summary package being mailed to Geomatrix. All data presented in this package has been reviewed prior to report submission. If you should have any questions or concerns, please contact me at (716) 288-5380.

Thank you for your continued use of our services.

Sincerely,

COLUMBIA ANALYTICAL SERVICES

Janice M. Jaeger
Project Chemist

RECEIVED
OCT 02 2000

enc.

cc: Ms. Judy Harry
Data Validation Services
120 Cobblecreek Road
North Creek, NY 12853

301455

Columbia Analytical Services inc.

1 Mustard ST.
Suite 250
Rochester, NY 14609

THIS IS AN ANALYTICAL TEST REPORT FOR:

Client	: Geomatrix Consultants Inc.
Project Reference	: PETER COOPER SITE
Lab Submission #	: R2003355
Reported	: 09/27/00

Report Contains a total of 34 pages

The results reported herein relate only to the samples received by the laboratory. This report may not be reproduced except in full, without the approval of Columbia Analytical Services.

This package has been reviewed by Columbia Analytical Services' QA Department/Laboratory Director to comply with NELAC standards prior to report submittal. Michael K P

CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper Site
SUBMISSION #: R2003355

Geomatrix samples were collected on 08/14/00 and received at CAS on 08/15/00 in good condition at cooler temperatures of 1-2 C.

SEMIVOLATILE ORGANICS

Five water samples were analyzed for the new TCL list of Semivolatiles by method 8270 from SW846.

All Tuning criteria for DFTPP were met.

All initial and continuing calibration criteria were met.

All surrogate standard recoveries were within limits except 081400-002DL and 081400-003DL. All surrogates were diluted out and have been flagged with a "D".

Job specific QC was performed on 081400-001 as requested. All MS/MSD recovereis were within limits unless flagged with an "*". All Blank Spike recoveries were within limits. All RPD's were within limits except Pentachlorophenol and has been flagged with an "*".

Several compounds for 081400-002 and 081400-003 have been flagged with an "E" as being outside the calibration range of the instrument. The samples were repeated at dilutions and both sets of data have been reported out.

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were extracted and analyzed within required holding times.

No other analytical or QC problems were encountered.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or his designee, as verified by the following signature. Michael K. P.

1 Mustard Street, Suite 250 • Rochester, NY 14609-6925 • Telephone (716) 288-5380 • Fax (716) 288-84--

CAS ASP/CLP BATCHING FORM / LOGIN SHEET

SDG #: 081400-001	BATCH COMPLETE: __yes_________	DATE REVISED:
SUBMISSIO R2003355	DISKETTE REQUESTED: Y___ N__x__	DATE DUE: 09/12/00
CLIENT: Geomatrix Consultants Inc.	DATE: 08/15/00	PROTOCOL: SW846
CLIENT REP: Janice Jaeger	CUSTODY SEAL: PRESENT/ABSENT:	SHIPPING No.:
PROJECT: PETER COOPER SITE	CHAIN OF CUSTODY: PRESENT/ABSENT:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLE	DATE RECEIVE	pH (SOLIDS)	% SOLIDS	REMARKS AMPLE CONDITIO
401572QC	081400-001	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401573	081400-002	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401574	081400-003	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401575	081400-004	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401576	081400-005	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			
401577	TRIP BLANK	WATER	8260,8270,TAL MET,CR6	8/14/00	8/15/00			

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00005

Columbia Analytical Services Inc.

Effective 04/01/96

CAS LIST OF QUALIFIERS

(The basis of this proposal are the EPA-CLP Qualifiers)

U - Indicates compound was analyzed for but was not detected. The sample quantitation limit must be corrected for dilution and for percent moisture.

J - Indicates an estimated value. For further explanation see case narrative / cover letter.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range.

A - This flag indicates that a TIC is a suspected aldol-condensation product.

N - Spiked sample recovery not within control limits.
(Flag the entire batch - Inorganic analysis only)

* - Duplicate analysis not within control limits.
(Flag the entire batch - Inorganic analysis only)

- Also used to qualify Organics QC data outside limits.

D - Spike diluted out.

S - Reported value determined by Method of Standard Additions. (MSA)

X - As specified in the case narrative.

CAS Lab ID # for State Certifications

NY ID # in Rochester:	10145	NJ ID # in Rochester:	73004
CT ID # in Rochester:	PH0556	RI ID # in Rochester:	158
MA ID # in Rochester:	M-NY032	NH ID # in Rochester:	294198-A
OH EPA # in Rochester	VAP	AIHA # in Rochester:	7889

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-001

Date Sampled : 08/14/00 14:30 **Order #:** 401572 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.0			
ACENAPHTHENE	10	10 U	UG/L
ACENAPHTHYLENE	10	10 U	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	10 U	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	10 U	UG/L
BENZO(A)PYRENE	10	10 U	UG/L
BENZO(B)FLUORANTHENE	10	10 U	UG/L
BENZO(G,H,I)PERYLENE	10	10 U	UG/L
BENZO(K)FLUORANTHENE	10	10 U	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	10 U	UG/L
DI-N-BUTYLPHTHALATE	10	1.4 J	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	10 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	10 U	UG/L
4-CHLOROANILINE	10	10 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	10 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	10 U	UG/L
2-CHLORONAPHTHALENE	10	10 U	UG/L
2-CHLOROPHENOL	10	10 U	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	10 U	UG/L
CHRYSENE	10	10 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	10 U	UG/L
DIBENZOFURAN	10	10 U	UG/L
3,3'-DICHLOROBENZIDINE	10	10 U	UG/L
2,4-DICHLOROPHENOL	10	10 U	UG/L
DIETHYLPHTHALATE	10	10 U	UG/L
DIMETHYL PHTHALATE	10	10 U	UG/L
2,4-DIMETHYLPHENOL	10	10 U	UG/L
2,4-DINITROPHENOL	25	25 U	UG/L
2,4-DINITROTOLUENE	10	10 U	UG/L
2,6-DINITROTOLUENE	10	10 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	10 U	UG/L
FLUORANTHENE	10	10 U	UG/L
FLUORENE	10	10 U	UG/L
HEXACHLOROBENZENE	10	10 U	UG/L
HEXACHLOROBUTADIENE	10	10 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	10 U	UG/L
HEXACHLOROETHANE	10	10 U	UG/L
ISOPHORONE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-001

Date Sampled : 08/14/00 14:30 **Order #:** 401572 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.0			
2-METHYLNAPHTHALENE	10	10 U	UG/L
4,6-DINITRO-2-METHYLPHENOL	25	25 U	UG/L
4-CHLORO-3-METHYLPHENOL	10	10 U	UG/L
2-METHYLPHENOL	10	10 U	UG/L
4-METHYLPHENOL	10	10 U	UG/L
NAPHTHALENE	10	2.2 J	UG/L
2-NITROANILINE	25	25 U	UG/L
3-NITROANILINE	25	25 U	UG/L
4-NITROANILINE	25	25 U	UG/L
NITROBENZENE	10	10 U	UG/L
2-NITROPHENOL	10	10 U	UG/L
4-NITROPHENOL	25	25 U	UG/L
N-NITROSODIPHENYLAMINE	10	10 U	UG/L
DI-N-OCTYL PHTHALATE	10	10 U	UG/L
PENTACHLOROPHENOL	25	25 U	UG/L
PHENANTHRENE	10	10 U	UG/L
PHENOL	10	10 U	UG/L
4-BROMOPHENYL-PHENYLETHER	10	10 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	10 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	10 U	UG/L
PYRENE	10	10 U	UG/L
2,4,6-TRICHLOROPHENOL	10	10 U	UG/L
2,4,5-TRICHLOROPHENOL	25	25 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141)	62	%
NITROBENZENE-d5	(35 - 114)	73	%
PHENOL-d6	(10 - 94)	27	%
2-FLUOROBIPHENYL	(43 - 116)	73	%
2-FLUOROPHENOL	(21 - 110)	32	%
2,4,6-TRIBROMOPHENOL	(10 - 123)	74	%

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-002

Date Sampled : 08/14/00 16:15 **Order #:** 401573 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.0			
ACENAPHTHENE	10	10 U	UG/L
ACENAPHTHYLENE	10	10 U	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	10 U	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	10 U	UG/L
BENZO(A)PYRENE	10	10 U	UG/L
BENZO(B)FLUORANTHENE	10	10 U	UG/L
BENZO(G,H,I)PERYLENE	10	10 U	UG/L
BENZO(K)FLUORANTHENE	10	10 U	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	10 U	UG/L
DI-N-BUTYLPHTHALATE	10	1.8 J	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	10 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	10 U	UG/L
4-CHLOROANILINE	10	10 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	10 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	10 U	UG/L
2-CHLORONAPHTHALENE	10	10 U	UG/L
2-CHLOROPHENOL	10	10 U	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	10 U	UG/L
CHRYSENE	10	10 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	10 U	UG/L
DIBENZOFURAN	10	10 U	UG/L
3,3'-DICHLOROBENZIDINE	10	10 U	UG/L
2,4-DICHLOROPHENOL	10	10 U	UG/L
DIETHYLPHTHALATE	10	10 U	UG/L
DIMETHYL PHTHALATE	10	10 U	UG/L
2,4-DIMETHYLPHENOL	10	3.2 J	UG/L
2,4-DINITROPHENOL	25	25 U	UG/L
2,4-DINITROTOLUENE	10	10 U	UG/L
2,6-DINITROTOLUENE	10	10 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	10 U	UG/L
FLUORANTHENE	10	10 U	UG/L
FLUORENE	10	10 U	UG/L
HEXACHLOROBENZENE	10	10 U	UG/L
HEXACHLOROBUTADIENE	10	10 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	10 U	UG/L
HEXACHLOROETHANE	10	10 U	UG/L
ISOPHORONE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-002

Date Sampled : 08/14/00 16:15 **Order #:** 401573 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.0			
2-METHYLNAPHTHALENE	10	10 U	UG/L
4,6-DINITRO-2-METHYLPHENOL	25	25 U	UG/L
4-CHLORO-3-METHYLPHENOL	10	1.4 J	UG/L
2-METHYLPHENOL	10	35	UG/L
4-METHYLPHENOL	10	1100 E	UG/L
NAPHTHALENE	10	7.7 J	UG/L
2-NITROANILINE	25	25 U	UG/L
3-NITROANILINE	25	25 U	UG/L
4-NITROANILINE	25	25 U	UG/L
NITROBENZENE	10	10 U	UG/L
2-NITROPHENOL	10	10 U	UG/L
4-NITROPHENOL	25	25 U	UG/L
N-NITROSODIPHENYLAMINE	10	10 U	UG/L
DI-N-OCTYL PHTHALATE	10	10 U	UG/L
PENTACHLOROPHENOL	25	25 U	UG/L
PHENANTHRENE	10	10 U	UG/L
PHENOL	10	180 E	UG/L
4-BROMOPHENYL-PHENYLETHER	10	10 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	10 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	10 U	UG/L
PYRENE	10	10 U	UG/L
2,4,6-TRICHLOROPHENOL	10	10 U	UG/L
2,4,5-TRICHLOROPHENOL	25	25 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141)	67	%
NITROBENZENE-d5	(35 - 114)	84	%
PHENOL-d6	(10 - 94)	28	%
2-FLUOROBIPHENYL	(43 - 116)	85	%
2-FLUOROPHENOL	(21 - 110)	30	%
2,4,6-TRIBROMOPHENOL	(10 - 123)	74	%

301463

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-002

Date Sampled : 08/14/00 16:15 **Order #:** 401573 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 0

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/12/00			
ANALYTICAL DILUTION: 20.00			
ACENAPHTHENE	10	200 U	UG/L
ACENAPHTHYLENE	10	200 U	UG/L
ACETOPHENONE	10	200 U	UG/L
ANTHRACENE	10	200 U	UG/L
ATRAZINE	10	200 U	UG/L
BENZALDEHYDE	10	200 U	UG/L
BENZO(A)ANTHRACENE	10	200 U	UG/L
BENZO(A)PYRENE	10	200 U	UG/L
BENZO(B)FLUORANTHENE	10	200 U	UG/L
BENZO(G,H,I)PERYLENE	10	200 U	UG/L
BENZO(K)FLUORANTHENE	10	200 U	UG/L
1,1'-BIPHENYL	10	200 U	UG/L
BUTYL BENZYL PHTHALATE	10	200 U	UG/L
DI-N-BUTYLPHTHALATE	10	200 U	UG/L
CAPROLACTAM	10	200 U	UG/L
CARBAZOLE	10	200 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	200 U	UG/L
4-CHLOROANILINE	10	200 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	200 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	200 U	UG/L
2-CHLORONAPHTHALENE	10	200 U	UG/L
2-CHLOROPHENOL	10	200 U	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	200 U	UG/L
CHRYSENE	10	200 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	200 U	UG/L
DIBENZOFURAN	10	200 U	UG/L
3,3'-DICHLOROBENZIDINE	10	200 U	UG/L
2,4-DICHLOROPHENOL	10	200 U	UG/L
DIETHYLPHTHALATE	10	200 U	UG/L
DIMETHYL PHTHALATE	10	200 U	UG/L
2,4-DIMETHYLPHENOL	10	200 U	UG/L
2,4-DINITROPHENOL	25	500 U	UG/L
2,4-DINITROTOLUENE	10	200 U	UG/L
2,6-DINITROTOLUENE	10	200 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	200 U	UG/L
FLUORANTHENE	10	200 U	UG/L
FLUORENE	10	200 U	UG/L
HEXACHLOROBENZENE	10	200 U	UG/L
HEXACHLOROBUTADIENE	10	200 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	200 U	UG/L
HEXACHLOROETHANE	10	200 U	UG/L
ISOPHORONE	10	200 U	UG/L
2-METHYLNAPHTHALENE	10	200 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-002

Date Sampled : 08/14/00 16:15 **Order #:** 401573 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 0

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/12/00			
ANALYTICAL DILUTION: 20.00			
4,6-DINITRO-2-METHYLPHENOL	25	500 U	UG/L
4-CHLORO-3-METHYLPHENOL	10	200 U	UG/L
2-METHYLPHENOL	10	31 J	UG/L
4-METHYLPHENOL	10	920 D	UG/L
NAPHTHALENE	10	200 U	UG/L
2-NITROANILINE	25	500 U	UG/L
3-NITROANILINE	25	500 U	UG/L
4-NITROANILINE	25	500 U	UG/L
NITROBENZENE	10	200 U	UG/L
2-NITROPHENOL	10	200 U	UG/L
4-NITROPHENOL	25	500 U	UG/L
N-NITROSODIPHENYLAMINE	10	200 U	UG/L
DI-N-OCTYL PHTHALATE	10	200 U	UG/L
PENTACHLOROPHENOL	25	500 U	UG/L
PHENANTHRENE	10	200 U	UG/L
PHENOL	10	180 J	UG/L
4-BROMOPHENYL-PHENYLETHER	10	200 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	200 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	200 U	UG/L
PYRENE	10	200 U	UG/L
2,4,6-TRICHLOROPHENOL	10	200 U	UG/L
2,4,5-TRICHLOROPHENOL	25	500 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141 %)	D	%
NITROBENZENE-d5	(35 - 114 %)	D	%
PHENOL-d6	(10 - 94 %)	D	%
2-FLUOROBIPHENYL	(43 - 116 %)	D	%
2-FLUOROPHENOL	(21 - 110 %)	D	%
2,4,6-TRIBROMOPHENOL	(10 - 123 %)	D	%

301465

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-003

Date Sampled : 08/14/00 16:30 **Order #:** 401574 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.0			
ACENAPHTHENE	10	10 U	UG/L
ACENAPHTHYLENE	10	10 U	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	10 U	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	10 U	UG/L
BENZO(A)PYRENE	10	10 U	UG/L
BENZO(B)FLUORANTHENE	10	10 U	UG/L
BENZO(G,H,I)PERYLENE	10	10 U	UG/L
BENZO(K)FLUORANTHENE	10	10 U	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	10 U	UG/L
DI-N-BUTYLPHTHALATE	10	1.9 J	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	10 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	10 U	UG/L
4-CHLOROANILINE	10	10 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	10 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	10 U	UG/L
2-CHLORONAPHTHALENE	10	10 U	UG/L
2-CHLOROPHENOL	10	10 U	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	10 U	UG/L
CHRYSENE	10	10 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	10 U	UG/L
DIBENZOFURAN	10	10 U	UG/L
3,3'-DICHLOROBENZIDINE	10	10 U	UG/L
2,4-DICHLOROPHENOL	10	10 U	UG/L
DIETHYLPHTHALATE	10	10 U	UG/L
DIMETHYL PHTHALATE	10	10 U	UG/L
2,4-DIMETHYLPHENOL	10	3.6 J	UG/L
2,4-DINITROPHENOL	25	25 U	UG/L
2,4-DINITROTOLUENE	10	10 U	UG/L
2,6-DINITROTOLUENE	10	10 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	10 U	UG/L
FLUORANTHENE	10	10 U	UG/L
FLUORENE	10	10 U	UG/L
HEXACHLOROBENZENE	10	10 U	UG/L
HEXACHLOROBUTADIENE	10	10 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	10 U	UG/L
HEXACHLOROETHANE	10	10 U	UG/L
ISOPHORONE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-003

Date Sampled : 08/14/00 16:30 **Order #:** 401574 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.0			
2-METHYLNAPHTHALENE	10	10 U	UG/L
4,6-DINITRO-2-METHYLPHENOL	25	25 U	UG/L
4-CHLORO-3-METHYLPHENOL	10	10 U	UG/L
2-METHYLPHENOL	10	33	UG/L
4-METHYLPHENOL	10	950 E	UG/L
NAPHTHALENE	10	7.4 J	UG/L
2-NITROANILINE	25	25 U	UG/L
3-NITROANILINE	25	25 U	UG/L
4-NITROANILINE	25	25 U	UG/L
NITROBENZENE	10	10 U	UG/L
2-NITROPHENOL	10	10 U	UG/L
4-NITROPHENOL	25	25 U	UG/L
N-NITROSODIPHENYLAMINE	10	10 U	UG/L
DI-N-OCTYL PHTHALATE	10	10 U	UG/L
PENTACHLOROPHENOL	25	25 U	UG/L
PHENANTHRENE	10	10 U	UG/L
PHENOL	10	150	UG/L
4-BROMOPHENYL-PHENYLETHER	10	10 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	10 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	10 U	UG/L
PYRENE	10	10 U	UG/L
2,4,6-TRICHLOROPHENOL	10	10 U	UG/L
2,4,5-TRICHLOROPHENOL	25	25 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141)	67	%
NITROBENZENE-d5	(35 - 114)	86	%
PHENOL-d6	(10 - 94)	27	%
2-FLUOROBIPHENYL	(43 - 116)	88	%
2-FLUOROPHENOL	(21 - 110)	33	%
2,4,6-TRIBROMOPHENOL	(10 - 123)	72	%

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-003

Date Sampled : 08/14/00 16:30 **Order #:** 401574 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 0

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/12/00			
ANALYTICAL DILUTION: 20.00			
ACENAPHTHENE	10	200 U	UG/L
ACENAPHTHYLENE	10	200 U	UG/L
ACETOPHENONE	10	200 U	UG/L
ANTHRACENE	10	200 U	UG/L
ATRAZINE	10	200 U	UG/L
BENZALDEHYDE	10	200 U	UG/L
BENZO(A)ANTHRACENE	10	200 U	UG/L
BENZO(A)PYRENE	10	200 U	UG/L
BENZO(B)FLUORANTHENE	10	200 U	UG/L
BENZO(G,H,I)PERYLENE	10	200 U	UG/L
BENZO(K)FLUORANTHENE	10	200 U	UG/L
1,1'-BIPHENYL	10	200 U	UG/L
BUTYL BENZYL PHTHALATE	10	200 U	UG/L
DI-N-BUTYLPHTHALATE	10	200 U	UG/L
CAPROLACTAM	10	200 U	UG/L
CARBAZOLE	10	200 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	200 U	UG/L
4-CHLOROANILINE	10	200 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	200 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	200 U	UG/L
2-CHLORONAPHTHALENE	10	200 U	UG/L
2-CHLOROPHENOL	10	200 U	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	200 U	UG/L
CHRYSENE	10	200 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	200 U	UG/L
DIBENZOFURAN	10	200 U	UG/L
3,3'-DICHLOROBENZIDINE	10	200 U	UG/L
2,4-DICHLOROPHENOL	10	200 U	UG/L
DIETHYLPHTHALATE	10	200 U	UG/L
DIMETHYL PHTHALATE	10	200 U	UG/L
2,4-DIMETHYLPHENOL	10	200 U	UG/L
2,4-DINITROPHENOL	25	500 U	UG/L
2,4-DINITROTOLUENE	10	200 U	UG/L
2,6-DINITROTOLUENE	10	200 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	200 U	UG/L
FLUORANTHENE	10	200 U	UG/L
FLUORENE	10	200 U	UG/L
HEXACHLOROBENZENE	10	200 U	UG/L
HEXACHLOROBUTADIENE	10	200 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	200 U	UG/L
HEXACHLOROETHANE	10	200 U	UG/L
ISOPHORONE	10	200 U	UG/L
2-METHYLNAPHTHALENE	10	200 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-003

Date Sampled : 08/14/00 16:30 **Order #:** 401574 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run** 0

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/12/00			
ANALYTICAL DILUTION: 20.00			
4,6-DINITRO-2-METHYLPHENOL	25	500 U	UG/L
4-CHLORO-3-METHYLPHENOL	10	200 U	UG/L
2-METHYLPHENOL	10	26 J	UG/L
4-METHYLPHENOL	10	780 D	UG/L
NAPHTHALENE	10	200 U	UG/L
2-NITROANILINE	25	500 U	UG/L
3-NITROANILINE	25	500 U	UG/L
4-NITROANILINE	25	500 U	UG/L
NITROBENZENE	10	200 U	UG/L
2-NITROPHENOL	10	200 U	UG/L
4-NITROPHENOL	25	500 U	UG/L
N-NITROSODIPHENYLAMINE	10	200 U	UG/L
DI-N-OCTYL PHTHALATE	10	200 U	UG/L
PENTACHLOROPHENOL	25	500 U	UG/L
PHENANTHRENE	10	200 U	UG/L
PHENOL	10	140 J	UG/L
4-BROMOPHENYL-PHENYLETHER	10	200 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	200 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	200 U	UG/L
PYRENE	10	200 U	UG/L
2,4,6-TRICHLOROPHENOL	10	200 U	UG/L
2,4,5-TRICHLOROPHENOL	25	500 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141 %)	D	%
NITROBENZENE-d5	(35 - 114 %)	D	%
PHENOL-d6	(10 - 94 %)	D	%
2-FLUOROBIPHENYL	(43 - 116 %)	D	%
2-FLUOROPHENOL	(21 - 110 %)	D	%
2,4,6-TRIBROMOPHENOL	(10 - 123 %)	D	%

301469

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-004

Date Sampled : 08/14/00 17:25 **Order #:** 401575 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 55144

DATE EXTRACTED : 08/17/00
DATE ANALYZED : 09/08/00
ANALYTICAL DILUTION: 1.0

ANALYTE	PQL	RESULT	UNITS
ACENAPHTHENE	10	10 U	UG/L
ACENAPHTHYLENE	10	10 U	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	10 U	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	10 U	UG/L
BENZO(A)PYRENE	10	10 U	UG/L
BENZO(B)FLUORANTHENE	10	10 U	UG/L
BENZO(G,H,I)PERYLENE	10	10 U	UG/L
BENZO(K)FLUORANTHENE	10	10 U	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	10 U	UG/L
DI-N-BUTYLPHTHALATE	10	2.9 J	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	10 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	10 U	UG/L
4-CHLOROANILINE	10	10 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	10 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	10 U	UG/L
2-CHLORONAPHTHALENE	10	10 U	UG/L
2-CHLOROPHENOL	10	10 U	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	10 U	UG/L
CHRYSENE	10	10 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	10 U	UG/L
DIBENZOFURAN	10	10 U	UG/L
3,3'-DICHLOROBENZIDINE	10	10 U	UG/L
2,4-DICHLOROPHENOL	10	10 U	UG/L
DIETHYLPHTHALATE	10	10 U	UG/L
DIMETHYL PHTHALATE	10	10 U	UG/L
2,4-DIMETHYLPHENOL	10	10 U	UG/L
2,4-DINITROPHENOL	25	25 U	UG/L
2,4-DINITROTOLUENE	10	10 U	UG/L
2,6-DINITROTOLUENE	10	10 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	10 U	UG/L
FLUORANTHENE	10	10 U	UG/L
FLUORENE	10	10 U	UG/L
HEXACHLOROBENZENE	10	10 U	UG/L
HEXACHLOROBUTADIENE	10	10 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	10 U	UG/L
HEXACHLOROETHANE	10	10 U	UG/L
ISOPHORONE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-004

Date Sampled : 08/14/00 17:25 **Order #:** 401575 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.0			
2-METHYLNAPHTHALENE	10	10 U	UG/L
4,6-DINITRO-2-METHYLPHENOL	25	25 U	UG/L
4-CHLORO-3-METHYLPHENOL	10	10 U	UG/L
2-METHYLPHENOL	10	1.9 J	UG/L
4-METHYLPHENOL	10	8.8 J	UG/L
NAPHTHALENE	10	1.4 J	UG/L
2-NITROANILINE	25	25 U	UG/L
3-NITROANILINE	25	25 U	UG/L
4-NITROANILINE	25	25 U	UG/L
NITROBENZENE	10	10 U	UG/L
2-NITROPHENOL	10	10 U	UG/L
4-NITROPHENOL	25	25 U	UG/L
N-NITROSODIPHENYLAMINE	10	10 U	UG/L
DI-N-OCTYL PHTHALATE	10	10 U	UG/L
PENTACHLOROPHENOL	25	25 U	UG/L
PHENANTHRENE	10	10 U	UG/L
PHENOL	10	4.5 J	UG/L
4-BROMOPHENYL-PHENYLETHER	10	10 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	10 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	10 U	UG/L
PYRENE	10	10 U	UG/L
2,4,6-TRICHLOROPHENOL	10	10 U	UG/L
2,4,5-TRICHLOROPHENOL	25	25 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141)	68	%
NITROBENZENE-d5	(35 - 114)	84	%
PHENOL-d6	(10 - 94)	25	%
2-FLUOROBIPHENYL	(43 - 116)	85	%
2-FLUOROPHENOL	(21 - 110)	32	%
2,4,6-TRIBROMOPHENOL	(10 - 123)	65	%

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-005

Date Sampled : 08/14/00 18:30 **Order #:** 401576 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.0			
ACENAPHTHENE	10	10 U	UG/L
ACENAPHTHYLENE	10	10 U	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	10 U	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	10 U	UG/L
BENZO(A)PYRENE	10	10 U	UG/L
BENZO(B)FLUORANTHENE	10	10 U	UG/L
BENZO(G,H,I)PERYLENE	10	10 U	UG/L
BENZO(K)FLUORANTHENE	10	10 U	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	10 U	UG/L
DI-N-BUTYLPHTHALATE	10	1.5 J	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	10 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	10 U	UG/L
4-CHLOROANILINE	10	10 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	10 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	10 U	UG/L
2-CHLORONAPHTHALENE	10	10 U	UG/L
2-CHLOROPHENOL	10	2.1 J	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	10 U	UG/L
CHRYSENE	10	10 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	10 U	UG/L
DIBENZOFURAN	10	10 U	UG/L
3,3'-DICHLOROBENZIDINE	10	10 U	UG/L
2,4-DICHLOROPHENOL	10	10 U	UG/L
DIETHYLPHTHALATE	10	10 U	UG/L
DIMETHYL PHTHALATE	10	10 U	UG/L
2,4-DIMETHYLPHENOL	10	10 U	UG/L
2,4-DINITROPHENOL	25	25 U	UG/L
2,4-DINITROTOLUENE	10	10 U	UG/L
2,6-DINITROTOLUENE	10	10 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	10 U	UG/L
FLUORANTHENE	10	10 U	UG/L
FLUORENE	10	10 U	UG/L
HEXACHLOROBENZENE	10	10 U	UG/L
HEXACHLOROBUTADIENE	10	10 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	10 U	UG/L
HEXACHLOROETHANE	10	10 U	UG/L
ISOPHORONE	10	10 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Geomatrix Consultants Inc.
Project Reference: PETER COOPER SITE
Client Sample ID : 081400-005

Date Sampled : 08/14/00 18:30 **Order #:** 401576 **Sample Matrix:** WATER
Date Received: 08/15/00 **Submission #:** R2003355 **Analytical Run:** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.0			
2-METHYLNAPHTHALENE	10	10 U	UG/L
4,6-DINITRO-2-METHYLPHENOL	25	25 U	UG/L
4-CHLORO-3-METHYLPHENOL	10	10 U	UG/L
2-METHYLPHENOL	10	10 U	UG/L
4-METHYLPHENOL	10	10 U	UG/L
NAPHTHALENE	10	2.6 J	UG/L
2-NITROANILINE	25	25 U	UG/L
3-NITROANILINE	25	25 U	UG/L
4-NITROANILINE	25	25 U	UG/L
NITROBENZENE	10	10 U	UG/L
2-NITROPHENOL	10	10 U	UG/L
4-NITROPHENOL	25	25 U	UG/L
N-NITROSODIPHENYLAMINE	10	10 U	UG/L
DI-N-OCTYL PHTHALATE	10	10 U	UG/L
PENTACHLOROPHENOL	25	25 U	UG/L
PHENANTHRENE	10	10 U	UG/L
PHENOL	10	10 U	UG/L
4-BROMOPHENYL-PHENYLETHER	10	10 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	10 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	10 U	UG/L
PYRENE	10	10 U	UG/L
2,4,6-TRICHLOROPHENOL	10	10 U	UG/L
2,4,5-TRICHLOROPHENOL	25	25 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141)	90	%
NITROBENZENE-d5	(35 - 114)	89	%
PHENOL-d6	(10 - 94)	22	%
2-FLUOROBIPHENYL	(43 - 116)	85	%
2-FLUOROPHENOL	(21 - 110)	35	%
2,4,6-TRIBROMOPHENOL	(10 - 123)	33	%

QUALITY CONTROL SUMMARY MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
WATER

Spiked Order No. : 401572 Geomatrix Consultants Inc.

Client ID: 081400-001

Test: 8270C SEMIVOLATILES

Analytical Units: UG/L

Run Number : 55144

ANALYTE	SPIKE ADDED	SAMPLE CONCENT.	MATRIX SPIKE FOUND	MATRIX SPIKE % REC.	MATRIX SPIKE DUP. FOUND	MATRIX SPIKE DUP. % REC.	MATRIX SPIKE DUP. RPD	QC LIMITS RPD	QC LIMITS REC.
ACENAPHTHENE	100	0	68.0	68	77.0	77	12	19	31 - 137
2-CHLOROPHENOL	200	0	66.0	33	75.0	38	13	50	25 - 102
2,4-DINITROTOLUENE	100	0	87.0	87	94.0	94	8	38	28 - 89
4-CHLORO-3-METHYLPHENOL	200	0	87.0	44	92.0	46	6	33	26 - 103
4-NITROPHENOL	200	0	43.0	22	37.0	19	15	50	11 - 114
PENTACHLOROPHENOL	200	0	60.0	30	12.0	6*	133*	47	17 - 109
PHENOL	200	0	48.0	24*	46.0	23*	4	35	26 - 90
N-NITROSO-DI-N-PROPYLAMINE	100	0	58.0	58	67.0	67	14	38	41 - 126
PYRENE	100	0	92.0	92	95.0	95	3	36	35 - 142

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Project Reference:
Client Sample ID : MATRIX SPIKE

Date Sampled :
Date Received:
Order #: 407785
Submission #:
Sample Matrix: WATER
Analytical Run 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.00			
ACENAPHTHENE	10	68	UG/L
ACENAPHTHYLENE	10	72	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	80	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	86	UG/L
BENZO(A)PYRENE	10	82	UG/L
BENZO(B)FLUORANTHENE	10	81	UG/L
BENZO(G,H,I)PERYLENE	10	88	UG/L
BENZO(K)FLUORANTHENE	10	86	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	84	UG/L
DI-N-BUTYLPHTHALATE	10	85	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	76	UG/L
INDENO(1,2,3-CD)PYRENE	10	54	UG/L
4-CHLOROANILINE	10	65	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	60	UG/L
BIS(2-CHLOROETHYL)ETHER	10	52	UG/L
2-CHLORONAPHTHALENE	10	66	UG/L
2-CHLOROPHENOL	10	66	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	32	UG/L
CHRYSENE	10	86	UG/L
DIBENZO(A,H)ANTHRACENE	10	89	UG/L
DIBENZOFURAN	10	74	UG/L
3,3'-DICHLOROBENZIDINE	10	66	UG/L
2,4-DICHLOROPHENOL	10	77	UG/L
DIETHYLPHTHALATE	10	82	UG/L
DIMETHYL PHTHALATE	10	78	UG/L
2,4-DIMETHYLPHENOL	10	75	UG/L
2,4-DINITROPHENOL	25	62	UG/L
2,4-DINITROTOLUENE	10	87	UG/L
2,6-DINITROTOLUENE	10	81	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	82	UG/L
FLUORANTHENE	10	80	UG/L
FLUORENE	10	78	UG/L
HEXACHLOROBENZENE	10	82	UG/L
HEXACHLOROBUTADIENE	10	57	UG/L
HEXACHLOROCYCLOPENTADIENE	10	10 U	UG/L
HEXACHLOROETHANE	10	38	UG/L
ISOPHORONE	10	66	UG/L
2-METHYLNAPHTHALENE	10	65	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Project Reference:
Client Sample ID : MATRIX SPIKE

Date Sampled :	Order #: 407785	Sample Matrix: WATER
Date Received:	Submission #:	Analytical Run 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.00			
4,6-DINITRO-2-METHYLPHENOL	25	76	UG/L
4-CHLORO-3-METHYLPHENOL	10	87	UG/L
2-METHYLPHENOL	10	65	UG/L
4-METHYLPHENOL	10	70	UG/L
NAPHTHALENE	10	57	UG/L
2-NITROANILINE	25	64	UG/L
3-NITROANILINE	25	76	UG/L
4-NITROANILINE	25	77	UG/L
NITROBENZENE	10	56	UG/L
2-NITROPHENOL	10	74	UG/L
4-NITROPHENOL	25	43	UG/L
N-NITROSODIPHENYLAMINE	10	74	UG/L
DI-N-OCTYL PHTHALATE	10	80	UG/L
PENTACHLOROPHENOL	25	60	UG/L
PHENANTHRENE	10	81	UG/L
PHENOL	10	48	UG/L
4-BROMOPHENYL-PHENYLETHER	10	80	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	82	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	58	UG/L
PYRENE	10	92	UG/L
2,4,6-TRICHLOROPHENOL	10	88	UG/L
2,4,5-TRICHLOROPHENOL	25	94	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141 %)	88	%
NITROBENZENE-d5	(35 - 114 %)	63	%
PHENOL-d6	(10 - 94 %)	35	%
2-FLUOROBIPHENYL	(43 - 116 %)	71	%
2-FLUOROPHENOL	(21 - 110 %)	34	%
2,4,6-TRIBROMOPHENOL	(10 - 123 %)	69	%

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Project Reference:
Client Sample ID : MATRIX SPIKE DUPLICATE

Date Sampled : Order #: 407786 Sample Matrix: WATER
Date Received: Submission #: Analytical Run 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.00			
ACENAPHTHENE	10	77	UG/L
ACENAPHTHYLENE	10	81	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	87	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	89	UG/L
BENZO(A)PYRENE	10	85	UG/L
BENZO(B)FLUORANTHENE	10	86	UG/L
BENZO(G,H,I)PERYLENE	10	93	UG/L
BENZO(K)FLUORANTHENE	10	90	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	89	UG/L
DI-N-BUTYLPHTHALATE	10	91	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	83	UG/L
INDENO(1,2,3-CD)PYRENE	10	51	UG/L
4-CHLOROANILINE	10	76	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	70	UG/L
BIS(2-CHLOROETHYL)ETHER	10	62	UG/L
2-CHLORONAPHTHALENE	10	72	UG/L
2-CHLOROPHENOL	10	75	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	39	UG/L
CHRYSENE	10	88	UG/L
DIBENZO(A,H)ANTHRACENE	10	93	UG/L
DIBENZOFURAN	10	82	UG/L
3,3'-DICHLOROBENZIDINE	10	82	UG/L
2,4-DICHLOROPHENOL	10	86	UG/L
DIETHYLPHTHALATE	10	85	UG/L
DIMETHYL PHTHALATE	10	70	UG/L
2,4-DIMETHYLPHENOL	10	88	UG/L
2,4-DINITROPHENOL	25	35	UG/L
2,4-DINITROTOLUENE	10	94	UG/L
2,6-DINITROTOLUENE	10	88	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	87	UG/L
FLUORANTHENE	10	85	UG/L
FLUORENE	10	85	UG/L
HEXACHLOROBENZENE	10	87	UG/L
HEXACHLOROBUTADIENE	10	69	UG/L
HEXACHLOROCYCLOPENTADIENE	10	10 U	UG/L
HEXACHLOROETHANE	10	50	UG/L
ISOPHORONE	10	74	UG/L
2-METHYLNAPHTHALENE	10	73	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Project Reference:
Client Sample ID : MATRIX SPIKE DUPLICATE

Date Sampled :	Order #: 407786	Sample Matrix: WATER
Date Received:	Submission #:	Analytical Run 55144

DATE EXTRACTED : 08/17/00
DATE ANALYZED : 09/08/00
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
4,6-DINITRO-2-METHYLPHENOL	25	67	UG/L
4-CHLORO-3-METHYLPHENOL	10	92	UG/L
2-METHYLPHENOL	10	72	UG/L
4-METHYLPHENOL	10	69	UG/L
NAPHTHALENE	10	67	UG/L
2-NITROANILINE	25	70	UG/L
3-NITROANILINE	25	81	UG/L
4-NITROANILINE	25	83	UG/L
NITROBENZENE	10	65	UG/L
2-NITROPHENOL	10	83	UG/L
4-NITROPHENOL	25	37	UG/L
N-NITROSODIPHENYLAMINE	10	84	UG/L
DI-N-OCTYL PHTHALATE	10	85	UG/L
PENTACHLOROPHENOL	25	25 U	UG/L
PHENANTHRENE	10	87	UG/L
PHENOL	10	46	UG/L
4-BROMOPHENYL-PHENYLETHER	10	88	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	88	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	67	UG/L
PYRENE	10	95	UG/L
2,4,6-TRICHLOROPHENOL	10	91	UG/L
2,4,5-TRICHLOROPHENOL	25	100	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141 %)	61	%
NITROBENZENE-d5	(35 - 114 %)	73	%
PHENOL-d6	(10 - 94 %)	33	%
2-FLUOROBIPHENYL	(43 - 116 %)	84	%
2-FLUOROPHENOL	(21 - 110 %)	39	%
2,4,6-TRIBROMOPHENOL	(10 - 123 %)	67	%

301478

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD: 8270C SEMIVOLATILES

LABORATORY REFERENCE SPIKE SUMMARY

REFERENCE ORDER #: 407788 ANALYTICAL RUN # : 55144

ANALYTE	TRUE VALUE	% RECOVERY	QC LIMITS
DATE ANALYZED : 9/ 8/2000			
ANALYTICAL DILUTION: 1.0			
ACENAPHTHENE	100	79	47 - 145
ACENAPHTHYLENE	100	82	33 - 145
ACETOPHENONE	100	NA	50 - 150
ANTHRACENE	100	93	27 - 133
ATRAZINE	100	NA	50 - 150
BENZALDEHYDE	100	NA	50 - 150
BENZO(A)ANTHRACENE	100	94	33 - 143
BENZO(A)PYRENE	100	90	17 - 163
BENZO(B)FLUORANTHENE	100	93	24 - 159
BENZO(G,H,I)PERYLENE	100	56	10 - 219
BENZO(K)FLUORANTHENE	100	93	11 - 162
1,1'-BIPHENYL	100	NA	50 - 150
BUTYL BENZYL PHTHALATE	100	80	10 - 152
DI-N-BUTYLPHTHALATE	100	85	10 - 118
CAPROLACTAM	100	NA	50 - 150
CARBAZOLE	100	87	10 - 160
INDENO(1,2,3-CD)PYRENE	100	60	10 - 171
4-CHLOROANILINE	100	82	10 - 160
BIS(-2-CHLOROETHOXY)METHANE	100	74	33 - 184
BIS(2-CHLOROETHYL)ETHER	100	67	12 - 158
2-CHLORONAPHTHALENE	100	76	60 - 118
2-CHLOROPHENOL	200	41	23 - 134
2,2'-OXYBIS(1-CHLOROPROPANE)	100	41	36 - 166
CHRYSENE	100	93	17 - 168
DIBENZO(A,H)ANTHRACENE	100	94	10 - 227
DIBENZOFURAN	100	85	10 - 160
3,3'-DICHLOROBENZIDINE	100	96	10 - 262
2,4-DICHLOROPHENOL	100	90	39 - 135
DIETHYLPHTHALATE	100	71	10 - 114
DIMETHYL PHTHALATE	100	37	10 - 112
2,4-DIMETHYLPHENOL	100	63	32 - 119
2,4-DINITROPHENOL	100	78	10 - 191
2,4-DINITROTOLUENE	100	99	39 - 139
2,6-DINITROTOLUENE	100	92	50 - 158
BIS(2-ETHYLHEXYL)PHTHALATE	100	85	10 - 158
FLUORANTHENE	100	97	26 - 137
FLUORENE	100	88	59 - 121
HEXACHLOROBENZENE	100	95	10 - 152
HEXACHLOROBUTADIENE	100	80	24 - 116
HEXACHLOROCYCLOPENTADIENE	100	53	10 - 110
HEXACHLOROETHANE	100	59	40 - 113

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD: 8270C SEMIVOLATILES

LABORATORY REFERENCE SPIKE SUMMARY

REFERENCE ORDER #: 407788 ANALYTICAL RUN # : 55144

ANALYTE	TRUE VALUE	% RECOVERY	QC LIMITS
DATE ANALYZED : 9/ 8/2000			
ANALYTICAL DILUTION: 1.0			
ISOPHORONE	100	81	21 - 196
2-METHYLNAPHTHALENE	100	75	10 - 160
4,6-DINITRO-2-METHYLPHENOL	100	89	10 - 181
4-CHLORO-3-METHYLPHENOL	200	44	22 - 147
2-METHYLPHENOL	100	70	10 - 160
4-METHYLPHENOL	100	68	10 - 160
NAPHTHALENE	100	70	21 - 133
2-NITROANILINE	100	72	10 - 160
3-NITROANILINE	100	85	10 - 160
4-NITROANILINE	100	86	10 - 160
NITROBENZENE	100	70	35 - 180
2-NITROPHENOL	100	88	29 - 182
4-NITROPHENOL	200	18	10 - 132
N-NITROSODIPHENYLAMINE	100	87	11 - 102
DI-N-OCTYL PHTHALATE	100	84	10 - 146
PENTACHLOROPHENOL	200	38	14 - 176
PHENANTHRENE	100	93	54 - 120
PHENOL	200	23	10 - 112
4-BROMOPHENYL-PHENYLETHER	100	93	53 - 127
4-CHLOROPHENYL-PHENYLETHER	100	93	25 - 158
N-NITROSO-DI-N-PROPYLAMINE	100	70	10 - 230
PYRENE	100	99	52 - 115
2,4,6-TRICHLOROPHENOL	100	89	37 - 144
2,4,5-TRICHLOROPHENOL	100	93	10 - 160

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Project Reference:
Client Sample ID : LABORATORY CONTROL SAMPLE

Date Sampled :
Date Received:
Order #: 407788
Submission #:
Sample Matrix: WATER
Analytical Run 55144

DATE EXTRACTED : 08/17/00
DATE ANALYZED : 09/08/00
ANALYTICAL DILUTION: 1.00

ANALYTE	PQL	RESULT	UNITS
ACENAPHTHENE	10	79	UG/L
ACENAPHTHYLENE	10	82	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	93	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	94	UG/L
BENZO(A)PYRENE	10	90	UG/L
BENZO(B)FLUORANTHENE	10	93	UG/L
BENZO(G,H,I)PERYLENE	10	56	UG/L
BENZO(K)FLUORANTHENE	10	93	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	80	UG/L
DI-N-BUTYLPHTHALATE	10	85	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	87	UG/L
INDENO(1,2,3-CD)PYRENE	10	60	UG/L
4-CHLOROANILINE	10	82	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	74	UG/L
BIS(2-CHLOROETHYL)ETHER	10	67	UG/L
2-CHLORONAPHTHALENE	10	76	UG/L
2-CHLOROPHENOL	10	82	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	41	UG/L
CHRYSENE	10	93	UG/L
DIBENZO(A,H)ANTHRACENE	10	94	UG/L
DIBENZOFURAN	10	85	UG/L
3,3'-DICHLOROBENZIDINE	10	96	UG/L
2,4-DICHLOROPHENOL	10	90	UG/L
DIETHYLPHTHALATE	10	71	UG/L
DIMETHYL PHTHALATE	10	37	UG/L
2,4-DIMETHYLPHENOL	10	63	UG/L
2,4-DINITROPHENOL	25	78	UG/L
2,4-DINITROTOLUENE	10	99	UG/L
2,6-DINITROTOLUENE	10	92	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	85	UG/L
FLUORANTHENE	10	97	UG/L
FLUORENE	10	88	UG/L
HEXACHLOROBENZENE	10	95	UG/L
HEXACHLOROBUTADIENE	10	80	UG/L
HEXACHLOROCYCLOPENTADIENE	10	53	UG/L
HEXACHLOROETHANE	10	59	UG/L
ISOPHORONE	10	81	UG/L
2-METHYLNAPHTHALENE	10	74	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Project Reference:
Client Sample ID : LABORATORY CONTROL SAMPLE

Date Sampled : Order #: 407788 Sample Matrix: WATER
Date Received: Submission #: Analytical Run 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.00			
4,6-DINITRO-2-METHYLPHENOL	25	89	UG/L
4-CHLORO-3-METHYLPHENOL	10	89	UG/L
2-METHYLPHENOL	10	70	UG/L
4-METHYLPHENOL	10	68	UG/L
NAPHTHALENE	10	70	UG/L
2-NITROANILINE	25	72	UG/L
3-NITROANILINE	25	85	UG/L
4-NITROANILINE	25	86	UG/L
NITROBENZENE	10	70	UG/L
2-NITROPHENOL	10	88	UG/L
4-NITROPHENOL	25	35	UG/L
N-NITROSODIPHENYLAMINE	10	87	UG/L
DI-N-OCTYL PHTHALATE	10	84	UG/L
PENTACHLOROPHENOL	25	76	UG/L
PHENANTHRENE	10	93	UG/L
PHENOL	10	47	UG/L
4-BROMOPHENYL-PHENYLETHER	10	93	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	93	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	70	UG/L
PYRENE	10	99	UG/L
2,4,6-TRICHLOROPHENOL	10	89	UG/L
2,4,5-TRICHLOROPHENOL	25	93	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141 %)	101	%
NITROBENZENE-d5	(35 - 114 %)	79	%
PHENOL-d6	(10 - 94 %)	32	%
2-FLUOROBIPHENYL	(43 - 116 %)	85	%
2-FLUOROPHENOL	(21 - 110 %)	43	%
2,4,6-TRIBROMOPHENOL	(10 - 123 %)	74	%

4B

SEMIVOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK1

Lab Name: Columbia Analytical Services Contract: GEOMATRI

Lab Code: 10145 Case No.: R200335 SAS No.: . SDG No.: 081400-00

Lab File ID: BC796.D Lab Sample ID: 407787

Instrument ID: HP5973-B Date Extracted: 8/17/00

Matrix: (soil/water) WATER Date Analyzed: 9/8/00

Level: (low/med) LOW Time Analyzed: 17:13

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	SBLK1MS	407788	BC797.D	9/8/00
02	081400-001	401572	BC798.D	9/8/00
03	081400-001MS	407785	BC799.D	9/8/00
04	08140-001MSD	407786	BC800.D	9/8/00
05	081400-002	401573	BC801.D	9/8/00
06	081400-003	401574	BC802.D	9/8/00
07	081400-004	401575	BC803.D	9/8/00
08	081400-005	401576	BC804.D	9/8/00
09	081400-002DL	401573 1/20	BC817.D	9/12/00
10	081400-003DL	401574 1/20	BC818.D	9/12/00

COMMENTS:

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Project Reference:
Client Sample ID : METHOD BLANK

Date Sampled : **Order #:** 407787 **Sample Matrix:** WATER
Date Received: **Submission #:** **Analytical Run** 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.00			
ACENAPHTHENE	10	10 U	UG/L
ACENAPHTHYLENE	10	10 U	UG/L
ACETOPHENONE	10	10 U	UG/L
ANTHRACENE	10	10 U	UG/L
ATRAZINE	10	10 U	UG/L
BENZALDEHYDE	10	10 U	UG/L
BENZO(A)ANTHRACENE	10	10 U	UG/L
BENZO(A)PYRENE	10	10 U	UG/L
BENZO(B)FLUORANTHENE	10	10 U	UG/L
BENZO(G,H,I)PERYLENE	10	10 U	UG/L
BENZO(K)FLUORANTHENE	10	10 U	UG/L
1,1'-BIPHENYL	10	10 U	UG/L
BUTYL BENZYL PHTHALATE	10	10 U	UG/L
DI-N-BUTYLPHTHALATE	10	10 U	UG/L
CAPROLACTAM	10	10 U	UG/L
CARBAZOLE	10	10 U	UG/L
INDENO(1,2,3-CD)PYRENE	10	10 U	UG/L
4-CHLOROANILINE	10	10 U	UG/L
BIS(-2-CHLOROETHOXY)METHANE	10	10 U	UG/L
BIS(2-CHLOROETHYL)ETHER	10	10 U	UG/L
2-CHLORONAPHTHALENE	10	10 U	UG/L
2-CHLOROPHENOL	10	10 U	UG/L
2,2'-OXYBIS(1-CHLOROPROPANE)	10	10 U	UG/L
CHRYSENE	10	10 U	UG/L
DIBENZO(A,H)ANTHRACENE	10	10 U	UG/L
DIBENZOFURAN	10	10 U	UG/L
3,3'-DICHLOROBENZIDINE	10	10 U	UG/L
2,4-DICHLOROPHENOL	10	10 U	UG/L
DIETHYLPHTHALATE	10	10 U	UG/L
DIMETHYL PHTHALATE	10	10 U	UG/L
2,4-DIMETHYLPHENOL	10	10 U	UG/L
2,4-DINITROPHENOL	25	25 U	UG/L
2,4-DINITROTOLUENE	10	10 U	UG/L
2,6-DINITROTOLUENE	10	10 U	UG/L
BIS(2-ETHYLHEXYL)PHTHALATE	10	10 U	UG/L
FLUORANTHENE	10	10 U	UG/L
FLUORENE	10	10 U	UG/L
HEXACHLOROBENZENE	10	10 U	UG/L
HEXACHLOROBUTADIENE	10	10 U	UG/L
HEXACHLOROCYCLOPENTADIENE	10	10 U	UG/L
HEXACHLOROETHANE	10	10 U	UG/L
ISOPHORONE	10	10 U	UG/L
2-METHYLNAPHTHALENE	10	10 U	UG/L
4,6-DINITRO-2-METHYLPHENOL	25	25 U	UG/L

COLUMBIA ANALYTICAL SERVICES

EXTRACTABLE ORGANICS
METHOD 8270C SEMIVOLATILES
Reported: 09/27/00

Project Reference:
Client Sample ID : METHOD BLANK

Date Sampled :	Order #: 407787	Sample Matrix: WATER
Date Received:	Submission #:	Analytical Run 55144

ANALYTE	PQL	RESULT	UNITS
DATE EXTRACTED : 08/17/00			
DATE ANALYZED : 09/08/00			
ANALYTICAL DILUTION: 1.00			
4-CHLORO-3-METHYLPHENOL	10	10 U	UG/L
2-METHYLPHENOL	10	10 U	UG/L
4-METHYLPHENOL	10	10 U	UG/L
NAPHTHALENE	10	10 U	UG/L
2-NITROANILINE	25	25 U	UG/L
3-NITROANILINE	25	25 U	UG/L
4-NITROANILINE	25	25 U	UG/L
NITROBENZENE	10	10 U	UG/L
2-NITROPHENOL	10	10 U	UG/L
4-NITROPHENOL	25	25 U	UG/L
N-NITROSODIPHENYLAMINE	10	10 U	UG/L
DI-N-OCTYL PHTHALATE	10	10 U	UG/L
PENTACHLOROPHENOL	25	25 U	UG/L
PHENANTHRENE	10	10 U	UG/L
PHENOL	10	10 U	UG/L
4-BROMOPHENYL-PHENYLETHER	10	10 U	UG/L
4-CHLOROPHENYL-PHENYLETHER	10	10 U	UG/L
N-NITROSO-DI-N-PROPYLAMINE	10	10 U	UG/L
PYRENE	10	10 U	UG/L
2,4,6-TRICHLOROPHENOL	10	10 U	UG/L
2,4,5-TRICHLOROPHENOL	25	25 U	UG/L

SURROGATE RECOVERIES	QC LIMITS		
TERPHENYL-d14	(33 - 141 %)	105	%
NITROBENZENE-d5	(35 - 114 %)	78	%
PHENOL-d6	(10 - 94 %)	30	%
2-FLUOROBIPHENYL	(43 - 116 %)	68	%
2-FLUOROPHENOL	(21 - 110 %)	41	%
2,4,6-TRIBROMOPHENOL	(10 - 123 %)	59	%

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: Columbia Analytical Services Contract: GEOMATRIX

Lab Code: 10145 Case No.: R200335 SAS No.: SDG No.: 081400-00

Lab File ID (Standard): BC788.D Date Analyzed: 9/8/00

Instrument ID: HP5973-B Time Analyzed: 12:15

		IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
	12 HOUR STD	71757	5.62	285053	7.37	164181	10.59
	UPPER LIMIT	143514	6.12	570106	7.87	328362	11.09
	LOWER LIMIT	35879	5.12	142527	6.87	82091	10.09
	EPA SAMPLE NO.						
01	SBLK1	66572	5.62	237028	7.37	146273	10.59
02	SBLK1MS	67818	5.62	259786	7.37	148657	10.58
03	081400-001	69024	5.62	264024	7.37	150820	10.59
04	081400-001MS	70705	5.62	282591	7.37	167008	10.59
05	08140-001MSD	73634	5.62	289710	7.37	166663	10.59
06	081400-002	68419	5.62	278540	7.37	159994	10.59
07	081400-003	65973	5.62	268843	7.37	150611	10.59
08	081400-004	64555	5.62	250651	7.37	148038	10.59
09	081400-005	57751	5.62	211119	7.37	125142	10.58

IS1 (DCB) = d4-1,4-Dichlorobenzene
IS2 (NPT) = d8-Naphthalene
IS3 (ANT) = d10-Acenaphthene
IS4 (PHN) = d10-Phenanthrene
IS5 (CRY) = d12-Chrysene
IS6 (PRY) = d12-Perylene

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.
* Values outside of contract required QC limits

8C

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: Columbia Analytical Services Contract: GEOMATRIX

Lab Code: 10145 Case No.: R200335 SAS No.: SDG No.: 081400-00

Lab File ID (Standard): BC788.D Date Analyzed: 09/08/00

Instrument ID: HP5973-B Time Analyzed: 12:15

		IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
	12 HOUR STD	312421	13.66	335869	19.54	303929	23.07
	UPPER LIMIT	624842	14.16	671738	20.04	607858	23.57
	LOWER LIMIT	156210	13.16	167934	19.04	151964	22.57
	EPA SAMPLE NO.						
01	SBLK1	274569	13.66	271441	19.53	260788	23.06
02	SBLK1MS	273703	13.66	283126	19.54	269835	23.06
03	081400-001	293911	13.67	289894	19.54	263458	23.07
04	081400-001M	322265	13.67	299206	19.55	275045	23.07
05	08140-001MS	309849	13.67	294979	19.55	270823	23.07
06	081400-002	299386	13.67	292010	19.54	262544	23.07
07	081400-003	292932	13.66	281973	19.54	253140	23.07
08	081400-004	272199	13.67	280698	19.54	256033	23.07
09	081400-005	245374	13.66	263060	19.54	243019	23.06

IS1 (DCB) = d4-1,4-Dichlorobenzene
IS2 (NPT) = d8-Naphthalene
IS3 (ANT) = d10-Acenaphthene
IS4 (PHN) = d10-Phenanthrene
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AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.
* Values outside of contract required QC limits

8B

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: Columbia Analytical Services Contract: GEOMATRIX

Lab Code: 10145 Case No.: R200335 SAS No.: SDG No.: 081400-00

Lab File ID (Standard): BC812.D Date Analyzed: 9/12/00

Instrument ID: HP5973-B Time Analyzed: 15:26

		IS1(DCB) AREA #	RT #	IS2(NPT) AREA #	RT #	IS3(ANT) AREA #	RT #
	12 HOUR STD	57010	5.58	214933	7.32	110099	10.52
	UPPER LIMIT	114020	6.08	429866	7.82	220198	11.02
	LOWER LIMIT	28505	5.08	107467	6.82	55050	10.02
	EPA SAMPLE NO.						
01	081400-002DL	52332	5.58	198518	7.32	105183	10.51
02	081400-003DL	52085	5.58	200386	7.32	104691	10.52

IS1 (DCB) = d4-1,4-Dichlorobenzene
IS2 (NPT) = d8-Naphthalene
IS3 (ANT) = d10-Acenaphthene
IS4 (PHN) = d10-Phenanthrene
IS5 (CRY) = d12-Chrysene
IS6 (PRY) = d12-Perylene

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.

* Values outside of contract required QC limits

8C

SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: Columbia Analytical Services Contract: GEOMATRIX

Lab Code: 10145 Case No.: R200335 SAS No.: SDG No.: 081400-00

Lab File ID (Standard): BC812.D Date Analyzed: 09/12/00

Instrument ID: HP5973-B Time Analyzed: 15:26

		IS4(PHN) AREA #	RT #	IS5(CRY) AREA #	RT #	IS6(PRY) AREA #	RT #
	12 HOUR STD	182215	13.59	193902	19.46	184813	22.93
	UPPER LIMIT	364430	13.09	387804	18.96	369626	22.43
	LOWER LIMIT	91108	14.09	96951	19.96	92407	23.43
	EPA SAMPLE NO.						
01	081400-002DL	172217	13.58	175181	19.44	171895	22.92
02	081400-003DL	172493	13.59	179267	19.45	172556	22.93

IS1 (DCB) = d4-1,4-Dichlorobenzene
IS2 (NPT) = d8-Naphthalene
IS3 (ANT) = d10-Acenaphthene
IS4 (PHN) = d10-Phenanthrene
IS5 (CRY) = d12-Chrysene
IS6 (PRY) = d12-Perylene

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = +0.50 minutes of internal standard RT
RT LOWER LIMIT = -0.50 minutes of internal standard RT

Column to be used to flag values outside QC limit with an asterisk.
* Values outside of contract required QC limits

APPENDIX G

APPENDIX G

Letter dated September 28, 2000 to U.S. EPA Regarding COPC Selection

338 Harris Hill Road, Suite 201
Williamsville, New York 14221
(716) 565-0624 • FAX (716) 565-0625

GEOMATRIX

September 28, 2000
5771.001

Ms. Sherrel Henry
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway – 20th Floor
New York, NY 10007-1866

Subject: Peter Cooper Site
Gowanda, New York
Administrative Order Index No. CERCLA-02-2000-2014

Dear Ms. Henry:

This letter summarizes the results of the initial groundwater sampling event at the Peter Cooper Site in Gowanda, New York to refine the list of constituents of potential concern (COPCs) of the Inactive Landfill Area. This activity was described in the Remedial Investigation/Feasibility Study Work Plan for the Inactive Landfill Area, Peter Cooper Site, Gowanda, New York (Work Plan), prepared by Geomatrix and Benchmark, revised March 2000, amended August, 2000.

On June 15, 2000, Geomatrix Consultants, Inc. (Geomatrix) conducted a groundwater monitoring well integrity program of the existing wells at the Inactive Landfill Area to determine the usability of each well for the Remedial Investigation. All wells were located to ascertain well integrity by evaluating the condition of the protective casing, access to the well, and quality of groundwater samples that would be collected from the well. An attempt was made to re-develop each well however, wells MW-2, MW-3, MW-4S, and MW-4D, were determined unusable for groundwater sample collection as a result of obstructions in the well or failure to produce adequate water. These four wells were abandoned and replaced during the week of July 10 – 14, 2000. The newly installed wells were subsequently developed. The groundwater monitoring well abandonment, installation, and development was conducted in accordance with the field operating procedures (FOPs) of the Quality Assurance Project Plan (QAPP), prepared by Geomatrix and Benchmark Environmental Engineering and Science, PLLC (Benchmark), Revised August 2000.

On August 14, 2000, four groundwater monitoring wells (MW-2S(R), MW-3, MW-4S, and MW-6) screened in or immediately below waste were sampled and analyzed to refine the list of COPCs defined in the Work Plan for the Inactive Landfill Area. Sampling was conducted in accordance with the FOPs of the QAPP. Groundwater samples were analyzed by Columbia Analytical Laboratory in Rochester, New York for target compound list volatile organic compounds (TCL VOCs), target compound list semi-volatile organic compounds (TCL SVOCs), and target analyte list (TAL) inorganics plus hexavalent chromium.

Analytical data packages were validated by a third party certified data validator (Data Validation Services). The data validation determined the data usable with minor qualifications and satisfied the data quality objectives. The data validation report is attached. The attached Table 1 summarizes the constituents detected in the groundwater samples. New York State Department of Environmental Conservation (NYSDEC) Class GA Groundwater Quality Standards or guidance values and EPA Region 9 preliminary remediation goals (PRGs) (groundwater criteria) are provided for comparison. VOCs were detected at 3 of the 4 well locations at concentrations above groundwater criteria. Chlorobenzene was detected in samples collected and analyzed from monitoring wells MW-4S(R) and MW-6 at concentrations of 68 and 200 ug/l, respectively. Benzene, 1,2-dichlorobenzene, 1,4-dichlorobenzene and toluene were also detected at concentrations exceeding groundwater criteria in at least one sample, but were present at very low concentrations and qualified by the laboratory.

As anticipated based on historic groundwater sample analytical results, acid extractable semi-volatile organic compounds were detected at elevated levels compared to historic background concentrations and groundwater criteria. Metals parameters detected at concentrations above groundwater criterion include: chromium, iron, magnesium, manganese, sodium, arsenic and hexavalent chromium.

The results of the initial groundwater sampling of monitoring wells screened in or below known landfill waste confirm the presence of acid extractable SVOCs and select metals in the groundwater. These results compare favorably with previous data used to define these compounds as COPCs at the Inactive Landfill Area. However, the initial groundwater sampling results also identified the presence of aromatic hydrocarbon VOCs above groundwater criteria (primarily chlorobenzene). Therefore, Geomatrix and Benchmark propose to add analysis for aromatic hydrocarbons by EPA Method 8021 to the list of analytes defined as COPCs for the Inactive Landfill Area of the Peter Cooper Site. Inclusion of aromatic hydrocarbons as COPCs satisfies the data quality objectives of the remedial investigation requiring an evaluation of the nature and extent of chemical constituents derived from the site. The VOC analyte list and the corresponding contract required quantitation limits (CRQLs) for water and soil matrices are presented in the following table.

PROPOSED ADDITIONAL COPC ANALYTES

Inactive Landfill Area Peter Cooper Site
Gowanda, New York

Aromatic Hydrocarbon VOC	CRQL Water (ug/l)	CRQL Soils (ug/kg)
Benzene	2	2
Ethylbenzene	2	2
Toluene	2	2
Total Xylene	2	2
Chlorobenzene	2	2
1,2-Dichlorobenzene	2	2
1,4-Dichlorobenzene	2	2

The revised COPC list for the Inactive Landfill Area presented in Table 4 of the QAPP is attached to this letter. Upon USEPA approval, the revised list of COPCs for the Inactive Landfill Area will include aromatic hydrocarbon VOCs.

Please contact either of the undersigned if you have questions.

Sincerely yours,
GEOMATRIX CONSULTANTS, INC.

Richard H. Frappa, P.G.
Senior Hydrogeologist

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

for
Thomas H. Forbes, P.E.
Project Manager

P:\Project\005771 PRP Group Peter Cooper NPL\letters\add VOCs memo.doc

Enclosure

cc: J. Wittenborn (Collier Shannon)
K. McMahon (Collier Shannon)
S. Davis (Huber Lawrence)
G. Shanahan (USEPA)(w/o Enclosure)
M. Graham (Phillips Lytle)
K. Hogan (Phillips Lytle)
J. Simone (NYSEG) (w/o Enclosure)

TABLE 1

ANALYTICAL RESULTS SUMMARY
INACTIVE LANDFILL AREA COPCS SAMPLING

Peter Cooper Site
Gowanda, New York

Constituent	Units	Groundwater Criteria [1]		Constituent Concentration				
		NYSDEC	Region 9	MW-4S(R)	MW-3	MW-3 DUP	MW-2S(R)	MW-6
Volatile Organic Compounds, EPA Method 8260B								
ACETONE	ug/l	50	610	12J	11J	11J		
BENZENE	ug/l	1	0.41					1.4J
CHLOROBENZENE	ug/l	5	110	68				200
1,2-DICHLOROBENZENE	ug/l	3	370	6.6J				
1,4-DICHLOROBENZENE	ug/l	3	0.5	4.0J				5.6J
ETHYLBENZENE	ug/l	5	1300		1.6J	1.9J		
2-HEXANONE	ug/l	50	--		3.0J			
4-METHYL-2-PENTANONE	ug/l	--	160		3.8J	4.8J		
TOLUENE	ug/l	5	720	2.8J	14	16	3.8J	
Semi-Volatile Organic Compounds, EPA Method 8270C								
DI-N-BUTYLPHTHALATE	ug/l	--	3600	1.4 J	1.8J	1.9J	2.9J	1.5J
2-CHLOROPHENOL	ug/l	--	30					2.1J
2,4-DIMETHYLPHENOL	ug/l	50	730		3.2J	3.6J		
4-CHLORO-3-METHYLPHENOL	ug/l	--	--		1.4J			
2-METHYLPHENOL	ug/l	--	1800		35	33	1.9J	
4-METHYLPHENOL	ug/l	--	180		920D	780D	8.8J	
NAPHTHALENE	ug/l	10	--	2.2J	7.7J	7.4J	1.4J	2.6J
PHENOL	ug/l	1	22000		200D	150	4.5J	
Metals, EPA Method 6010B								
ALUMINUM	mg/l	--	--	0.437	0.161	0.145	0.746	0.185
BARIUM	mg/l	1.0	2.6	0.237	0.154	0.152	0.279	0.258
CALCIUM	mg/l	--	--	180	117	117	158	176
CHROMIUM	mg/l	0.050	55	0.337	0.433	0.427	0.174	0.0368
IRON	mg/l	0.300	--	3.11	0.520	0.495	2.08	12.8
MAGNESIUM	mg/l	35.0	--	99.8	114	113	98.2	60.7
MANGANESE	mg/l	0.300	--	0.277	0.0665	0.0662	0.117	0.820
POTASSIUM	mg/l	--	--	10.6	4.65	4.38	5.92	5.58
SODIUM	mg/l	20.0	--	29.6	14.1	14.4	17.2	5.58
ZINC	mg/l	2.0	11	0.0248	0.0214		0.0356	0.0290
ARSENIC	mg/l	0.025	4.5E-05	0.115	0.0342	0.0328	0.163	0.0302
HEXAVALENT CHROMIUM	mg/l	0.050	0.110	0.104			0.103	

NOTES:

1. Groundwater criteria based on NYSDEC's "Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations", Reissued June 1998, for class GA groundwater and EPA Region 9 Preliminary Remediation Goals "Tap Water Value".
2. "--" indicates no groundwater criteria.
3. Blank cells indicates parameter not detected above method detection limit.
4. J values indicates an estimated value.
5. D values indicated spike diluted out.

TABLE 4

ANALYTICAL PROGRAM SUMMARY

Peter Cooper Site
Gowanda, New York

Sample Type/Location	Matrix	Parameter [1]	Quantity [2]	Container Type	Minimum Volume	Preservation (Cool to 4° >2 °C for all samples)	Holding Time from Sample Date
Inactive Landfill Area Groundwater	water	TAL Metals [3,4,5]	4	plastic	600 ml	HNO_3 to pH<2	6 months
		TCL VOCs	4	glass vial	2-40 ml	HCl to pH<2, Zero Headspace	14 days
(Preliminary Screening to develop COPCs)		TCL SVOCs	4	amber glass	2 liters	Cool to 4 ° < 2°C	14 days
Inactive Landfill Area Surface (20) and Subsurface (11)	soil	Aromatic Hydrocarbon VOCs[13]	31	EnCore Sampler		Cool to 4 ° <2 °C, Zero Headspace	14 days[12]
		Arsenic	31	glass	16 oz.	Cool to 4 ° < 2°C	6 months
		Chromium[7]	31	glass	16 oz.	Cool to 4 ° < 2°C	6 months
		Hex. Chromium[7]	31	glass	8 oz.	Cool to 4 ° < 2°C	24 hours[11]
		Zinc	31	glass	16 oz.	Cool to 4 ° < 2°C	6 months
		pH	31	glass	8 oz.	Cool to 4 ° < 2°C	24 hours
		TOC	31	glass	4 oz.	Cool to 4 ° < 2°C	28 days
Former Manufacturing Plant Area Surface (12) and Subsurface (12)	soil	TAL Metals [illegible]	24	glass	16 oz.	Cool to 4 ° < 2°C	6 months
		TCL VOCs[6]	24	EnCore Sampler		Cool to 4 ° <2 °C, Zero Headspace	14 days[12]
		TCL SVOCs[6]	24	glass	16 oz.	Cool to 4 ° < 2°C	6 months
		pH	24	glass	8 oz.	Cool to 4 ° < 2°C	24 hours
		TOC	24	glass	4 oz.	Cool to 4 ° < 2°C	28 days
Creek Surface Water (4) (2 sampling rounds)	water	TAL Metals [3,4,5]	8	plastic	600 ml	HNO_3 to pH<2	6 months
		Aromatic Hydrocarbon VOC's[13]	8	glass vial	2-40 ml	HCl to pH<2, Zero Headspace	14 days
		TCL SVOCs[6]	8	amber glass	2 liters	Cool to 4 ° < 2°C	14 days
		Alkalinity	8	plastic	100 ml	Cool to 4 ° < 2°C	14 days
		Alk (bi-carb)	8	plastic	100 ml	Cool to 4 ° < 2°C	14 days
		Alk (carb)	8	plastic	100 ml	Cool to 4 ° < 2°C	14 days
		Ammonia	8	plastic	500 ml	H_2SO_4 to pH<2	28 days
		Chloride	8	plastic	50 ml	Cool to 4 ° < 2°C	28 days
		DO	8	NA	NA	NA	NA
		DOC	8	amber glass	250 ml	Cool to 4 ° < 2°C	28 days
		ORP	8	NA	NA	NA	NA
		Total Hardness	8	plastic	100 ml	H_2SO_4 to pH<2	6 months
		Nitrate	8	plastic	100 ml	H_2SO_4 to pH<2	48 hours
		Sulfate	8	plastic	50 ml	Cool to 4 ° < 2°C	28 days
		Sulfide	8	plastic	500 ml	NaOH, 20 drops Zinc Acetate to pH>9, Cool to 4 °C	7 days
		Ferrous Iron	8[10]	plastic	8 oz.	Cool to 4 ° < 2°C	upon receipt
		TDS	8	plastic	100 ml	Cool to 4 ° < 2°C	7 days
		TKN	8	plastic	500 ml	H_2SO_4 to pH<2	28 days

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TABLE 4

ANALYTICAL PROGRAM SUMMARY

Sample Type/Location	Matrix	Parameter [1]	Quantity [2]	Container Type	Minimum Volume	Preservation (Cool to 4° ±2°C for all samples)	Holding Time from Sample Date
Creek Surface Water (4)	water	TSS	8	plastic	100 ml	Cool to 4° < 2°C	7 days
(continued)		TOC	8	plastic	(3) 40 ml	H_2SO_4 to pH<2	28 days
Seep Water	water	Aromatic Hydrocarbon VOCs[13]	6	glass vial	2-40 ml	HCl to pH<2, Zero Headspace	14 days
Inactive Landfill Area		SVOCs[4]	6	amber glass	2 liters	Cool to 4° < 2°C	14 days
(2 sampling rounds)		Arsenic[3][4]	6	plastic	600 ml	HNO_3 to pH<2	6 months
		Chromium[3][4]	6	plastic	600 ml	HNO_3 to pH<2	6 months
		Hex. Chromium[3][4]	6	plastic	400 ml	Cool to 4° < 2°C	24 hours
		Zinc[3][4]	6	plastic	600 ml	HNO_3 to pH<2	6 months
		Calcium[3]	6	plastic	600 ml	HNO_3 to pH<2	6 months
		Iron[3]	6	plastic	600 ml	HNO_3 to pH<2	6 months
		Potassium[3]	6	plastic	600 ml	HNO_3 to pH<2	6 months
		Magnesium[3]	6	plastic	600 ml	HNO_3 to pH<2	6 months
		Sodium[3]	6	plastic	600 ml	HNO_3 to pH<2	6 months
		Alkalinity	6	plastic	100 ml	Cool to 4° < 2°C	14 days
		Alk (bi-carb)	6	plastic	100 ml	Cool to 4° < 2°C	14 days
		Alk (carb)	6	plastic	100 ml	Cool to 4° < 2°C	14 days
		Ammonia	6	plastic	500 ml	H_2SO_4 to pH<2	28 days
		Chloride	6	plastic	50 ml	Cool to 4° < 2°C	28 days
		DO	6	NA	NA	NA	NA
		DOC	6	amber glass	250 ml	Cool to 4° < 2°C	28 days
		ORP	6	NA	NA	NA	NA
		Total Hardness	6	plastic	100 ml	H_2SO_4 to pH<2	6 months
		Nitrate	6	plastic	100 ml	H_2SO_4 to pH<2	48 hours
		Sulfate	6	plastic	50 ml	Cool to 4° < 2°C	28 days
		Sulfide	6	plastic	500 ml	NaOH, 20 drops Zinc Acetate to pH>9, Cool to 4°C	7 days
		Ferrous Iron	6[10]	plastic	8 oz.	Cool to 4° < 2°C	upon receipt
		TDS	6	plastic	100 ml	Cool to 4° < 2°C	7 days
		TKN	6	plastic	500 ml	H_2SO_4 to pH<2	28 days
		TSS	6	plastic	100 ml	Cool to 4° < 2°C	7 days
		TOC	6	glass	(3) 40 ml	H_2SO_4 to pH<2	28 days
Wetland (10) Sediment	sediment	Aromatic Hydrocarbon VOCs[13]	10	EnCore Sampler		Cool to 4° <2°C, Zero Headspace	14 days[12]
Inactive Landfill Area		Arsenic	10	glass	16 oz.	Cool to 4° < 2°C	6 months
		Chromium[3]	10	glass	16 oz.	Cool to 4° < 2°C	6 months
		Hex. Chromium[3]	10	glass	8 oz.	Cool to 4° < 2°C	24 hours[11]
		Zinc	10	glass	16 oz.	Cool to 4° < 2°C	6 months
		pH	10	glass	8 oz.	Cool to 4° < 2°C	24 hours
		TOC	10	plastic	50 ml	H_2SO_4 to pH<2	28 days

301497

TABLE 4

ANALYTICAL PROGRAM SUMMARY

Sample Type/Location	Matrix	Parameter (1)	Quantity (2)	Container Type	Minimum Volume	Preservation (Cool to 4° >2 °C for all samples)	Holding Time from Sample Date
Creek Sediments (4)	sediment	TAL Metals (3)(7)(8)	4	glass	16 oz.	Cool to 4 " < 2°C	6 months
		TCL VOCs (4)	4	EnCore Sampler		Cool to 4 " <2 °C, Zero Headspace	14 days (12)
		TCL SVOCs (5)	4	glass	16 oz.	Cool to 4 " < 2°C	6 months
		pH	4	glass	8 oz.	Cool to 4 " < 2°C	24 hours
		TOC	4	glass	4 oz.	Cool to 4 " < 2°C	28 days
Groundwater (6) Former Manufacturing Plant Area (2 sampling rounds)	water	TAL Metals (3)(7)(8)	12	plastic	600 ml	HNO_3 to pH<2	6 months
		TCL VOCs (4)	12	glass vial	2-40 ml	HCl to pH<2, Zero Headspace	14 days
		TCL SVOCs (5)	12	amber glass	2 liters	Cool to 4 " < 2°C	14 days
Groundwater (6) Former Manufacturing Plant Area (included in first sampling round only)	water	Alk (bi-carb)	6	plastic	100 ml	Cool to 4 " < 2°C	14 days
		Alk (carb)	6	plastic	100 ml	Cool to 4 " < 2°C	14 days
		DO	6	NA	NA	NA	NA
		DOC	6	amber glass	250 ml	Cool to 4 " < 2°C	28 days
		ORP	6	NA	NA	NA	NA
		Sulfate	6	plastic	50 ml	Cool to 4 " < 2°C	28 days
		Sulfide	6	plastic	500 ml	NaOH, 20 drops Zinc Acetate to pH>9, Cool to 4 oC	7 days
		Ferrous Iron	6 (10)	plastic	8 oz.	Cool to 4 " < 2°C	upon receipt
		TDS	6	plastic	100 ml	Cool to 4 " < 2°C	7 days
		TOC	6	glass	(3) 40 ml	H_2SO_4 to pH<2	28 days
Groundwater (15) Inactive Landfill Area (2 sampling rounds)	water	Aromatic Hydrocarbon VOCs (11)	30	glass vial	2-40 ml	HCl to pH<2, Zero Headspace	14 days
		SVOCs (5)	30	amber glass	2 liters	Cool to 4 " < 2°C	14 days
		Arsenic (3)(8)	30	plastic	600 ml	HNO_3 to pH<2	6 months
		Chromium (3)(8)	30	plastic	600 ml	HNO_3 to pH<2	6 months
		Hex. Chromium (3)(8)	30	plastic	400 ml	Cool to 4 " < 2°C	24 hours
		Zinc (3)(8)	30	plastic	600 ml	HNO_3 to pH<2	6 months
		Calcium (3)	30	plastic	600 ml	HNO_3 to pH<2	6 months
		Iron (3)	30	plastic	600 ml	HNO_3 to pH<2	6 months
		Potassium (3)	30	plastic	600 ml	HNO_3 to pH<2	6 months
		Magnesium (3)	30	plastic	600 ml	HNO_3 to pH<2	6 months
		Sodium (3)	30	plastic	600 ml	HNO_3 to pH<2	6 months
		Alk (bi-carb)	30	plastic	100 ml	Cool to 4 " < 2°C	14 days
		Alk (carb)	30	plastic	100 ml	Cool to 4 " < 2°C	14 days
		Ammonia	30	plastic	500 ml	H_2SO_4 to pH<2	28 days
		Chloride	30	plastic	50 ml	Cool to 4 " < 2°C	28 days
		DO	30	NA	NA	NA	NA
		DOC	30	amber glass	250 ml	Cool to 4 " < 2°C	28 days
		ORP	30	NA	NA	NA	NA

301498

TABLE 4

ANALYTICAL PROGRAM SUMMARY

Sample Type/Location	Matrix	Parameter [1]	Quantity [2]	Container Type	Minimum Volume	Preservation (Cool to 4° >2 °C for all samples)	Holding Time from Sample Date
Groundwater (15)	water	Nitrate	30	plastic	100 ml	H_2SO_4 to pH<2	48 hours
(continued)		Sulfate	30	plastic	50 ml	Cool to 4 ° < 2°C	28 days
		Sulfide	30	plastic	500 ml	NaOH, 20 drops Zinc Acetate to pH>9, Cool to 4 oC	7 days
		Ferrous Iron	30[illegible]	plastic	8 oz.	Cool to 4 ° < 2°C	upon receipt
		TDS	30	plastic	100 ml	Cool to 4 ° < 2°C	7 days
		TKN	30	plastic	500 ml	H_2SO_4 to pH<2	28 days
		TOC	30	glass	(3) 40 ml	H_2SO_4 to pH<2	28 days
Waste/Fill	soil	TCL VOCs	3	EnCore Sampler		Cool to 4 ° <2 °C, Zero Headspace	14 days[12]
		TCL SVOCs	1	amber glass	16 oz.	Cool to 4 ° < 2°C	14 days
		TAL Metals [illegible]	1	glass	16 oz.	Cool to 4 ° < 2°C	6 months
Landfill Gas	air	VOCs	3	summa canister	6 liters	None	14 days
		Carbon Dioxide	3	summa canister	6 liters	None	14 days
		Oxygen	3	summa canister	6 liters	None	14 days
		Methane	3	summa canister	6 liters	None	14 days
		Nitrogen	3	summa canister	6 liters	None	14 days

Sample Type/Location	Matrix	Geotechnical Parameter	Quantity	Container Type	Minimum Volume	Preservation	Holding Time from Sample Date
Waste/Fill	waste	Atterberg Limits TOC Grain Size Distribution Shear Strength	1	5 gal bucket	5 gal.	NA	NA
		Insitu Permeability	1	Shelby Tube	3-inch tube	NA	NA
Inactive Landfill Area Surface Soil	soil	Grain Size Distribution Atterberg Limits Modified Proctor Recompacted Perm. Shear Strength	6	5 gal bucket	5 gal.	NA	NA
		Moisture Content Insitu Permeability	6	Shelby Tube	3-inch tube	NA	NA
Wetland	Sediment	Grain Size Distribution	3	Polyethylene	8 oz [9]	NA	NA
Creek	Sediment	Grain Size Distribution	4	Polyethylene	8 oz. [9]	NA	NA
Former Manufacturing Plant Area Surface Soils	Soil	Grain Size Distribution	20	Polyethylene	8 oz. [9]	NA	NA

References:

(1) Test Methods for Evaluating Solid Wastes, USEPA SW-846, revised 1991.

(2) Code of Federal Regulations Chapter 40 Part 136

301499

TABLE 4

ANALYTICAL PROGRAM SUMMARY

Sample Type/Location	Matrix	Parameter (1)	Quantity (2)	Container Type	Minimum Volume	Preservation (Cool to 4° ±2 °C for all samples)	Holding Time from Sample Date

Notes

1. Parameter list includes anticipated chemical constituents of concern and is subject to revision based on initial groundwater analysis for inactive landfill area. EPA-approved methods published in References 1 and 2 above may be used The list of analytes, laboratory method and the method detection limit for each parameter are included in Tables 1-3 of the QAPP for each matrix
2. Sample quantity does not include QA/QC samples Sample frequency of QA/QC samples is detailed in Section 3 and Section 8 of the QAPP
3. Metals analysis will be for Total metals
4. Metals analysis will be for Soluble metals when water turbidity is field measured greater than 50 NTU
5. Includes Hexavalent Chromium [Cr VI]
6. SVOC analysis for acid extractables only.
4. Includes Hexavalent Chromium [Cr VI].
7. Per Method 3060A, Mg^{+2} in a phosphate buffer will be added to the alkaline extraction solution to suppress oxidation of soluble Cr (III) to Cr (VI).
8. The specific analyte list for the second sampling event will be established after COPCs are developed
9. Assumes no gravel present If significant gravel is present, collect 1 gallon.
10. Ferrous iron analysis will be conducted in the field Ten percent (10%) of the total number of ferrous iron samples will be submitted to the laboratory for assessment of precision and accuracy
11. Laboratory indicates a hold time of 28 days for hexavalent chromium in sediments and soils.
12. Samples must be transferred out of the EnCore Samplers within 48 hours of sample collection at the laboratory
13. Aromatic hydrocarbon VOCs analyzed by EPA Method 8021 to include benzene, ethylbenzene, toluene, total xylene, chlorobenzene, 1,2-Dichlorobenzene and 1,4-Dichlorobenzene.

Acronyms

Alk (bi-carb) = Bi-carbonate alkalinity
Alk (carb) = Carbonate alkalinity
DO = Dissolved Oxygen (field measured)
SVOC = Semi-Volatile Organic Compounds
DOC = Dissolved Organic Carbon
TOC = Total Organic Carbon
TSS = Total Suspended Solids
VOC = Volatile Organic Compounds

Geotechnical Parameter Methods.

Atterberg Limit=American Society of Testing and Materials (ASTM) D4318
TOC=Walkey Black Method
Grainsize Distribution=ASTM D421, 422
Shear Strength=ASTM D3080
Insitu Permeability=ASTM D5084
Modified Proctor=ASTM D1557
Recompacted Permeability=ASTM D5084
Moisture Content=ASTM D2216

301500

APPENDIX H

APPENDIX H

Hydraulic Conductivity Testing Data

Subject: Packartest Quantitative Evaluation | Project No. 5771.01

By: RHF | Checked By: wj | Task No.

Date: 10/31/02 | Date: 11/13/02 | File No. SD

Sheet ____ of ____

Thiem Equation

$$T = \frac{Q \ln(R/r_b)}{2\pi P_i}$$

T = transmissivity (m^2/day)
Q = injection rate (m^3/day)
P_i = net injection pressure (m)
r_b = borehole radius (m)
R = radius of influence

P_i = combined pressure head
depth to water + gauge pressure + gauge height
(assume friction loss is negligible)

$\boxed{\text{For test interval 18-23}}$

Q = Flow rate = 0.36 gpm or 1.925 m^3/day r_b = 0.04 m   R = 5 m

$$T = \frac{1.925\ m^3/day\ \ln(5/0.04)}{2\pi \times 31.9\ m}$$

P_i = 20.5 ft + 3.5 ft + 35 psi
~~P_i = 5?psi~~
1 psi = 0.7031 m H_2O
1 ft H_2O = 0.4335 PSI
~~R = 4 m~~

$$\frac{1.925\ m^3/day\ 4.9}{200.33\ m}$$

P_i = 24 ft = 10.4 PSI + 35 psi
P_i = 45.4 psi
P_i = 31.9 m

T = 0.04708 m^2/day
K = T/test interval   test interval = 5 ft or 1.52 m

K = 0.03097 m/day
or
$\boxed{K = 3.6 \times 10^{-5}\ cm/sec}$ - $\boxed{18-23'}$

$\boxed{\text{For test interval 28-33'}}$

Q = 0.24 gpm or 1.302 m^3/day

P_i = 30.5 ft + 55 psi
P_i = 13.22 psi + 55 psi
P_i = 68.22 psi
P_i = 47.97 m

$$\frac{1.302\ m^3/day \times \ln(5/0.04)}{2\pi \times 47.97\ m}$$

$$T = \frac{6.38\ m^3/day}{301.23\ m}$$

T = 0.02118 m^2/day   1.52 m test interval

k = 0.0139 m/day or $\boxed{1.6 \times 10^{-5}\ cm/sec}$ $\boxed{28-33'}$

PRESSURE TEST REPORT

GEOMATRIX

Page ___ of ___

Project: Peter Cooper Site: ______ Date: 10/2/00 Boring No.: MW-4D2

Location: Gowanda, NY Ground Elev.: ______ Total Depth: ______ Top of Rock: Depth: ______

Contractor: Nothnagle Driller: Neal Saint Inspector: JSV Chek'd By: ______

Water Level: Depth 12.75 Elevation: ______ Water Pipe Length: ______ Water Pipe I.D.: ______

Flow Meter No. ______ Pressure Gauge No.: ______ Test Interval: Depth: 18-23 Elevation: ______

Gauge Pressure: 10
Packer Infl't'n Press.: 225

Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow
0	5864.15	
0:30	..64.15	0
1:00	..64.15	0
1:30	..64.15	0
2:00	..64.15	0
2:30	..64.15	0
3:00	..64.15	0
4:00	..64.15	0

Remarks:

Gauge Pressure: 20
Packer Infl't'n Press.: 225

Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow
0	...64.40	
0:30	..64.40	0
1:00	..64.40	0
2:00	..64.40	0
3:00	..64.40	0
4:00	..64.40	0
5:00	..64.40	0

Remarks:

Gauge Pressure: 30-35
Packer Infl't'n Press.: 225

Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow
0	..64.45	
0:30	64.75	—
1:00	64.75	0
2:00	..64.75	0
3:00	..64.75	0
4:00	64.80	0.05
5:00	64.90	0.10
6:00	..65.00	0.10
7:00	65.10	0.10
8:00	65.25	0.15
9:00	65.45	0.20
10:00	65.75	0.30
11:00	66.15	0.40

Remarks:

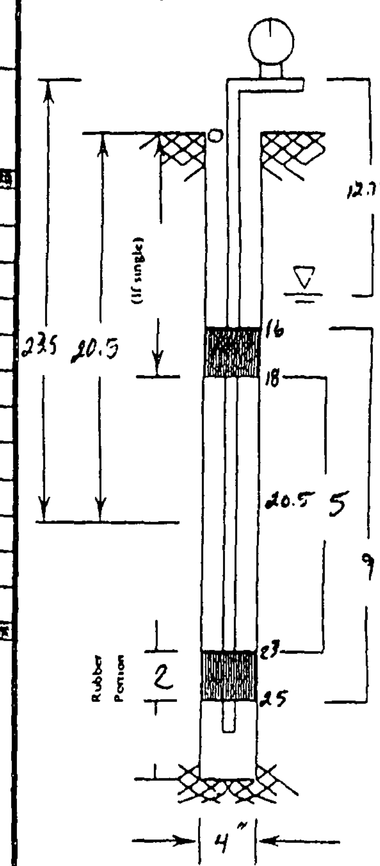
12:00	66.55	0.40
13:00	66.90	0.35
14:00	67.45	0.55
15:00	68.10	0.65
16:00	68.70	0.60
17:00	69.40	0.70
18:00	70.20	0.80
19:00	71.20	1.00

Gauge Pressure: ______
Packer Infl't'n Press.: ______

Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow

Remarks:

Test Configuration



SINGLE ☐
DOUBLE ☐
Tape/Rule No. ______

Pmax (20.5 − 12.75) x 2.3 = 17.8
W/L = 10.73

W/L = 10.73 above pump
stop test for may be
opening fracture.

6.75 gallons

301504

GEOMATRIX

PRESSURE TEST REPORT

Page ____ of ____

Project: Peter Cooper Site: ______ Date: 10/02/00 Boring No.: MW-4D2

Location: Gowanda, NY Ground Elev.: ______ Total Depth: ______ Top of Rock: Depth: ______

Contractor: Nothnagle Driller: Neal Stoart Inspector: JSV Chek'd By: ______

Water Level: Depth 12.75 Elevation: ______ Water Pipe Length: ______ Water Pipe I.D.: ______

Flow Meter No. 5098610 Pressure Gauge No.: ______ Test Interval: Depth: 23-28' Elevation: ______

Gauge Pressure: 18
Packer Infl't'n Press.: 225

Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow
~~0~~	~~58865.90~~	
0	58865.90	
0:30	58865.95	0.05
1:00	...65.95	0
1:30	....65.95	0
2:00	...65.95	0
3:00	...65.95	0
4:00	...65.95	0

Remarks:

Gauge Pressure: 30
Packer Infl't'n Press.: 225

Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow
0	58866.00	0
0:30	...66.00	
1:00	...66.00	0
2:00	...66.00	0
3:00	...66.05	0.05
4:00	...66.05	0
5:00	...66.05	0

Remarks:

Gauge Pressure: 50
Packer Infl't'n Press.: ______

Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow
0	...66.05	
0:30	...66.10	0.05
1:00	...66.10	0
1:30	...66.10	0
2:00	...66.10	0
3:00	...66.10	0
4:00	...66.10	0

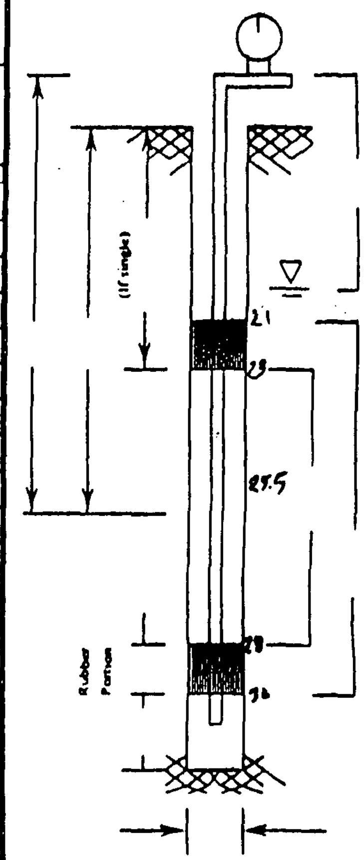
Remarks:

Gauge Pressure: ______
Packer Infl't'n Press.: ______

Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow

Remarks:

Test Configuration



SINGLE ☐
DOUBLE ☐
Tape/Rule No. ______

25.5 - 12.75 = 12.75 x 2.3 = 29.35 .2x(35 max)

301505

GEOMATRIX

PRESSURE TEST REPORT

Page ___ of ___

Project: Peter Cooper | Site: | Date: 10/2/00 | Boring No.:

Location: Gowanda NY | Ground Elev.: | Total Depth: | Top of Rock: Depth:

Contractor: Nothnagle | Driller: Neal Smart | Inspector: JTV | Chek'd By:

Water Level: Depth 12.75 | Elevation: | Water Pipe Length: | Water Pipe I.D.:

Flow Meter No. | Pressure Gauge No.: | Test Interval: Depth: 28-33' BGS | Elevation:

Gauge Pressure: 20
Packer Infl't'n Press.: 225

Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow
0	58853.95	
0:30	...53.95	0
1:00	...53.95	0
2:00	...53.95	0
3:00	...53.95	0
4:00	...53.95	0
5:00	...53.95	0

Remarks:

Gauge Pressure: 40
Packer Infl't'n Press.: 225

Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow
0	58854.0	
0:30	...54.25	
1:00	...54.30	
1:30	...54.30	
2:00	...54.35	
2:30	...54.35	
3:00	...54.35	
3:30	...54.35	
4:00	...54.35	
5:00	...54.35	

Remarks:

Gauge Pressure: 50 (52)
Packer Infl't'n Press.: 225

Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow
0	54.40	
0:30	54.45	0.05
1:00	54.50	0.05
2:00	54.55	0.05
3:00	54.60	0.05
4:00	54.70	0.10
5:00	54.90	0.20
6:00	55.05	0.15
7:00	55.15	0.10
8:00	55.30	0.15
10:00	55.45	0.15
15:00	55.45	0
20:00	55.45	

Remarks: FLOW METER ERROR CLEAN OUT METER & TRY AGAIN.

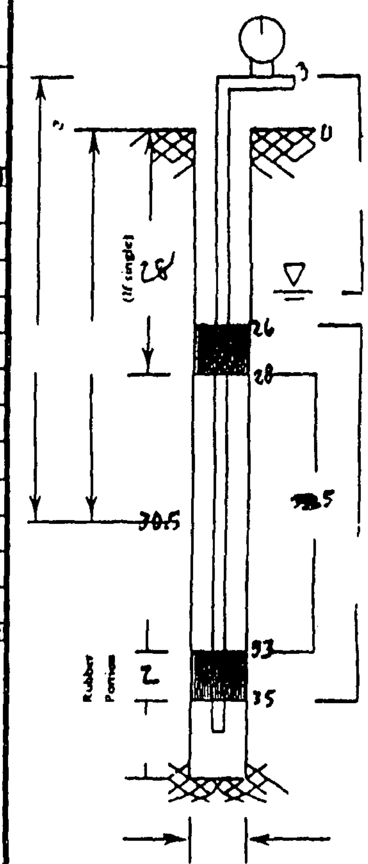
Gauge Pressure: 50-55
Packer Infl't'n Press.:

Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow
0	58868.50	
0:30	68.55	0.05
1:00	68.60	0.05
1:30	68.75	0.15
2:00	68.85	0.10
2:30	68.95	0.10
3:00	69.05	0.10
3:30	69.15	0.10
4:30	69.30	0.15
5:00	69.40	0.10
6:00	69.55	0.15
7:00	69.70	0.15
8:00	69.85	0.15

Remarks:

9:00	70.05	0.20
10:00	70.30	0.25
11:00	70.55	0.25
12:00	70.85	0.30
13:00	71.10	0.25
14:00	71.40	0.30
15:00	71.70	0.30
16:00	72.00	0.30
17:00	72.30	0.30
18:00	72.65	0.35
19:00	72.95	0.30
20:00	73.25	0.30

Test Configuration



SINGLE ☐
DOUBLE ☐
Tape/Rule No.

$P_{max} = (30.5 - 12.75) \times 2.3 = 40.8$

w/L ≈ 11.70
w/L @ END = 11.68 no chge.

DROPPED PRESSURE @ MAX TO SEAL WELL total = 4.75 gpm

301506

GEOMATRIX

PRESSURE TEST REPORT

Project: Peter Cooper   Site: ____   Date: 10/02/00   Boring No.: MW-402

Location: ____   Ground Elev.: ____   Total Depth: ____   Top of Rock: Depth: ____

Contractor: ____   Driller: ____   Inspector: ____   Chek'd By: ____

Water Level: Depth 12.74 @ 1043   Elevation: ____   Water Pipe Length: ____   Water Pipe I.D.: ____

Flow Meter No. 58853.6   Pressure Gauge No.: ____   Test Interval: Depth: 33-38 BGS   Elevation: ____

Gauge Pressure: 15			Gauge Pressure: 30			Gauge Pressure:			Gauge Pressure:		
Packer Infl't'n Press.: ~~150~~ 225			Packer Infl't'n Press.: 225			Packer Infl't'n Press.:			Packer Infl't'n Press.:		
Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow	Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow	Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow	Elapsed Time (min.)	Flow Reading (gallons)	Δ Flow
0	58853.6		0	58853.65							
0:30	...53.65	0	0:30	58853.65	0						
1:00	...53.65	0	1:00	...53.65	0						
2:00	...53.65	0	2:00	...53.65	0						
3:00	...53.65	0	3:00	...53.65	0						
4:00	...53.65	0	4:00	...53.65	0						
5:00	...53.65		5:00	...53.65	0						

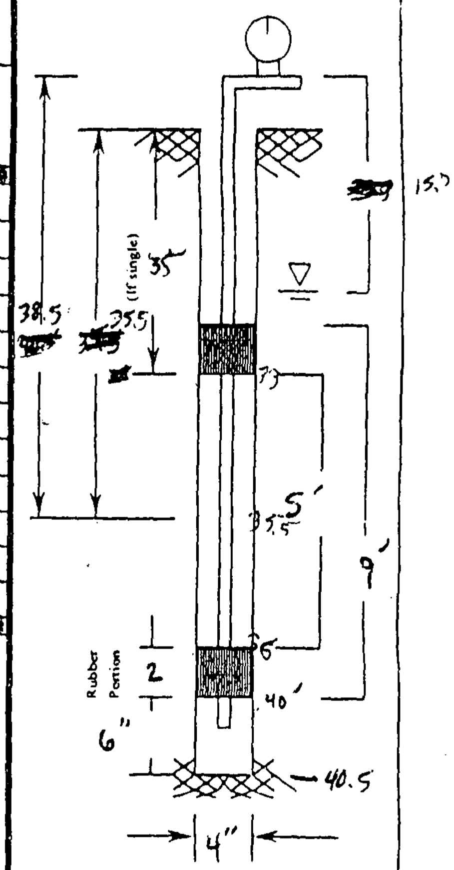
Remarks:

Remarks:

Remarks:

Remarks:

Test Configuration



SINGLE ☐

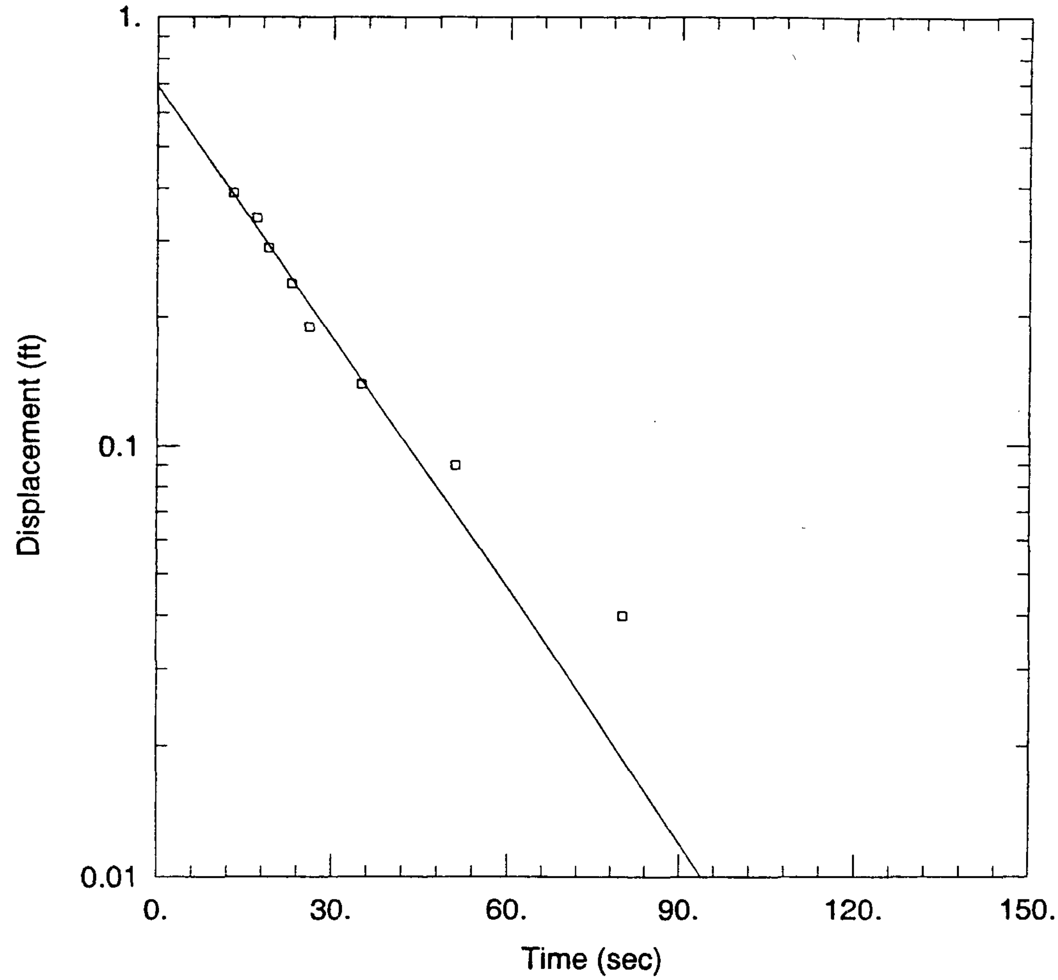
DOUBLE ☐

Tape/Rule No. ____

301507

Pw = (32.5-12.5) x 2.3   WL = 9.3

57895 water   10   = 32.5 = 6ye Pp   10.2' ... length



WELL TEST ANALYSIS

Data Set: I:\...\mw1s.aqt
Date: 11/02/02 Time: 16:12:32

PROJECT INFORMATION

Company: Geomatrix Consultants
Client: Peter COoper PRP Group
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/19/00

AQUIFER DATA

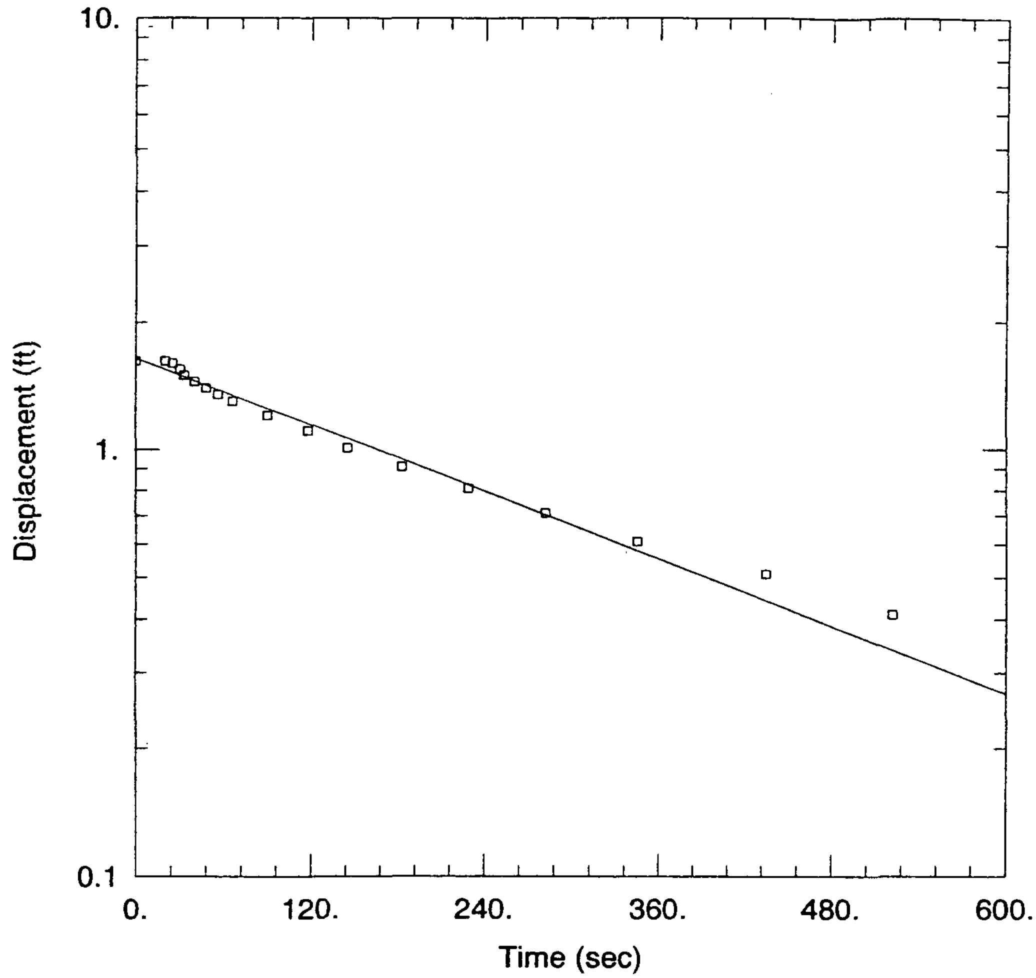
Saturated Thickness: 3. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1S)

Initial Displacement: 1.5 ft
Water Column Height: 3. ft
Casing Radius: 0.0833 ft
Wellbore Radius: 0.1666 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.00426 cm/sec
y0 = 0.6953 ft



MW-1D

Data Set: I:\...\mw1d.aqt
Date: 11/02/02 Time: 16:24:35

PROJECT INFORMATION

Company: Geomatrix Consultants
Client: Peter COoper PRP Group
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/19/00

AQUIFER DATA

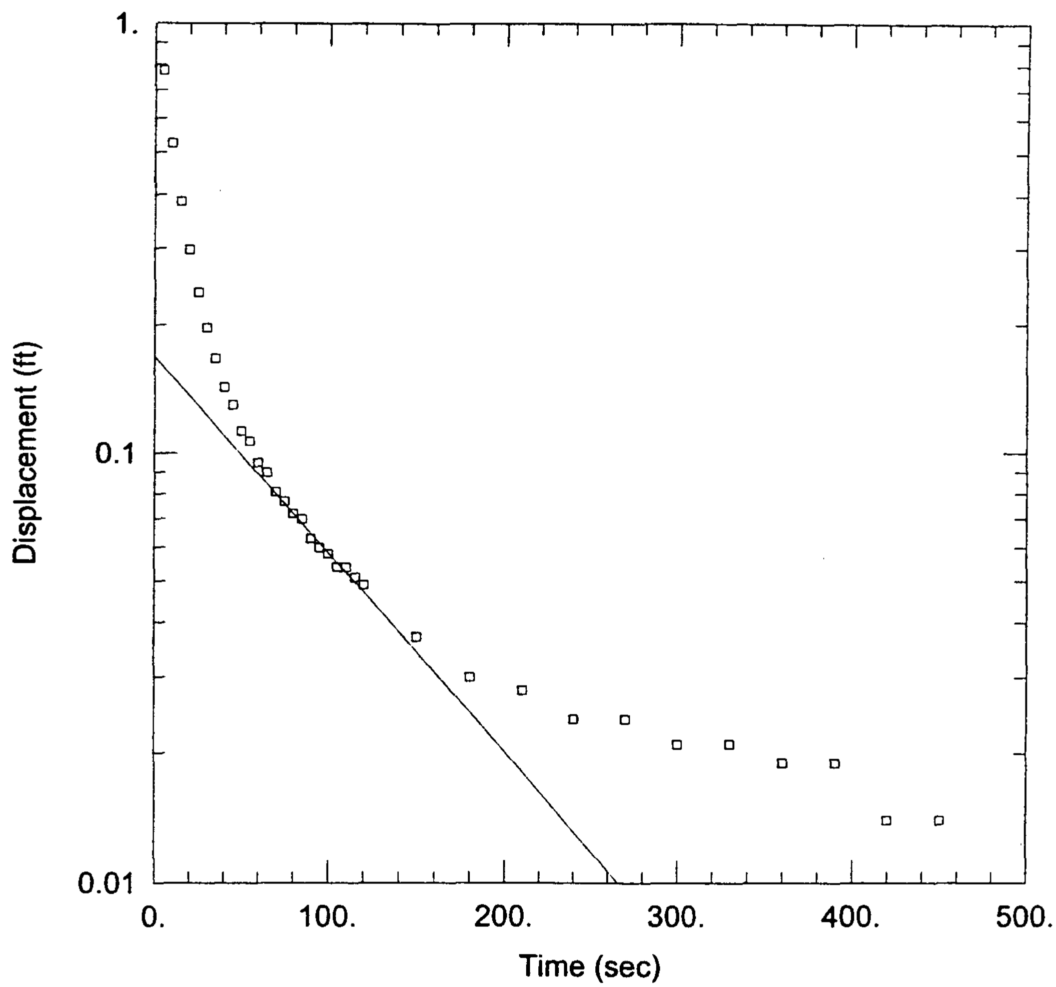
Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1D)

Initial Displacement: 1.63 ft Water Column Height: 3. ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.1666 ft
Screen Length: 5. ft Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice
K = 0.0002498 cm/sec y0 = 1.657 ft



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mw2sr.aqt
Date: 05/26/01 Time: 12:23:59

PROJECT INFORMATION

Company: Geomatrix Consultants
Client: Peter COoper PRP Group
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/19/00

AQUIFER DATA

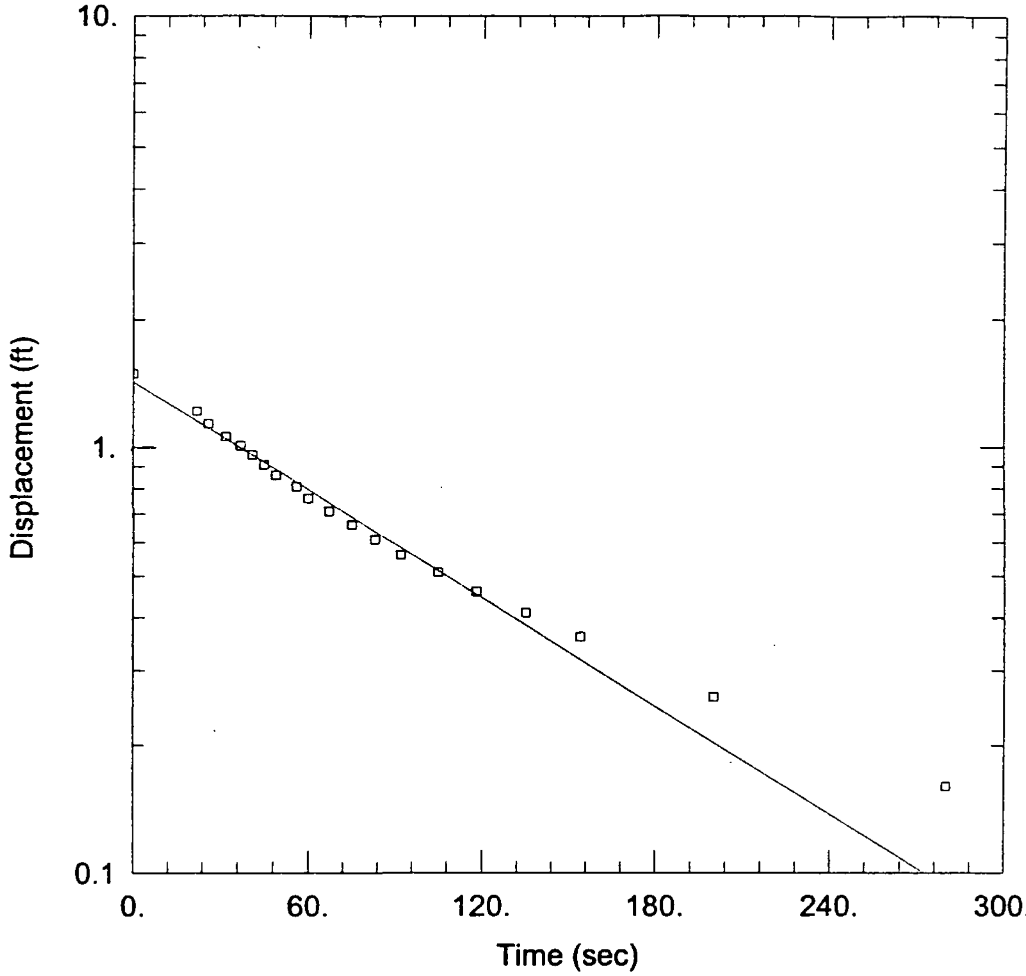
Saturated Thickness: 3. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2SR)

Initial Displacement: 1.5 ft
Water Column Height: 3. ft
Casing Radius: 0.0833 ft
Wellbore Radius: 0.1666 ft
Screen Length: 4. ft
Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.001229 cm/sec
y0 = 0.1688 ft



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mw2d.aqt
Date: 05/26/01 Time: 12:23:50

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/30/00

AQUIFER DATA

Saturated Thickness: 5. ft Anisotropy Ratio (Kz/Kr): 1.

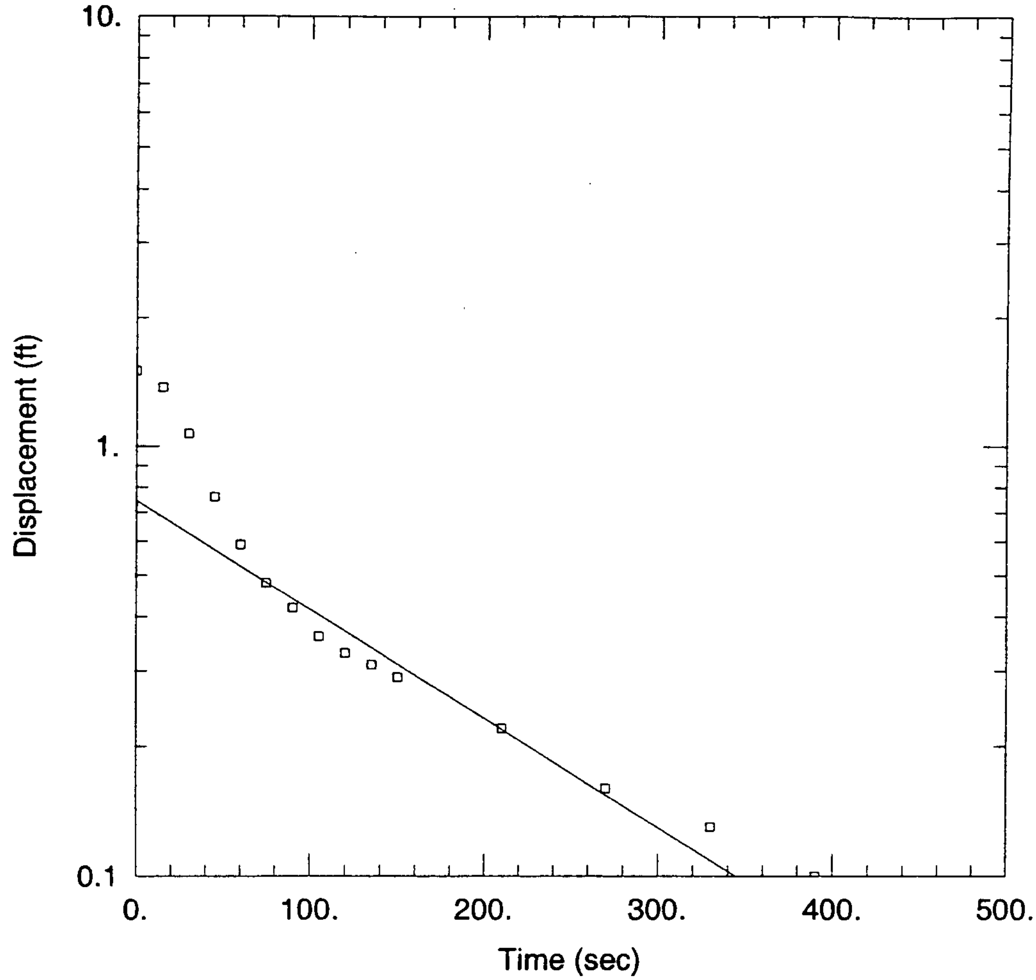
WELL DATA (MW-2DR)

Initial Displacement: 1.5 ft Water Column Height: 10. ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.1666 ft
Screen Length: 5. ft Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.001231 cm/sec y0 = 1.435 ft



MW-3SR

Data Set: I:\...\mw3r.aqt
Date: 11/02/02 Time: 16:02:25

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Well: MW-3SR
Test Date: 10/19/00

AQUIFER DATA

Saturated Thickness: 4. ft Anisotropy Ratio (Kz/Kr): 1.

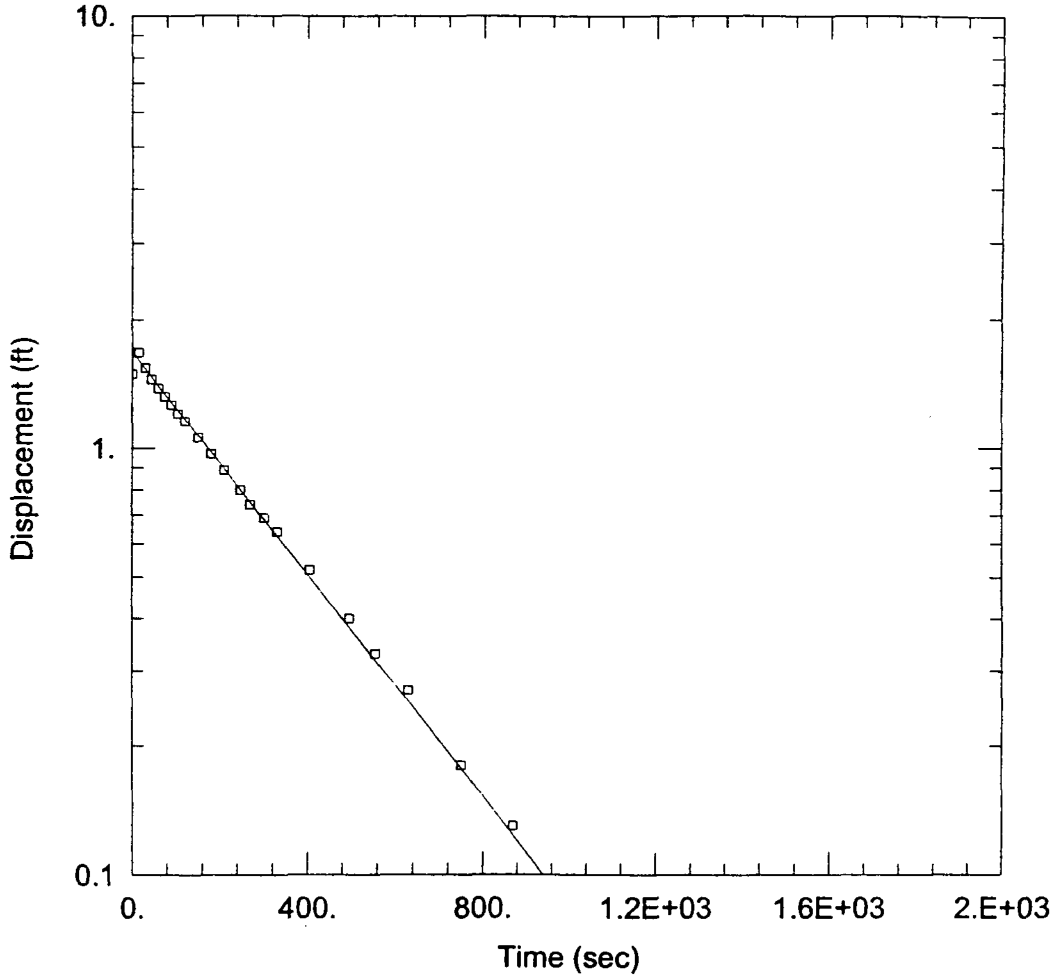
WELL DATA (MW-3SR)

Initial Displacement: 1.5 ft Water Column Height: 4. ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.1666 ft
Screen Length: 4.5 ft Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0006562 cm/sec y0 = 0.7462 ft



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mw4sr.aqt
Date: 05/26/01 Time: 12:24:39

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/19/00

AQUIFER DATA

Saturated Thickness: 6.5 ft Anisotropy Ratio (Kz/Kr): 1.

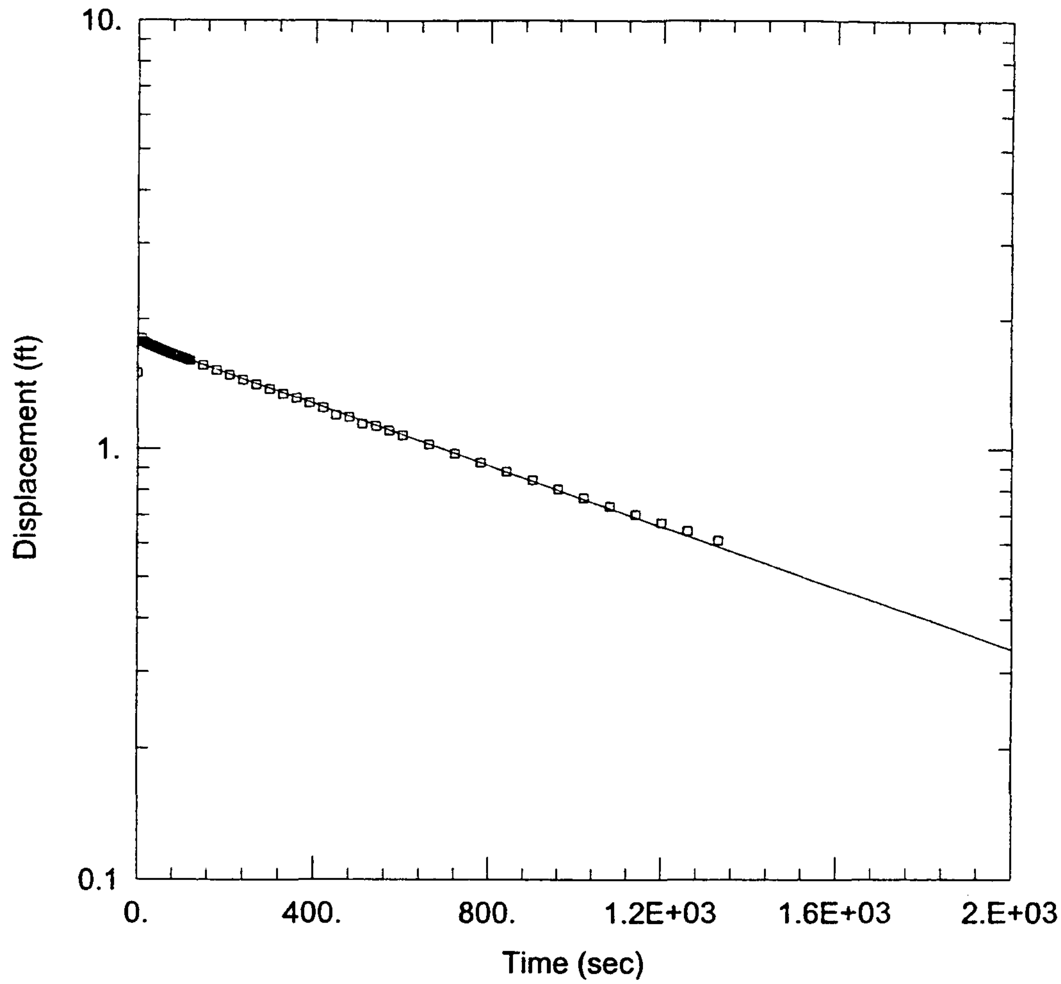
WELL DATA (MW-4SR)

Initial Displacement: 1.5 ft Water Column Height: 6.5 ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.1666 ft
Screen Length: 4.5 ft Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0003801 cm/sec y0 = 1.685 ft



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mw4dr.aqt
Date: 05/26/01 Time: 12:24:30

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/19/00

AQUIFER DATA

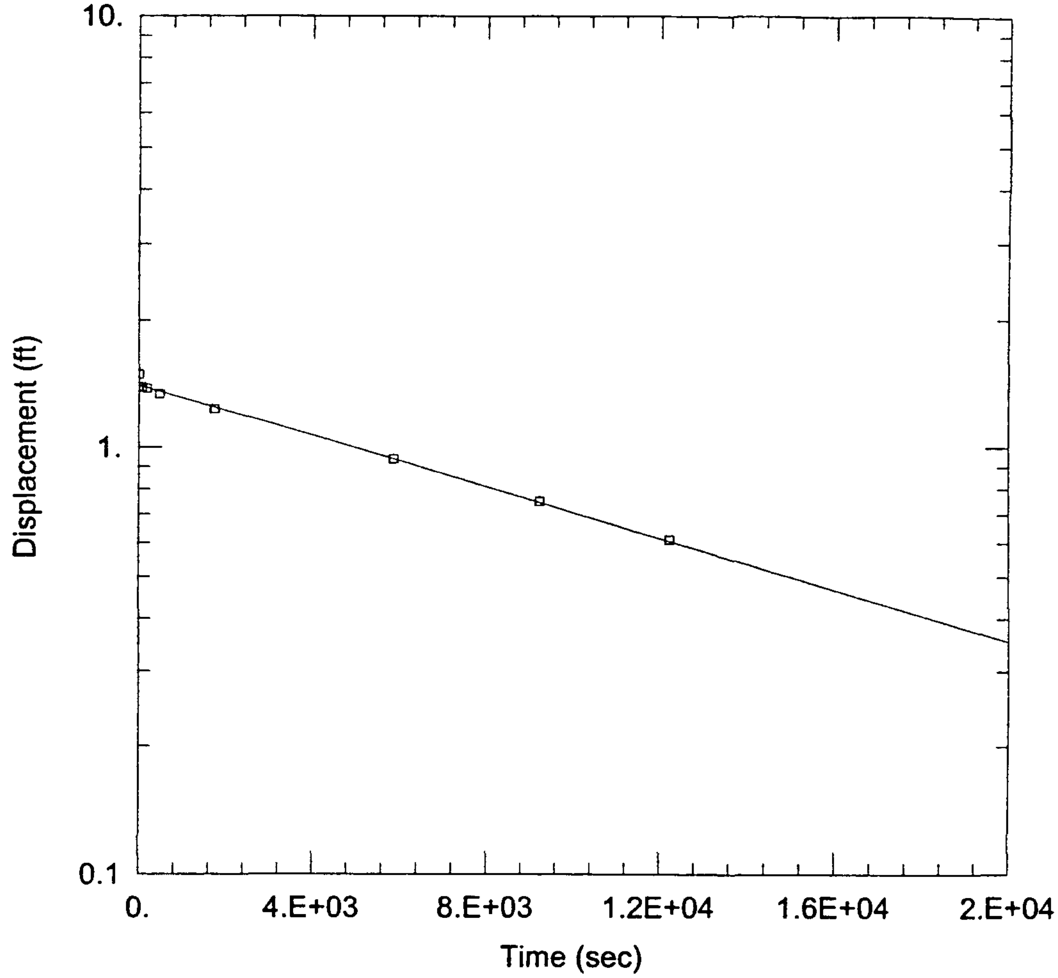
Saturated Thickness: 5. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-4DR)

Initial Displacement: 1.5 ft Water Column Height: 12. ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.1666 ft
Screen Length: 5. ft Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice
K = 0.0001079 cm/sec y0 = 1.777 ft



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mw4d2.aqt
Date: 05/26/01 Time: 12:24:20

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/30/00

AQUIFER DATA

Saturated Thickness: 10. ft
Anisotropy Ratio (Kz/Kr): 1.

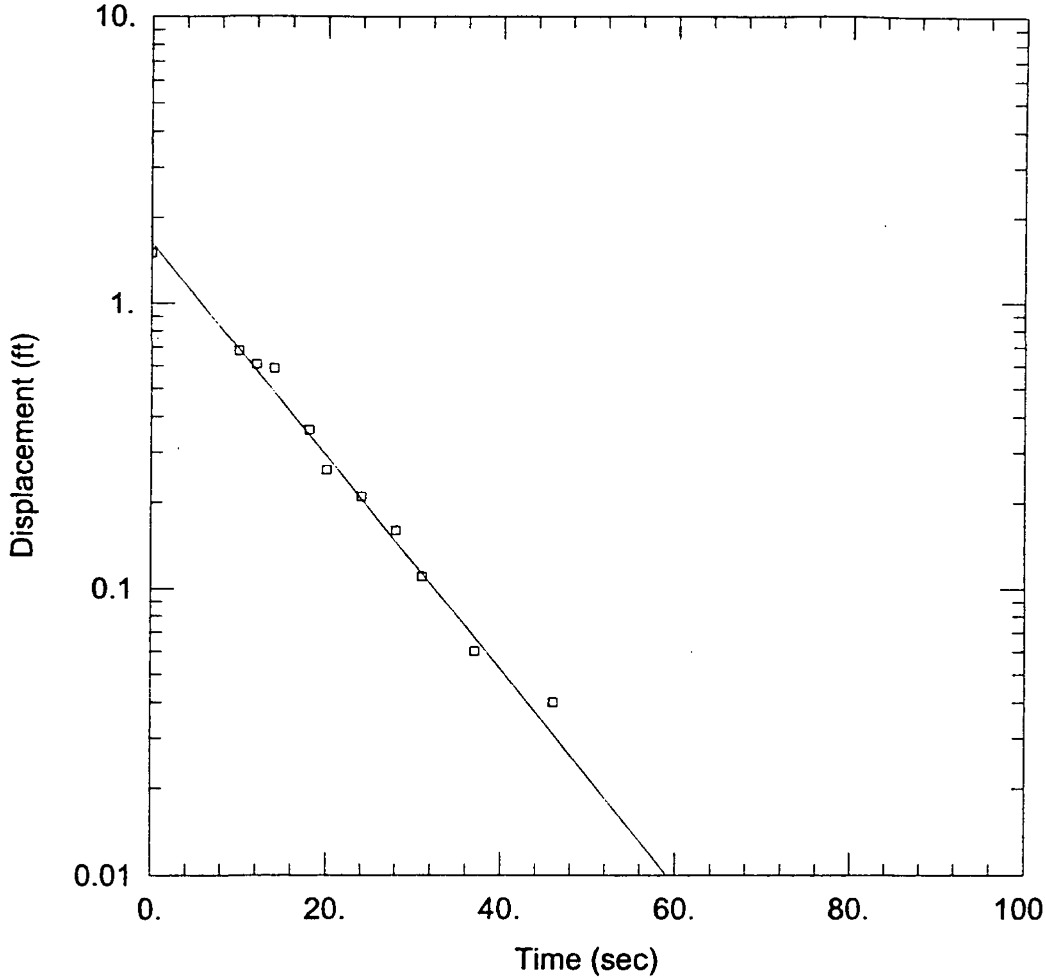
WELL DATA (MW-4D2)

Initial Displacement: 1.5 ft
Water Column Height: 29. ft
Casing Radius: 0.0833 ft
Wellbore Radius: 0.1666 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 5.547E-06 cm/sec
y0 = 1.414 ft



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mw5s.aqt
Date: 05/26/01 Time: 12:24:58

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/23/00

AQUIFER DATA

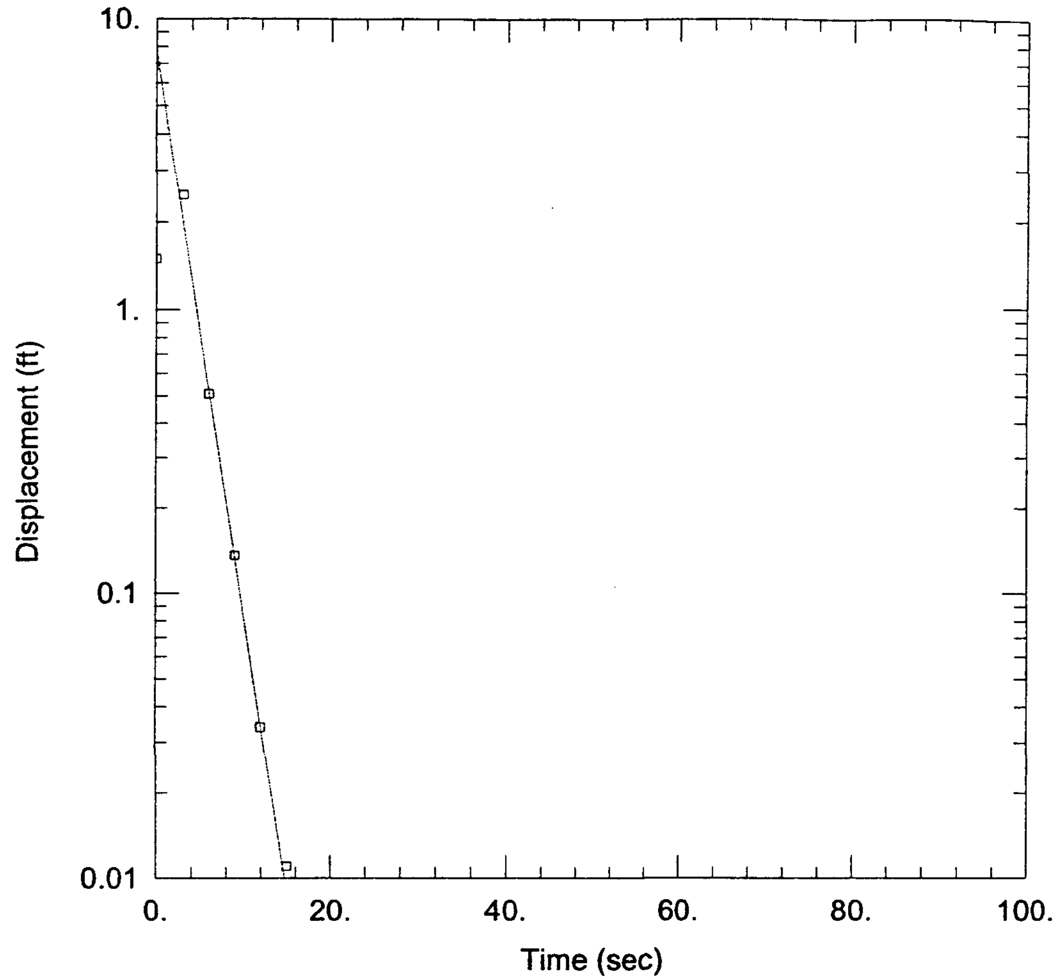
Saturated Thickness: 7.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-5S)

Initial Displacement: 1.5 ft
Casing Radius: 0.0833 ft
Screen Length: 2. ft
Water Column Height: 7.5 ft
Wellbore Radius: 0.1666 ft
Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.02245 cm/sec
y0 = 1.631 ft



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mw5d.aqt
Date: 05/26/01 Time: 12:24:49

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/23/00

AQUIFER DATA

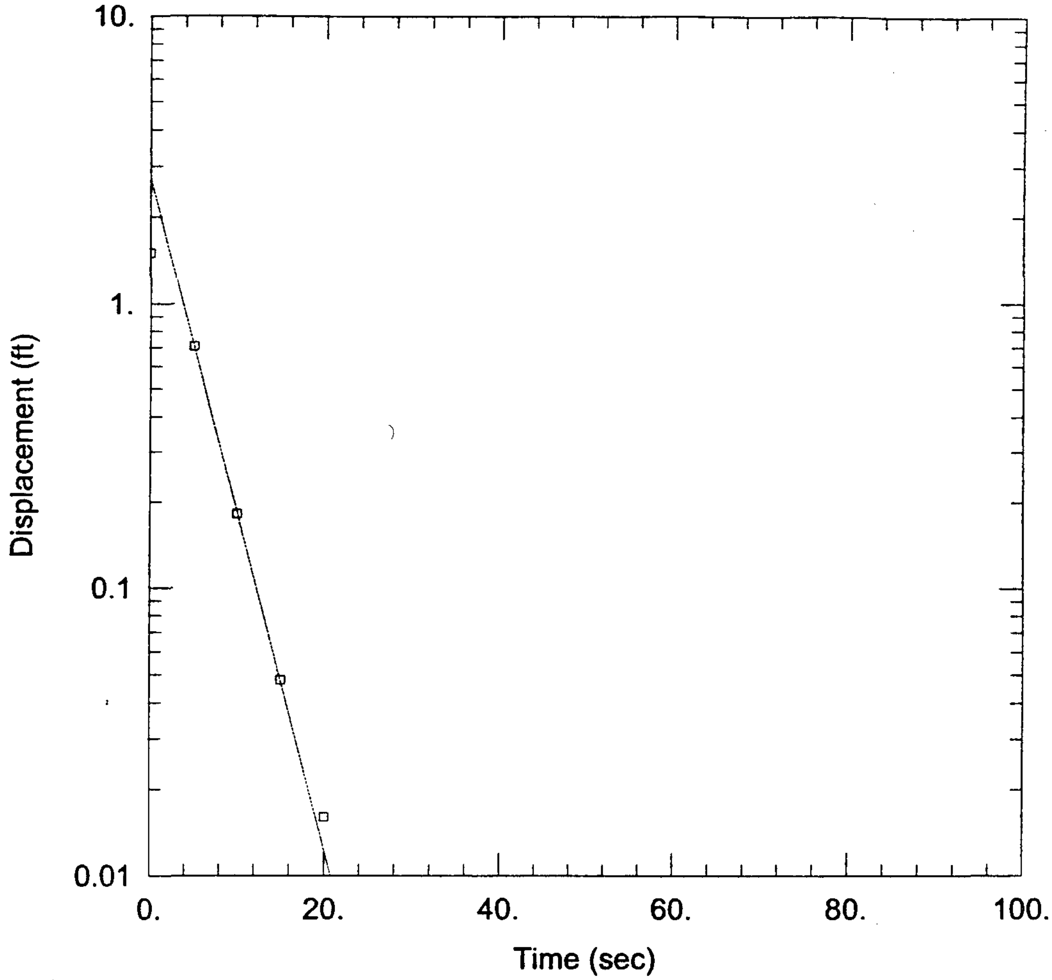
Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-5D)

Initial Displacement: 1.5 ft Water Column Height: 20. ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.1666 ft
Screen Length: 10. ft Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice
K = 0.03395 cm/sec y0 = 7.724 ft



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mw6.aqt
Date: 05/26/01 Time: 12:25:07

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/19/00

AQUIFER DATA

Saturated Thickness: 9. ft Anisotropy Ratio (Kz/Kr): 1.

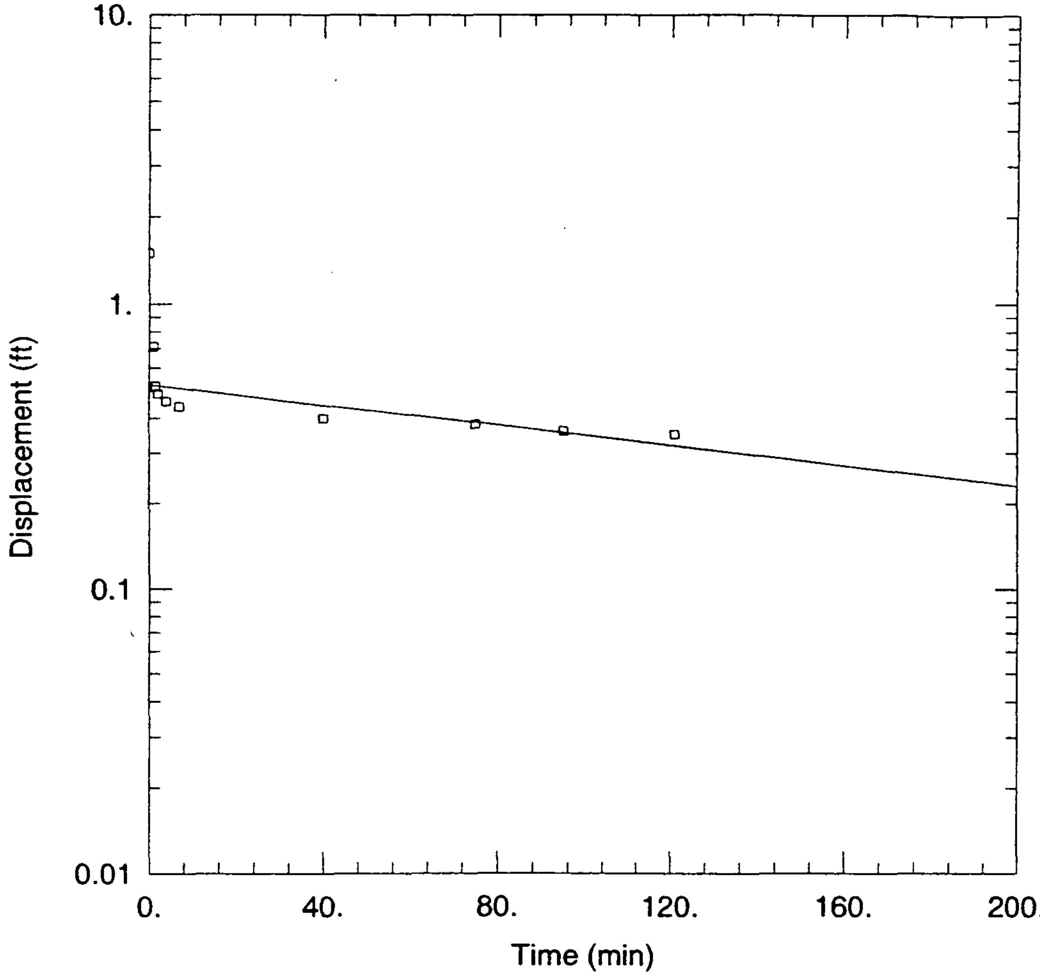
WELL DATA (MW-6S)

Initial Displacement: 1.5 ft Water Column Height: 9. ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.1666 ft
Screen Length: 5. ft Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.03329 cm/sec y0 = 2.73 ft



MW-7S

Data Set: I:\...\mw7s.aqt
Date: 11/02/02 Time: 15:50:23

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Well: 7S
Test Date: 10/30/00

AQUIFER DATA

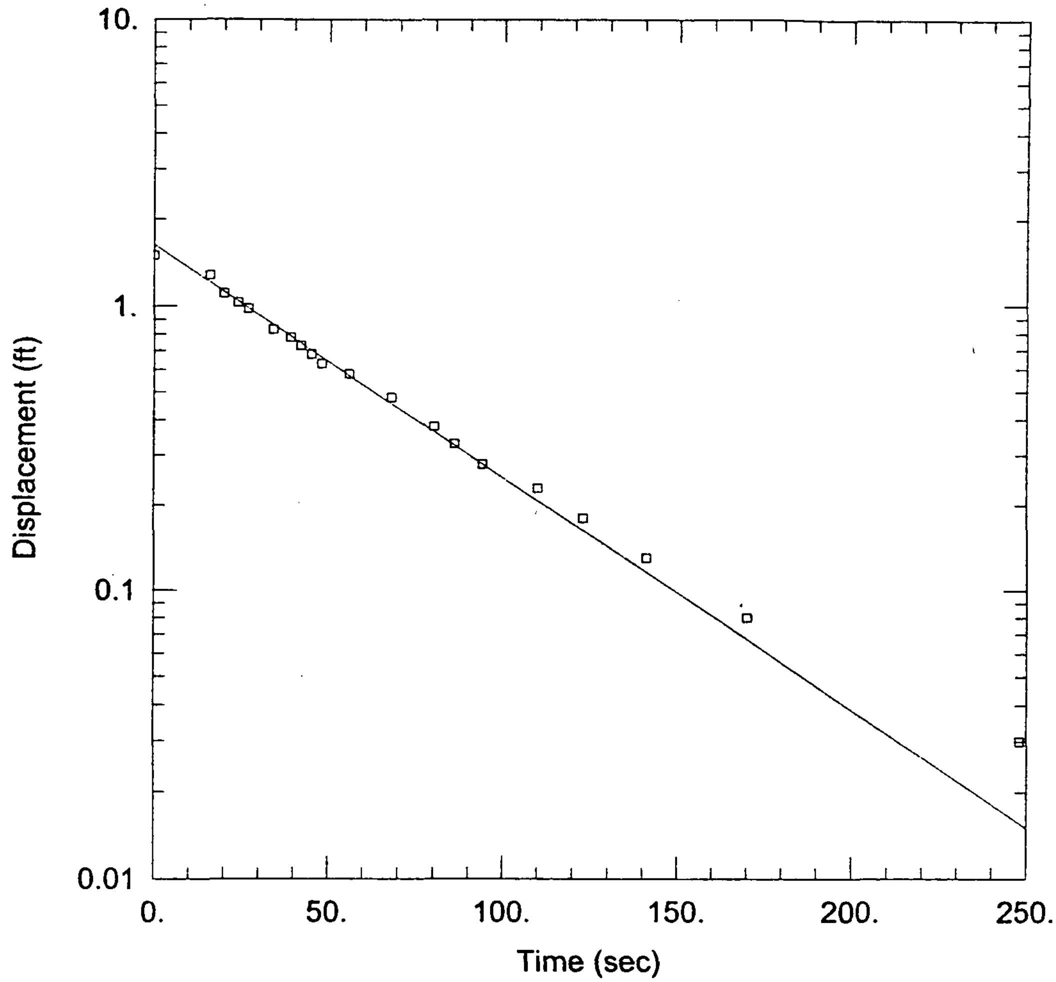
Saturated Thickness: 4. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-7S)

Initial Displacement: 1.5 ft
Water Column Height: 4. ft
Casing Radius: 0.0833 ft
Wellbore Radius: 0.1666 ft
Screen Length: 12.5 ft
Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.952E-06 cm/sec
y0 = 0.5267 ft



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mw7d.aqt
Date: 05/26/01 Time: 12:25:17

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/23/00

AQUIFER DATA

Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 1.

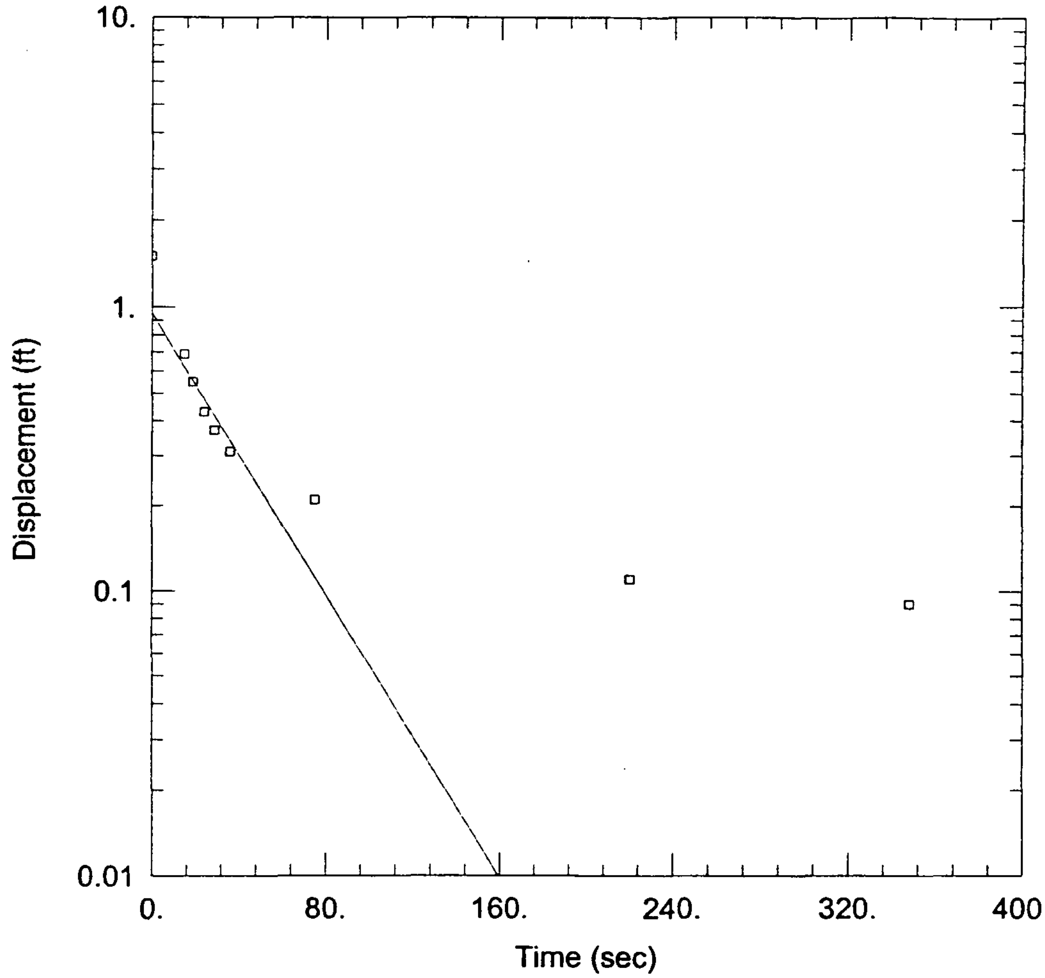
WELL DATA (MW-7D)

Initial Displacement: 1.5 ft Water Column Height: 15. ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.1666 ft
Screen Length: 10. ft Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.001342 cm/sec y0 = 1.635 ft



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mw8s.aqt
Date: 05/26/01 Time: 12:26:01

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/23/00

AQUIFER DATA

Saturated Thickness: 8.5 ft Anisotropy Ratio (Kz/Kr): 1.

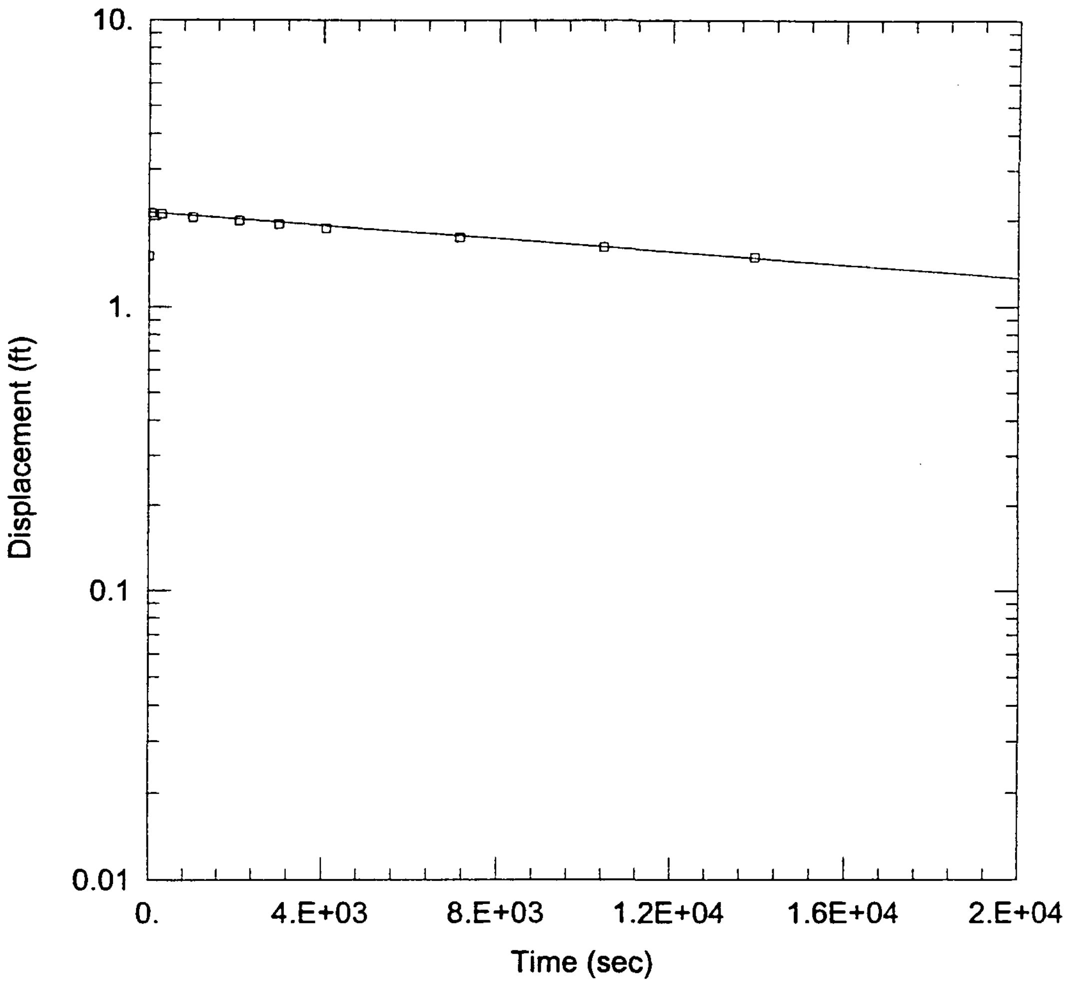
WELL DATA (MW-8S)

Initial Displacement: 1.5 ft Water Column Height: 8.5 ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.1666 ft
Screen Length: 10. ft Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0.001826 cm/sec y0 = 0.9522 ft

GEOMATRIX



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mw8d.aqt
Date: 05/26/01 Time: 12:25:38

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/30/00

AQUIFER DATA

Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 1.

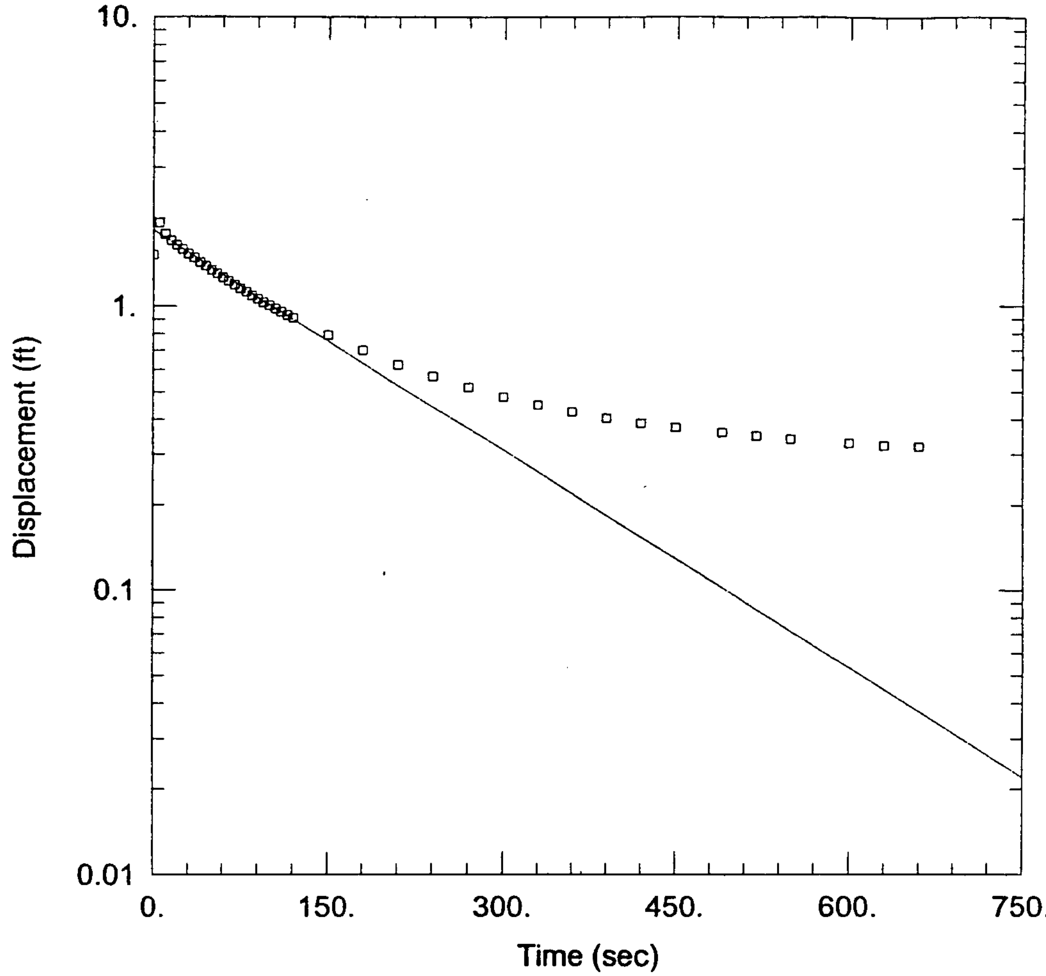
WELL DATA (MW-8D)

Initial Displacement: 1.5 ft Water Column Height: 37.5 ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.1666 ft
Screen Length: 10. ft Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 2.171E-06 cm/sec y0 = 2.126 ft



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mwfp1d.aqt
Date: 05/26/01 Time: 12:26:13

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/19/00

AQUIFER DATA

Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 1.

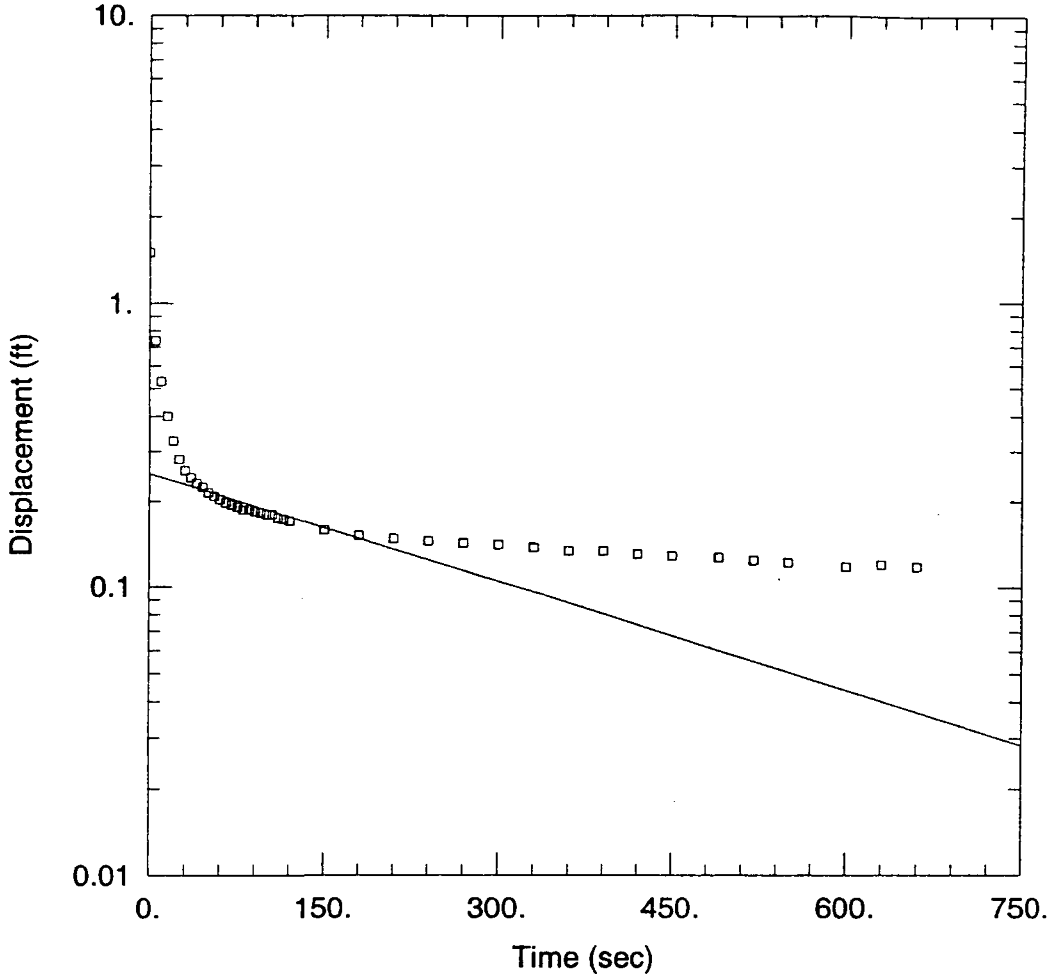
WELL DATA (MWFP-1D)

Initial Displacement: 1.5 ft Water Column Height: 13.5 ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.1666 ft
Screen Length: 10. ft Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.0004131 cm/sec $y0$ = 1.828 ft



WELL TEST ANALYSIS

Data Set: I:\...\mwfp2s.aqt
Date: 11/02/02 Time: 16:09:22

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/19/00

AQUIFER DATA

Saturated Thickness: 2.5 ft Anisotropy Ratio (Kz/Kr): 1.

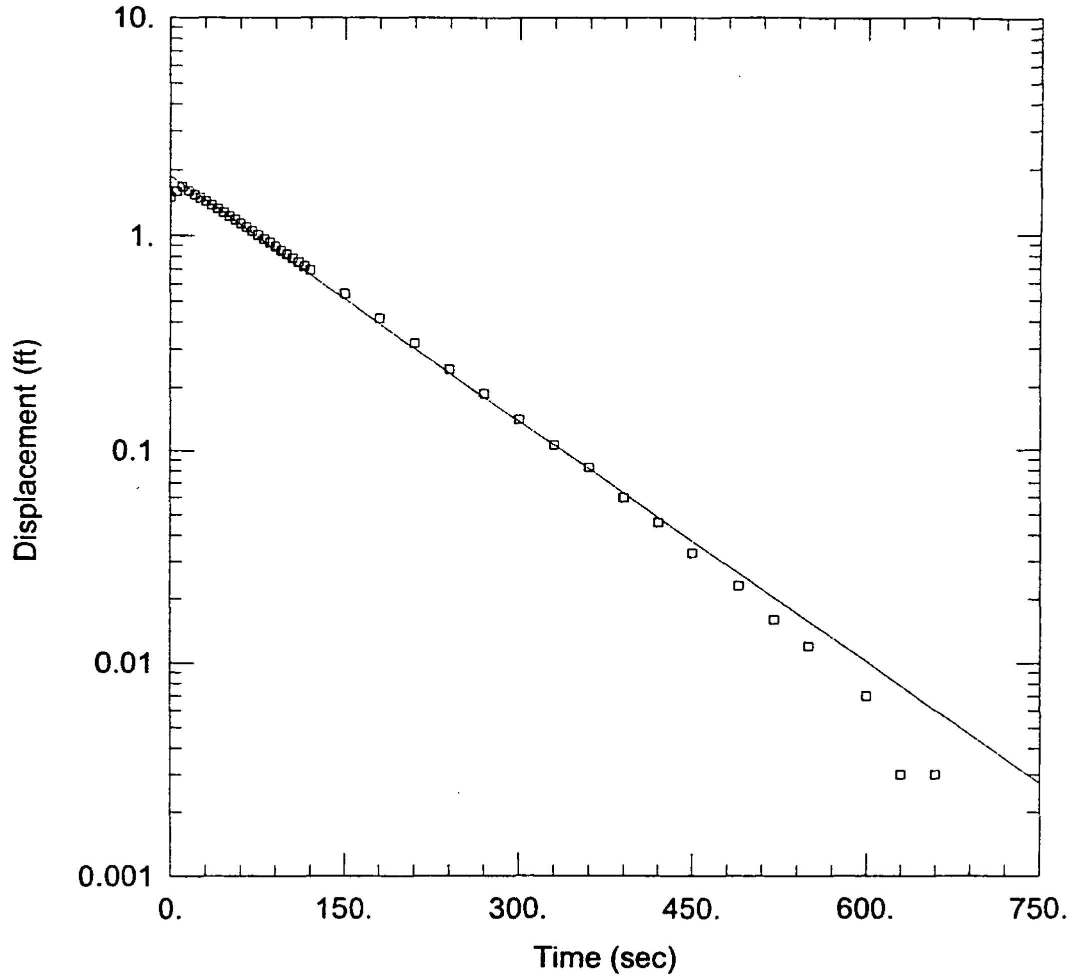
WELL DATA (MWFP-2S)

Initial Displacement: 1.5 ft Water Column Height: 2.5 ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.1666 ft
Screen Length: 10. ft Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0001339 cm/sec y0 = 0.2505 ft



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mwfp2d.aqt
Date: 05/26/01 Time: 12:26:22

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/19/00

AQUIFER DATA

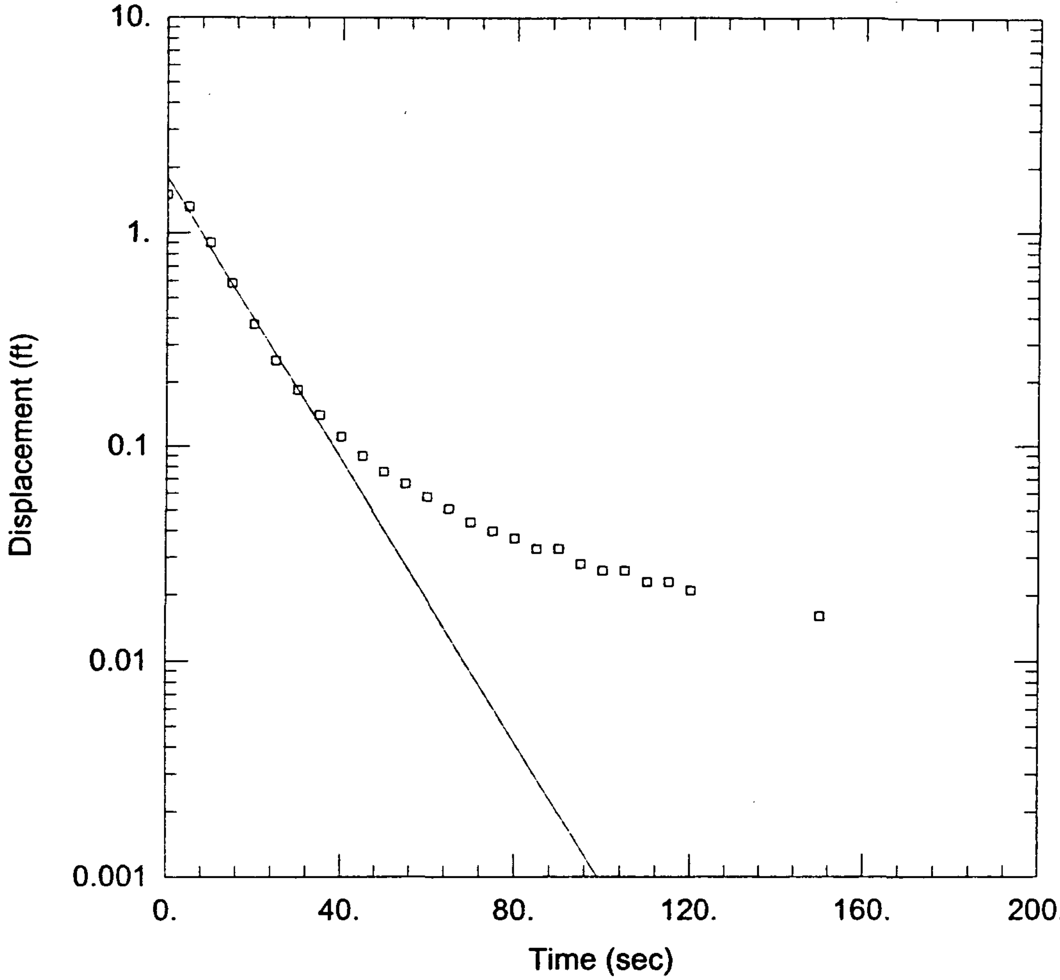
Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MWFP-2D)

Initial Displacement: 1.5 ft Water Column Height: 17. ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.1666 ft
Screen Length: 10. ft Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice
K = 0.0006367 cm/sec y0 = 1.881 ft



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mwfp3s.aqt
Date: 05/26/01 Time: 12:27:26

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/19/00

AQUIFER DATA

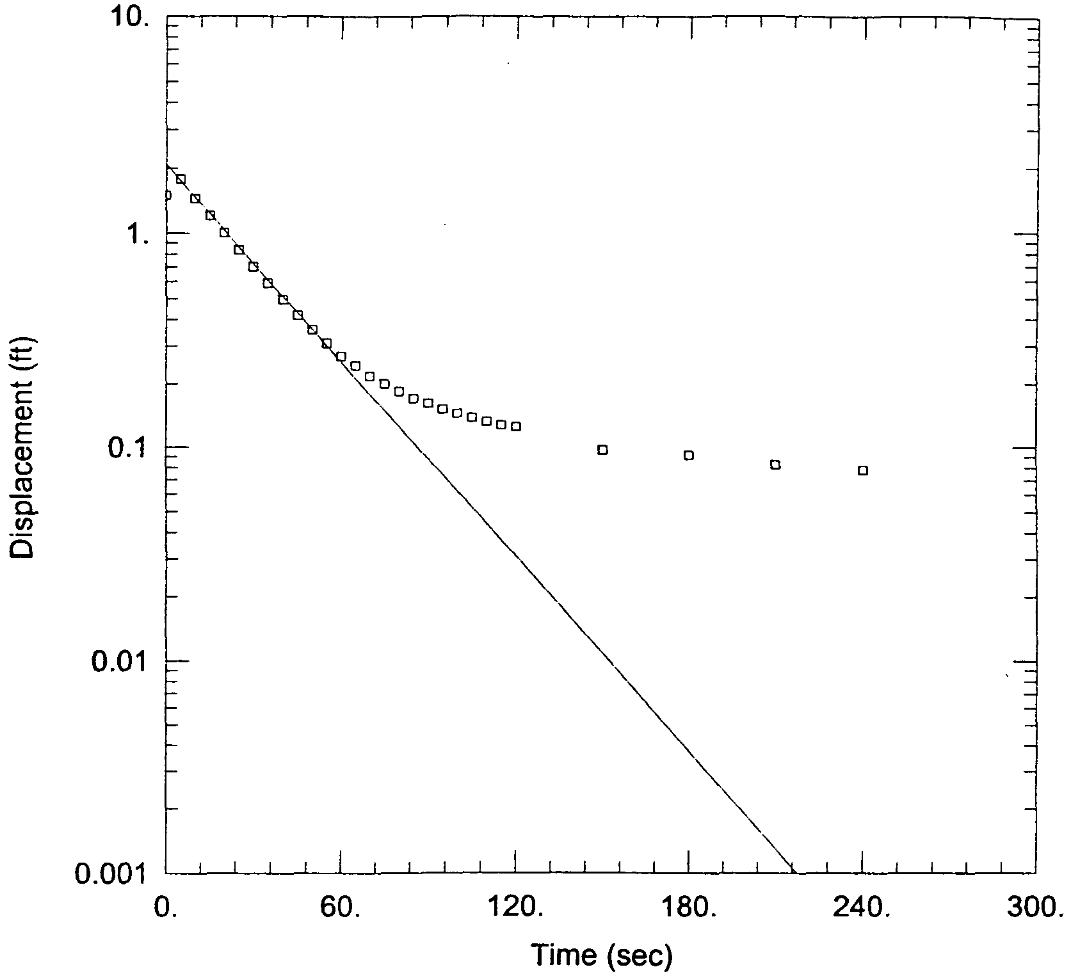
Saturated Thickness: 5.8 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MWFP-3S)

Initial Displacement: 1.5 ft
Water Column Height: 5.8 ft
Casing Radius: 0.0833 ft
Wellbore Radius: 0.1666 ft
Screen Length: 6.5 ft
Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.006668 cm/sec
y0 = 1.807 ft



WELL TEST ANALYSIS

Data Set: I:\Project\005771 PRP Group Peter Cooper NPL\working\slug test data\mwfp3d.aqt
Date: 05/26/01 Time: 12:27:15

PROJECT INFORMATION

Company: Geomatrix
Client: Peter Cooper PRP
Project: 005771.001 Task A
Test Location: Gowanda, NY
Test Date: 10/19/00

AQUIFER DATA

Saturated Thickness: 10. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MWFP-3D)

Initial Displacement: 1.5 ft Water Column Height: 13. ft
Casing Radius: 0.0833 ft Wellbore Radius: 0.1666 ft
Screen Length: 10. ft Gravel Pack Porosity: 0.33

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.002445 cm/sec y0 = 2.092 ft

APPENDIX I

APPENDIX I

Letter dated April 12, 2001 to U.S. EPA Regarding Second Round COPC Selection for the Former Manufacturing Plant Area

301529

338 Harris Hill Road, Suite 201
Williamsville, New York 14221
(716) 565-0624 • FAX (716) 565-0625

GEOMATRIX

April 12, 2001
Project 5976.001

Ms. Sherrel Henry
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway – 20th Floor
New York, New York 10007-1866

Subject: Peter Cooper Site – Proposed Target Analytes for the Second Environmental Sample Collection Event
Gowanda, New York
Administrative Order Index No. CERCLA-02-2000-2014

Dear Ms. Henry:

This letter identifies the proposed Target Analytes for the second environmental sample collection event at the Peter Cooper Site in Gowanda, New York. The selection of the Target Analytes for this sampling event is described in Section 2.3.1 and Section 4.4.1 of the Remedial Investigation/Feasibility Study Work Plan, Inactive Landfill Area (revised March 2000) and Section 2.1.6 and 4.2.10 in the Addendum to Remedial Investigation/Feasibility Study Work Plan Scope of Work to Address the Former Manufacturing Plant Area (revised August 2000) prepared by Benchmark Environmental Engineering and Science, PLLC (Benchmark) and Geomatrix Consultants, Inc. (Geomatrix).

Surface soil, subsurface soil, groundwater, landfill seeps, surface water, and landfill gas samples were collected from the Peter Cooper Site during October and November 2000. At the Former Manufacturing Plant Area, aqueous samples were analyzed for Target Compound List (TCL) Volatile Organic Compounds (VOCs), TCL Semi-Volatile Organic Compounds (SVOCs), and Target Analyte List (TAL) Metals (including hexavalent chromium). Aqueous samples collected from the Inactive Landfill Area were analyzed for select petroleum aromatic hydrocarbons, acid extractable SVOCs, arsenic, chromium, hexavalent chromium, and zinc. Samples collected from both areas were also analyzed for select water quality parameters. Sampling was conducted in accordance with the Field Operating Procedures (FOPs) of the Quality Assurance Project Plan (QAPP), prepared by Benchmark and Geomatrix, revised August 2000. Groundwater split samples were collected by TAMS at monitoring well locations MWFP-2D, MWFP-3S, MWFP-3D, MW-3R, and MW-6.

Sample results were validated by a third party certified data validator (Data Validation Services). The validated analytical results for the first round of comprehensive sampling were submitted to the United States Environmental Protection Agency (USEPA) as part of the February 15, 2001 Progress Report.

The validated analytical results were used in the Pathways Analysis Report (PAR), submitted March 2, 2001 that presented the approach to the Human Health Risk Assessment (HHRA) and the Ecological Risk Assessment (ERA). As part of that approach, the site characteristics and analytical data were evaluated to identify Chemicals of Potential Concern (COPCs) for evaluation of potential risk.

The HHRA COPCs for the Peter Cooper Site were identified for each environmental medium by comparing detected concentrations to risk-based screening criteria. A chemical was selected as a COPC if the maximum detected concentration exceeded its respective risk-based screening criterion or if the maximum reporting limit exceeded the criterion. Risk-based screening criterion for soil samples were compared to USEPA Region 9 Preliminary Remediation Goals (PRGs) for industrial land use while groundwater samples (overburden and bedrock) were compared to USEPA Region 9 PRGs for tap water. The comparisons are presented in RAGS Part D tables for surface soil, subsurface soil, and groundwater.

The COPCs identified in the PAR have been selected as proposed Target Analytes for the second groundwater sampling event within the Former Manufacturing Plant Area. The Target Analytes for the Inactive Landfill Area (groundwater and seeps) were defined in a September 28, 2000 letter to the USEPA and will remain the same for the second sampling event. The COPCs for surface water samples have been revised to include the Target Analytes of the Inactive Landfill Area and the Target Analytes of the Former Manufacturing Plant Area. The proposed revised Analytical Program Summary for media to be sampled during the second sampling event is attached to this letter.

Upon USEPA approval, the revised Analytical Program Summary will be used in the second groundwater and surface water sampling event. We have tentatively scheduled this sampling event for the week of April 30, 2001 to collect samples during a high water table condition.

Please contact either of the undersigned if you have questions.

Sincerely yours,
GEOMATRIX CONSULTANTS, INC.

Richard H. Frappa, P.G.
Senior Hydrogeologist

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

Jennifer M. Hugo for

Thomas H. Forbes, P.E.
Project Manager

P:\Project\005771 PRP Group Peter Cooper NPL\letters\COPCs plant area

Enclosure

cc: J. Wittenborn (Collier Shannon)
K. McMahon (Collier Shannon)
S. Davis (Huber Lawrence)
G. Shanahan (USEPA)
M. Graham (Phillips Lytle)
K. Hogan (Phillips Lytle)
J. Simone (NYSEG)

ANALYTICAL PROGRAM SUMMARY
PROPOSED SECOND SAMPLING EVENT TARGET ANALYTES

GEOMATRIX

Peter Cooper Site
Gowanda, New York

Former Manufacturing Plant Area Groundwater	Inactive Landfill Area Groundwater/Seeps	Cattaraugus Creek Surface Water	Inactive Landfill Gas[1]
Benzene	Benzene	Benzene	Total VOCs
Carbon Tetrachloride	Ethylbenzene	Ethylbenzene	Hydrogen Sulfide
Chloroform	Toluene	Toluene	Methane
Tetrachloroethene	Total Xylene	Total Xylene	Carbon Monoxide
Trichloroethene	Chlorobenzene	Chlorobenzene	Oxygen
Benzo(a)anthracene	1,2-Dichlorobenzene	1,2-Dichlorobenzene	
Benzo(a)pyrene	1,4-Dichlorobenzene	1,4-Dichlorobenzene	
Benzo(b)fluoranthene	Acid extractable SVOCs	Carbon Tetrachloride	
Indeno(1,2,3-cd)pyrene	Arsenic[2]	Chloroform	
Benzo(a,h)anthracene	Chromium[2]	Tetrachloroethene	
Iron[2]	Hex. Chromium[2]	Trichloroethene	
Manganese[2]	Zinc[2]	Acid extractable SVOCs	
Lead[2]	Iron[2]	Benzo(a)anthracene	
Calcium[2]	Calcium[2]	Benzo(a)pyrene	
Potassium[2]	Potassium[2]	Benzo(b)fluoranthene	
Magnesium[2]	Magnesium[2]	Indeno(1,2,3-cd)pyrene	
Sodium[2]	Sodium[2]	Benzo(a,h)anthracene	
Alk (bi-carb)	Alkalinity	Arsenic[2]	
Alk (carb)	Alk (bi-carb)	Chromium[2]	
Chloride	Alk (carb)	Hex. Chromium[2]	
Sulfate	Ammonia	Zinc[2]	
DOC	Chloride	Iron[2]	
Sulfide	DOC	Manganese[2]	
Ferrous Iron[3]	Nitrate	Lead[2]	
TDS	Sulfate	Calcium[2]	
TOC	Sulfide	Potassium[2]	
Field Measured Parameters[4]	Ferrous Iron[3]	Magnesium[2]	
	TKN	Alkalinity	
	TOC	Alk (bi-carb)	
	Field Measured Parameters[4]	Alk (carb)	
		Chloride	
		Total Hardness	
		Nitrate	
		Sulfate	
		Sulfide	
		TDS	
		TKN	
		TSS	
		TOC	
		DOC	
		Ferrous Iron[3]	
		Ammonia	
		Field Measured Parameters[4]	

Notes:

1. Landfill Gas to be field screened with hand held instruments.
2. Metals analysis will be for Total metals when field measured turbidity is less than 50 NTU, metals analysis will be for Soluble metals when field measured turbidity is greater than 50 NTU.
3. Ferrous iron analysis will be conducted in the field. Ten percent (10%) of the total number of ferrous iron samples will be submitted to the laboratory for assessment of precision and accuracy.
4. Field measured parameters for aqueous samples include: pH, specific conductance, oxidation-reduction potential, temperature, dissolved oxygen, turbidity, and ferrous iron.

VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds
DOC = Dissolved Organic Carbon
TDS = Total Dissolved Solids
TOC = Total Organic Carbon

TKN = Total Kjeldahl Nitrogen
TSS = Total Suspended Solids
Alk (bi-carb) = Bi-carbonate Alkalinity
Alk (carb) = Carbonate Alkalinity

APPENDIX J

APPENDIX J
QA/QC Variance Log

Variance Log
Updated: October 2000
Peter Cooper Site RI/FS – Gowanda, New York

GEOMATRIX

Geomatrix elected to perform the following variances from the scope, methods, or procedures designated in the RI/FS Work Plan, Addendum, and/or Quality Assurance Plan, based on field conditions or new information. These variances are not anticipated to negatively impact project objectives and were performed in accordance with EPA contractor oversite (TAMS) concurrence.

1) Monitoring well cluster MWFP-1 was to be installed at the former manufacturing plant area and include a shallow well (monitoring the overburden groundwater) and a deep well (monitoring the shallow bedrock groundwater). Drilling activities at this location showed bedrock to be 4.3 feet below ground surface. Since the overburden material was dry and too shallow to install a typical monitoring well, the shallow well was not installed at this location.

2) Three groundwater wells (MW-4D2, MW-7S, and MW-8D) exhibited extremely slow recharge rates during development. After purging these groundwater wells, recovery to static conditions can require in excess of 24 hours. These wells were pumped and/or bailed dry many times (over several days) during the well development program. Due to the slow recharge at these wells, the water quality stabilization and volume requirements as stipulated in SOP 23 of the QAPP (stabilization of water quality parameters, turbidity at 5 NTUs, and removal of 10 well volumes) were not achievable. These wells are considered fully developed for the following reasons:

   a.) During the development program, the water in well MW-4D2 was completely evacuated on four separate occasions between October 19 and October 23, removing 15.5 gallons of water, or approximately 3 well casing volumes. In addition, 50 gallons of water were removed prior to installing the PVC screen and riser pipe on October 10 to remove sediment in the open corehole and any water injected during the pressure packer testing. Turbidity values remained high most likely because a bailer was used to purge the water column, which continuously surged the water column. The other measured water quality parameters were somewhat variable, depending on the amount of time the water column had been allowed to recover between purges, but were not indicative of continuous change in groundwater quality. Therefore representative formation water was being purged. Initial turbidities were much lower than those measured after purging the well, therefore a non-turbid groundwater sample will be possible, provided the water column is allowed to settle after purging.

   b.) Well MW-7S was completely evacuated on 6 separate occasions between October 18 and October 23, with approximately 7.5 gallons being removed, or approximately 9 well volumes being removed. As with MW-4D2, a bailer was used for much of the purging, and is reflected in the turbidity measurements. Initial turbidity values were low and increased continuously as the well was surged with the bailer. Other water quality parameters were also somewhat variable, depending on the amount of time the water column had been allowed to recover between purges, but were not indicative of a continuous change in groundwater quality. Therefore representative formation water was being purged. The final groundwater appearance was clear with a pale yellowish-brown color. As this is an overburden well, no drill water was added during installation. The water color and turbidity are not a result of suspended sediments, but of representative formation water at this location.

c.) Well MW-8D was completely evacuated on 7 separate occasions between October 19 and October 23, with approximately 20 gallons being removed, or 3.5 well volumes being removed. The initial water quality was very silty, with a pH of 10.76, indicating the potential for grout influence in the well. The rock core at this location showed several silt and clay zones throughout the cored interval, indicating potential preferential pathways for grout migration. Low pumping rates during development to evacuate the borehole resulted in decreasing groundwater pH measurements that stabilized for a substantial time period after the initial water column was removed. Lower turbidity and pH values were obtained after development. It was agreed upon with TAMS personnel that allowing the water column to recover with settling of suspended fines in the water column during sampling would allow a representative groundwater sample to be obtained during groundwater sampling.

APPENDIX K

301537

APPENDIX K

RI Laboratory Analytical Data Validation Reports

January 12, 2001
Data Validation Report

301539

Data Validation Services
120 Cobble Creek Road P. O. Box 208
North Creek, N. Y. 12853
Phone 518-251-4429
Facsimile 518-251-4428

January 12, 2001

Jennifer Hagen
Geomatrix Consultants
336 Harris Hill Rd.
Williamsville, NY 14221

RE: Validation of Peter Cooper Site Data Packages
CAS SDG Nos. 0030, 0070, and 0083
Performance Analytical Inc. data package report date 11-13-00

Dear Ms. Hagen:

Review has been completed for the data packages generated by Columbia Analytical Services and Performance Analytical Inc. pertaining to samples collected at the Peter Cooper site October 10, 2000 through October 19, 2000. Forty four soil samples were analyzed for arsenic, chromium, zinc, TOC, and hexavalent chromium. All but two of these, and three additional soil samples, were processed for site-specific volatiles. Soil matrix spikes/duplicates were also processed. Methodologies utilized are those of the USEPA SW846. Four air samples were processed for four gases and TCL volatiles by USEPA TO-14A.

Data validation was performed with guidance from the most current editions of the USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review and the USEPA Region 2 SOPs HW-2 and HW-6. The following items were reviewed:

* Data Completeness
* Custody Documentation
* Holding Times
* Surrogate and Internal Standard Recoveries
* Matrix Spike Recoveries/Duplicate Correlations
* Field Duplicate Correlation
* Preparation/Calibration Blanks
* Control Spike/Laboratory Control Samples
* Instrumental Tunes
* Calibration Standards
* Instrument IDLs
* Method Compliance
* Sample Result Verification

Those items showing deficiencies are discussed in the following sections of this report. All others were found to be acceptable as outlined in the above-mentioned validation procedures, and as applicable for the methodology. Unless noted specifically in the following text, reported results are substantiated by the raw data, and generated in compliance with protocol requirements.

In summary, most results for volatile analytes are qualified as estimated in value due to low surrogate standard and/or internal standard recovery. Two volatiles analytes in two samples, and four in another are rejected due to the severity of the low recoveries. No qualifications are required for volatiles in air, metals, or TOC. Results for hexavalent chromium in eleven samples are qualified as estimated due to matrix. These issues are discussed in the following analytical sections. The laboratory procedure of utilizing only the sample suffixes for the client ID is also followed within this report.

Attached to this narrative are copies of laboratory case narratives. Also included in this submission are red-ink edited client results tables, reflecting validation qualifiers.

General

Sample 0068 and its matrix spikes were added to the chain of custody following laboratory receipt.

Volatile Analyses by EPA 8260

Most samples produced low surrogate BFB recoveries, and some showed outlying recoveries for one or both of the other surrogates. The low surrogate recovery indicates that all reported detected values and reporting limits for the affected samples be considered quantitatively estimated (qualifiers "J" and "UJ"). Many of those samples also exhibited low responses for one or more of the internal standards. The outliers occured with multiple analyses of the samples. In most cases, the recoveries were, although low, high enough that the level of bias of the reported values and limits is not extreme. However, there were three samples which showed sufficiently low internal standard responses that certain of the reported analyte results are rejected, and not usable. In summary, results for **all** sample results **except** the following are to be qualified as estimated. The following are also qualified as indicated:

1. 0054, 0061, 0062, and 0071 for whom no qualification is required
2. 0047 , 0065, and 0066 -only results for 1,2-dichlorobenzene and 1,4-dichlorobenzene are to be qualified as estimated
3. 0064 and 0084--results for 1,2-dichlorobenzene and 1,4-dichlorobenzene are rejected ("R"); other analyte results are estimated.

Most low surrogate recoveries were above 45%. Instrument sensitivity and reported MDL values, which are generally orders of magnitude below the reporting limits used for the project, indicate good sensitivity. Although many nondetected results of these project samples are qualified as estimated (indicating uncertainty of detection at those concentrations), the instrument sensitivity shows that if the analytes were present at the reporting limits, some low level detection would probably been observed in many cases.

Holding times, instrumental tunes, and blank responses were within required limits. Calibration standard responses were within action guidelines, or pertained to analyte values already qualified.

Matrix spikes of site-specific volatiles in samples 0047 and 0068 showed acceptable accuracy and precision. Spiked blank recoveries were also acceptable.

Field duplicate correlations for 0052 and 0053 were acceptable.

Volatile Analyses by TO-14

Holding times and instrumental performance were acceptable. Calibration standards met protocol/validation requirements.

Lab duplicates of 0082 (gases) and 0080 (TCL list) showed good correlation. Matrix spike evaluations are not applicable. Spiked control recoveries were acceptable.

Preliminary confirmation of detected analyte identifications is based, for this review, upon chromatographic retention time, software spectral fit values, and analyst evaluation.

Metals Analyses

Accuracy and precision evaluations were performed on 0047 and 0068, and showed acceptable recoveries and duplicate correlations. ICP serial dilution evaluations of the same samples showed no matrix effect resulting in qualification.

Field duplicate correlations for 0052 and 0053, and for 0063 and 0069 were acceptable.

Processing was compliant, and sample reported results are substantiated by the raw data.

Hexavalent Chromium and TOC Analyses

Holding times met method requirements. The reanalysis result for each sample was used, due to a processing error in the initial analysis.

Accuracy and precision for 0047 was acceptable. The recovery for the matrix spike of 0068 was low, at 21%. The reporting limits for the associated samples (SDG 070) are qualified estimated ("J" and "UJ"). Field duplicate correlations for 0052 and 0053, and for 0063 and 0069 were acceptable.

Please do not hesitate to contact me if questions or comments arise during your review of this report.

Very truly yours,

Judy Harry

301543

CAS ASP/CLP BATCHING FORM / LOGIN SHEET

SDG #: 0030	BATCH COMPLETE: __yes________	DATE REVISED:
SUBMISSIO R2004209	DISKETTE REQUESTED: Y___ N__x__	DATE DUE:11/08/00
CLIENT: Geomatrix Consultants Inc.	DATE: 10/12/00	PROTOCOL: SW846
CLIENT REP: Janice Jaeger	CUSTODY SEAL: PRESENT/ABSENT:	SHIPPING No.:
PROJECT: PETER COOPER SITE	CHAIN OF CUSTODY: PRESENT/ABSENT:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLE	DATE RECEIVE	pH (SOLIDS)	% SOLIDS	REMARKS AMPLE CONDITIO
415296QC	0047	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415297	0048	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415298	0049	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415299	0050	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415300	0051	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415301	0052	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415302	0053	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415303	0054	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415304	0055	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415305	0056	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415306	0057	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415307	0030	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415308	0058	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415309	0059	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415310	0060	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415311	0061	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415312	0062	SOIL	~~8260~~,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415313	0063	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415314	0064	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415315	0065	SOIL	8260,CR6,TOC,AS,CR,ZN	10/10/00	10/11/00			
415316	0066	SOIL	8260,CR6,TOC,AS,CR,ZN	10/11/00	10/11/00			
415317	0067	SOIL	8260,CR6,TOC,AS,CR,ZN	10/11/00	10/11/00			
415318	0069	SOIL	~~8260~~,CR6,TOC,AS,CR,ZN	10/11/00	10/11/00			

CAS ASP/CLP BATCHING FORM / LOGIN SHEET

301544

SDG #: 0070
SUBMISSION R2004215
CLIENT: Geomatrix Consultants Inc.
CLIENT REP: Janice Jaeger
PROJECT: PETER COOPER SITE

BATCH COMPLETE: __yes__________
DISKETTE REQUESTED: Y___ N__x__
DATE: 10/25/00
CUSTODY SEAL: PRESENT/ABSENT:
CHAIN OF CUSTODY: PRESENT/ABSENT:

DATE REVISED:
DATE DUE: 11/2/00
PROTOCOL SW-846
SHIPPING No.:

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS	% SOLIDS	REMARKS SAMPLE CONDITION
415528	0070	SOIL	See Below*	10/11/00	10/12/00			
415529	0071	SOIL	See Below*	10/11/00	10/12/00			
415530	0072	SOIL	See Below*	10/11/00	10/12/00			
415531	0073	SOIL	See Below*	10/11/00	10/12/00			
415532	0074	SOIL	See Below*	10/11/00	10/12/00			
415533	0075	SOIL	See Below*	10/11/00	10/12/00			
415534	0076	SOIL	See Below*	10/11/00	10/12/00			
415535	0077	SOIL	See Below*	10/11/00	10/12/00			
415655 QC	0068	SOIL	See Below* QC	10/11/00	10/12/00			
415802	0078	SOIL	See Below*	10/12/00	10/13/00			
415803	0031	SOIL	See Below*	10/12/00	10/13/00			
			*% Sol, Cr+6, TOC (WB), pH					
			As (LL), Cr, ZN,					
			8260 -special list					
			REPORT to CRQL's					
			2 WEEK RUSH!					

DATA VALIDATION SERV 5182514428 17:50 01/14/2001

000004

CAS ASP/CLP BATCHING FORM / LOGIN SHEET

301545

SDG #: 0083	BATCH COMPLETE: __yes________	DATE REVISED:
SUBMISSION R2004338	DISKETTE REQUESTED: Y___ N__x__	DATE DUE: 11/17/00
CLIENT: Geomatrix Consultants Inc.	DATE: 10/20/00	PROTOCC SW846
CLIENT REP: Janice Jaeger	CUSTODY SEAL: PRESENT/ABSENT:	SHIPPING No.:
PROJECT: PETER COOPER SITE	CHAIN OF CUSTODY: PRESENT/ABSENT:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS SAMPLE CONDITION
417655	0083	SOIL	8260	10/19/00	10/20/00			
417656	0084	SOIL	8260	10/19/00	10/20/00			
417657	0085	SOIL	8260	10/19/00	10/20/00			

DATA VALIDATION SERV

01/14/2001 17:50 5182514428

003

301546

CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper Site
SUBMISSION #: R2004209

Geomatrix samples were collected on 10/10-11/00 and received at CAS on 10/11/00 in good condition at a cooler temperature of 5 C.

INORGANIC ANALYSIS

Twenty three soil samples were analyzed for Arsenic, Chromium and Zinc by method 6010B from SW-846, TOC by the Walkley Black Titration and Hexavalent Chromium by method 7196.

Job specific QC was performed on 0047 as requested. All MS and Blank Spike recoveries were within limits. All RPD's were within limits.

During the original analysis of Hexavalent Chromium, the Mg+2 in a phosphate buffer was not added to the alkaline extraction solution as requested. The samples were repeated within the recommended holding time with the addition of the buffer, and both sets of data have been reported out.

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Twenty soil samples were analyzed for a site specific list of Volatiles by method 8260 from SW-846.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

Many internal standard areas were outside QC limits. All samples were repeated except 0049 and most of internal standards were still outside limits. Most of these replicates were analyzed outside the recommended holding time of 14 days. The contents of 2 encore samplers were placed into 1 low level vial for 0049 and the client resampled this location for 8260 only. All outlying internal standards have been flagged with an "*".

Many surrogate standard recoveries were outside acceptance limits. All samples were repeated except 0049 and many of the surrogates were still outside limits. 0049 could not be repeated for the reason mentioned above.

Job specific QC was performed on 0047 as requested. All MS/MSD's and Reference Spike recoveries were within limits. All RPD's were within limits.

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were analyzed within required holding times except as mentioned above.

No other analytical or QC problems were encountered.

1 Mustard Street, Suite 250 ▪ Rochester, NY 14609-6925 ▪ Telephone (716) 288-5380 ▪ Fax (716) 288-8475

Geomatrix - submission #R2004209 - page 2

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or his designee, as verified by the following signature. Michael K. P

CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper Site
SUBMISSION #: R2004215

Geomatrix samples were collected on 10/11-12/00 and received at CAS on 10/12-13/00 in good condition at cooler temperatures of 3-6 C.

INORGANIC ANALYSIS

Eleven soil samples were analyzed for Arsenic, Chromium and Zinc by method 6010B from SW-846, TOC by the Walkley Black Titration, pH by method 9045 and Hexavalent Chromium by method 7196.

Job specific QC was performed on sample 0068 as requested. All matrix spike recoveries were within limits except Hexavalent Chromium which has been flagged with an "N". The matrix spike recovery for the repeat Hexavalent chromium analysis done on sample 0077 was within QC limits. All Blank Spike recoveries were within limits. All RPD's were within limits.

During the original analysis of Hexavalent Chromium, the Mg+2 in a phosphate buffer was not added to the alkaline extraction solution as requested. The samples were repeated within the recommended holding time with the addition of the buffer, and both sets of data have been reported out.

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Eleven soil samples were analyzed for a site specific list of Volatiles by method 8260 from SW-846.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

Many internal standard areas were outside QC limits. All samples were repeated except 0070 and all of internal standards were still outside limits. All of these replicates were analyzed outside the recommended holding time of 14 days. Sample 0070 was set up on an automated sequence during the evening analytical run. MS failure occurred during the analysis of this sample, therefore no results are available and the vial that contained this sample could not be reanalyzed. The second vial was analyzed but the internal standards could not be confirmed since no sample remained. All outlying internal standards have been flagged with an "*".

Many surrogate standard recoveries were outside acceptance limits. All samples were repeated except 0070 and all of the surrogates were still outside limits. 0070 could not be repeated for the reason mentioned above.

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Geomatrix - submission #R2004215 - page 2

Job specific QC was performed on 0068 as requested. All MS/MSD's and Reference Spike recoveries were within limits.

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were analyzed within required holding times except as mentioned above.

No other analytical or QC problems were encountered.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or his designee, as verified by the following signature. Mukul K. P.

CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc
Peter Cooper Site
SUBMISSION #: R2004338
SDG #I0083

Geomatrix samples were collected on 10/19/00 and received at CAS on 10/20/00 in good condition.

VOLATILE ORGANICS

Three soil samples were analyzed for the new TCL list of Volatiles by method 8260 from SW-846.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits except 0083, 0084 and 0085. The samples were repeated and again the internal standards were outside limits and have been flagged with an "*".

All surrogate standard recoveries were within acceptance limits for all samples except 0083, 0084 and 0085. The samples were repeated and again the surrogates were outside limits and have been flagged with an "*".

Site specific QC was not requested on these samples. All Reference Spike recoveries were within limits.

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were analyzed within required holding times.

No other analytical or QC problems were encountered.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in the hard copy package has been authorized by the Laboratory Manager or his designee, as verified by the following signature. ________________

301550

1 Mustard Street, Suite 250 • Rochester, NY 14609-6925 • Telephone (716) 288-5380 • Fax (716) 288-8475

Performance Analytical Inc.
Air Quality Laboratory
A Division of Columbia Analytical Services, Inc.
An Employee Owned Company

LABORATORY REPORT

Client:	GEOMATRIX CONSULTANTS, INC.	Date of Report:	11/13/00
Address:	338 Harris Hill Road, Suite 201	Date Received:	10/17/00
	Williamsville, NY 14221	PAI Project No:	P2002780
Contact:	Mr. Rick Frappa	Purchase Order:	Verbal
Client Project ID:	Peter Cooper Site	New York ELAP ID:	11221

Four (4) Stainless Steel Summa Canisters labeled:

"101200079" "101200080" "101200081" "101200082"

The samples were received at the laboratory under chain of custody on October 17, 2000. The samples were received intact. The dates of analyses are indicated on the attached data sheets.

<u>Oxygen/Argon, Nitrogen, Methane and Carbon Dioxide Analysis</u>

The samples were analyzed for Oxygen/Argon, Nitrogen, Methane and Carbon dioxide according to ASTM D1946 using a gas chromatograph equipped with a thermal conductivity detector (TCD).

The results of analyses are given in the attached data package.

Reviewed and Approved:

Ku-Jih Chen
Principal Chemist

Reviewed and Approved:

Chris Parnell
Senior Chemist

Performance Analytical Inc.
Air Quality Laboratory
A Division of Columbia Analytical Services, Inc.
An Employee Owned Company

Volatile Organic Compound Analysis

The samples were analyzed by combined gas chromatography/mass spectrometry (GC/MS) for volatile organic compounds. The analyses were performed according to the methodology outlined in EPA Method TO-14A. The analyses were performed by gas chromatography/mass spectrometry, utilizing a direct cryogenic trapping technique. The analytical system used was comprised of a Hewlett Packard Model 5973 GC/MS/DS interfaced to a Tekmar AutoCan Elite whole air inlet system/cryogenic concentrator. A 100% Dimethylpolysiloxane capillary column (RT_x-1, Restek Corporation, Bellefonte, PA) was used to achieve chromatographic separation.

2665 Park Center Drive, Suite D, Simi Valley, California 93065 • Phone (805) 526-7161 • Fax (805) 526-7270

The edited Form I data sheets from data validation have been submitted to USEPA and NYSDEC under separate cover.

January 20, 2001
Data Validation Report

Data Validation Services

120 Cobble Creek Road P. O. Box 208

North Creek, N. Y. 12853

Phone 518-251-4429

Facsimile 518-251-4428

January 20, 2001

Jennifer Hagen
Geomatrix Consultants
336 Harris Hill Rd.
Williamsville, NY 14221

RE: Validation of Peter Cooper Site Data Packages
CAS SDG Nos. 0020, 0021, 0023, 0086, 0092, 0097, 0102, and 0110

Dear Ms. Hagen:

Review has been completed for the data packages generated by Columbia Analytical Services pertaining to samples collected at the Peter Cooper site October 6, 2000 through November 11, 2000. Soil and aqueous samples were analyzed for various combinations of TCL or site-specific volatiles by EPA 8260B, TCL or acid analytes by EPA 8270C, TAL or site-specific metals by EPA 6000/7000, hexavalent chromium, TOC, and/or water quality parameters. Matrix spikes/duplicates were also processed.

Data validation was performed with guidance from the most current editions of the USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review and the USEPA Region 2 SOPs HW-2 and HW-6. The following items were reviewed:

* Data Completeness
* Custody Documentation
* Holding Times
* Surrogate and Internal Standard Recoveries
* Matrix Spike Recoveries/Duplicate Correlations
* Field Duplicate Correlation
* Preparation/Calibration Blanks
* Control Spike/Laboratory Control Samples
* Instrumental Tunes
* Calibration Standards
* Instrument IDLs
* Method Compliance
* Sample Result Verification

Those items showing deficiencies are discussed in the following sections of this report. All others were found to be acceptable as outlined in the above-mentioned validation procedures, and as applicable for the methodology. Unless noted specifically in the following text, reported results are substantiated by the raw data, and generated in compliance with protocol requirements.

In summary, most results for volatile analytes in soil samples are qualified as estimated in value, primarily due to matrix effect. Acid semivolatile compound results for two samples are not usable (also due to matrix), and results for two base/neutral analytes in several samples are also not usable. The hexavalent chromium result for one sample is rejected, and some of the TOC/SOC detections in aqueous samples are considered contamination. Most of the remaining semivolatile, metals, and wet chemistry data are usable as reported, or with qualification as estimated due to matrix effect or processing concerns. These issues are discussed in the following analytical sections. The laboratory procedure of utilizing only the sample suffixes for the client ID is also followed within this report.

Attached to this narrative are copies of laboratory case narratives, and resubmission communications. Also included in this submission are red-ink edited laboratory sample report forms, reflecting validation qualifiers.

Volatile Analyses by EPA 8260

The tops of the Encore samplers received for sample 0029 were off when received (see case narrative for SDG 023). Additionally, the caps for samples 0020, 0021, 0022, 0025, 0026, 0027, and 0028 were loose when received. Due to potential losses, results for all samples noted above except 0029 are considered estimated ("J" and "UJ"), with a possible low bias. Sample 0029 reported low concentrations of five of the eight analytes, and those values should be estimated, considered as potentially having an extreme low bias. The results for the three nondetected analytes in 0029 are rejected ("R"), and not usable.

Some of the soil samples exhibited inconsistent concentrations of several analytes when repeat analyses were performed. These analytes include acetone, 2-butanone, methylacetate, and carbon disulfide. The lab narratives discuss the potential for contribution of ketones from reactions with the preservative used with Encore samplers. Results for these analytes in the samples should be used with caution. Low level acetone values for some samples are considered contamination (discussed below).

Results for analytes initially reported with the "E" flag should be derived from the dilution analysis of the given sample. All other results for the given sample can be used from the initial analysis, unless noted otherwise herein.

The result for tetrachloroethene in 0039, although flagged as "E", should be derived from the initial analysis and qualified estimated. The dilution analysis of that sample followed one from which carryover of that analyte may have occurred.

Most soil samples produced low surrogate BFB recoveries, and some showed outlying recoveries for one or both of the other surrogates. The low surrogate recovery indicates that all reported detected values and reporting limits for the affected samples be considered quantitatively estimated (qualifiers "J" and "UJ"). Many of those samples also exhibited low responses for one or more of the internal standards. The outliers occured with multiple analyses of the samples. In most cases, the recoveries were, although low, high enough that the level of bias of the reported values and limits is not extreme.

In summary, results for **all** sample results **except** the following are to be derived from the initial analysis, and qualified as estimated ("J" and "UJ"). The following are also qualified as indicated:

1. 0009 -- for whom no qualification is required
2. 0012, 0017, 0035 -- results for 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2,4-trichlorobenzene, 1,1,2,2-tetrachloroethane, and 1,2-dibromo-3-chloropropane are qualified estimated.
3. 0016 --all analyte results estimated, but use the reanalysis preferentially over the initial.
4. 0045 -- all results are estimated, and the results for 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2,4-trichlorobenzene, 1,1,2,2-tetrachloroethane, and 1,2-dibromo-3-chloropropane are to be derived from the reanalysis (which had higher reporting limits).

Most low surrogate recoveries were above 45%. Instrument sensitivity and reported MDL values, which are generally orders of magnitude below the reporting limits used for the project, indicate good sensitivity. Although many nondetected results of these project samples are qualified as estimated (indicating uncertainty of detection at those concentrations), the instrument sensitivity shows that if the analytes were present at the reporting limits, some low level detection would probably been observed in many cases.

Although outlying surrogate recoveries are generally attributed to matrix effect, it is observed that the trip blank (and cancelled field blank) in SDG 023 also showed low BFB recoveries (76%, below 86% aqueous limit, above 74% soil limit).

Due to the lack of available sample for the moisture determinations, the results for samples 0042, 0043, and 0045 were calculated using the solids content of 0046, which is a composite of the three samples. That solids value may not accurately reflect the solids of its components. These sample results are estimated due to matrix, as noted above.

Holding times, instrumental tunes, and blank responses were within required limits. Calibration standard responses were within action guidelines, or pertained to analyte values already qualified, with the following exceptions: bromomethane in all soil samples in SDG 023
methyl acetate detections in soil samples in SDG 023

Matrix spikes of site-specific volatiles in soil sample 0020, and TCL analytes in soil samples 0010, 0038, and 0092 showed acceptable accuracy and precision. Matrix spikes of aqueous sample 0097 were also acceptable. Recoveries for only five matrix spike compounds were reported on the summary forms for those associated with the TCL analyses. Raw data shows most analytes were spiked, and unless noted specifically herein, showed generally acceptable responses. Although reported as nondetection on the Form 1 for the matrix spike duplicate of 0092, raw data shows good response for analyte carbon tetrachloride. Project spiked blank recoveries were also acceptable.

Field duplicate correlations for soil sample sets 0015/00116, 0040/0041 and 0026/0027, and for aqueous sample sets 0088/0089, 0093/0094, and 0098/0099 were acceptable.

Although not detected in the blank associated with 0016, 1,2,4-trichlorobenzene (detected in 0016) was detected in a method blank on another day's analysis. The detection should be regarded with caution. This analyte was also detected in some of the soil sample reanalyses, but not initial analyses.

Weights of samples taken in the Encore samplers often fell below 4.5 grams. This results in elevated reporting limits.

Aqueous samples 0108, 0109, and 0117 were analysed at tenfold dilution, although little matrix interference was noted in the chromatograms. This can result in unnecessarily elevated reporting limits.

Semivolatile Analyses

Holding times, instrumental tunes, and blank responses were within required limits.

There are no usable results for the acid compounds in samples 0089 and 0120 ("R" qualifier) due to failed acid surrogate standard recoveries (below 10%). The samples were reinjected, but could not be reextracted due to limited sample volume. Therefore it is unknown if the failures were matrix or processing related. Base/neutral compound data for 0089 are not affected. The QC summary Form 8 for the reanalysis of 0089 should have shown sample ID of 0089, not 0091.

Due to low recovery of internal standard d12-perylene, results for the following analytes in 0007, 0046, and 0094 should be qualified estimated ("UJ" and "J"); the reanalysis results should be used: di-n-octylphthalate, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)anthracene, dibenz(a,h)-anthracene, indeno(1,2,3-cd)pyrene, and benzo(g,h,i)perylene.

Due to failure to recover in the associated QC check samples (spiked blanks), the results for 3-nitroaniline in the soil samples in SDG 021 and SDG 023, and for 3,3'-dichlorobenzidine in those in SDG 023, are rejected ("R"), and not usable.

The result for pentachlorophenol in sample 0046 should have been reported as 6800 ug/kg, as indicated in the raw data. It was reported as nondetection.

Results for analytes initially reported with the "E" flag should be derived from the dilution analysis of the given sample. All other results can be used from the initial analysis.

Matrix spikes of soil sample 0010 showed significant variance between the concentrations of the target analytes detected in the sample itself and the concentrations produced in the matrix spikes. The analytes native to the sample, primarily PAHs, showed concentrations about tenfold higher in the matrix spikes than in the sample itself. The spiking only contributed a small fraction of those responses. This is evidenced by the recovery of pyrene in the matrix spikes (637% and 1350%). The results for the detected analytes in the sample 0010 are therefore qualified estimated, due to possible nonhomgeneity of the sample.

Matrix spikes of aqueous samples 0086 and 0097 produced low recoveries for phenol (16% to 20%) and pentachlorophenol (13% and 15%). Although not qualified, results for these analytes in the samples of similar matrix should be considered as having a possible low bias.

Matrix spikes reported for semivolatiles in soil sample 0092 showed acceptable accuracy and precision.

Recoveries for only nine matrix spike compounds were reported for those samples associated with the TCL analyses. Raw data shows most analytes were spiked, and showed generally good responses, with the exception that 3,3'-dichlorobenzidine did not recover in one of the spikes of 0092. Results for this analyte should be used with caution.

Spiked blank recoveries were also acceptable, with the exceptions of those noted within this report.

Field duplicate correlations for soil sample sets 0015/0016 and 0040/0041, and for aqueous sample sets 0088/0089 and 0098/0099 were acceptable.

Due to copresence in the associated blank, detected results for di-nbutylphthalate in samples in SDG 092 are considered contamination, and edited to nondetection at the CRDL. The presence of phthalates in the other project samples are also suspect.

Calibration standard responses are within action guidelines, or pertaine to analyte values already qualified, with the following exceptions:

1. Hexachlorocyclopentadiene reporting limits should be increased by a factor of five in samples in SDG 023 due to poor response in low concentration initial calibration standard (48%RSD, low RRF = 0.035).
2. 2,4-dinitrophenol and 4-nitrophenol results in sample 0046 are qualified estimated
3. Hexachlorocyclopentadiene and benzaldehyde in samples in SDG 092 are qualified estimated
4. 2,4-dinitrophenol in sample 0109 and those in SDG 102 and SDG 110 are qualified estimated

Metals Analyses

Accuracy and precision evaluations were performed for soil samples on 0020, 0010, 0038, and 0092 showed recoveries and duplicate correlations within the validation guidelines, with the following exceptions. Associated sample element results are qualified as estimated:

Sample Spiked	Outlying low recovery	Samples Affected
0020	zinc	all in SDG 020
0010	antimony and lead	all in SDG 021
0038	antimony	all in SDG 023
0092	antimony, arsenic, and silver	all in SDG 092

Accuracy and precision evaluations were performed for aqueous samples on 0097 and 0118 (and on the filtered fraction of a field blank 0113), and showed acceptable recoveries and duplicate correlations.

Some sample exhibited outlying recoveries for post-digest spikes on analytes processed by graphite furnace. Those samples showed no detection for those elements, and no qualification is required.

Due to outlying recoveries of the CRI standards, results for the following sample analytes are qualified estimated, with a possible bias as stated:

chromium in 0026 and 0027, biased high
selenium in samples in SDG 023, biased low

ICP serial dilution evaluations of soil samples 0020, 0010, 0038, and 0092 showed no matrix effect resulting in qualification, with the exception of zinc in 0010 and iron in 0038. Zinc results for all samples in SDG 021, and those for iron in the samples in SDG 023, are qualified as estimated.

ICP serial dilution evaluations of aqueous samples 0091, 0097, and 0118 showed no matrix effect resulting in qualification.

It is noted that the evaluation is performed only to the reported project CRDLs. The laboratory reports IDLs (QC summary Form 10) that are equal to CRDLs for many of the data packages. Evaluation to actual lower instrument IDLs, which are not provided with this data, involves a more strict evaluation of matrix effect at low analyte concentrations. As reported, the samples exhibited little matrix effect at elevated concentrations.

Field duplicate correlations for soil sample sets 0040/0041 and 0026/0027, and for aqueous sample sets 0088/0089, 0093/0094, and 0098/0099 were acceptable. The correlations for three metals in the soil samples 0015/0016 exceeded validation criteria of >+-2XCRDL of 100%RPD. Therefore results for calcium, chromium, and mercury in 0015 and 0016 are qualified as estimated. Caution should be used in the evaluation of these elements' data in samples of similar matrix to those field duplicates.

Processing was compliant, and sample reported results are substantiated by the raw data.

Hexavalent Chromium, TOC, and other Wet Chemistry Analyses

Review was conducted for method compliance, holding times, transcription, calculations, standard and blank acceptability, accuracy and precision, etc., as applicable to each procedure. All were acceptable unless noted below.

Holding times met method requirements, with the exception of the following:

1. Hexavalent chromium analysis of 0118 was performed at more than four days from collection (holding time is 24 hour). The result for this analyte in the sample is rejected.
2. Hexavalent chromium analyses of 0116 and 116-soluble were performed one and twenty two hours past that allowed. Results for this analyte in the two sample are qualified estimated, with a possible low bias.
3. Nitrate analyses of samples 0110, 0111, 0112, and 0114. Results for these are qualified as estimated, with a possible low bias. The holding time exceedence was minor (1 to 3.5 hours beyond the 48 hours allowed).

Some soil samples were processed twice for hexavalent chromium, due to a processing error in the initial analysis. The reanalysis results should be used.

The field blank 0113, associated with the aqueous samples, showed detection of TOC above the CRDL (at 2.3 mg/L). Therefore all aqueous sample detections of TOC or SOC at or below 11.5 mg/L are considered contamination and are edited to nondetection at elevated reporting limits corresponding to the originally reported concentrations.

One sulfide method blank showed response at the CRDL. Associated samples showed no detection of that analyte.

A summary form entry showing a noncompliant elevated method blank response (2.94 mg/L) was not substantiated by raw data. Sample results are associated with compliant blanks.

The hexavalent chromium result for the dissolved fraction of 0116 was slightly above the reporting limit,while that fraction showed no total chromium. Additionally, the unfiltered fraction showed no hexavalent chromium. The result for total and hexavalent chromium in the dissolved fraction are qualified estimated.

Accuracy and precision for hexavalent chromium and TOC, and duplicate correlation for pH and moisture, in soil samples 0020, 0038, and 0092 were all acceptable.

Accuracy and precision for wet chemistry parameters in aqueous sample 0097 were acceptable.

The matrix spike of hexavalent chromium on soil sample 0010 had only 24% recovery. Results for that analyte in the soil samples in SDG 021 are therefore qualified as estimated, with a possible low bias.

The matrix spike for the ferrous iron analysis associated with sample 0108 was low (76%). The result for that analyte in the sample is therefore qualified estimated, with a possible slight low bias.

Field duplicate correlations for soil sample sets 0015/0016 and 0040/0041, and for aqueous sample sets 0088/0089 and 0093/0094 were acceptable. The correlations for TOC in soil samples 0026/0027 showed variance exceeding the validation action limit of >2X+-CRDL. Results for TOC in those two samples are therefore considered estimated, and the end-users of the data should consider that other samples of similar matrix may show variance at low TOC concentrations. Similarly, the Total Suspended Solids contents of aqueous field duplicates 0098/0099 varied by more than +-CRDL, results for that analyte in those two samples are also qualified as estimated, and consideration of this variance should be used when evaluating other samples of similar matrix.

Raw data for the sulfide and hardness analyses of the samples in SDG 097 were not located within that data package, but can be found in SDG 0102.

General

Some of the sample collection custody forms have uninitialed writeovers and strikeovers. All edits should have been dated and initialed.

The case narrative for SDG 0021 should state the receive date of 10/6/00, not 10/11/00.

Please do not hesitate to contact me if questions or comments arise during your review of this report.

Very truly yours,

Judy Harry

CAS ASP/CLP BATCHING FORM / LOGIN SHEET

SDG #: 0020	BATCH COMPLETE: __yes_________	DATE REVISED:
SUBMISSION R2004153	DISKETTE REQUESTED: Y___ N__x__	DATE DUE: 11/03/00
CLIENT: Geomatrix Consultants Inc.	DATE: 10/24/00	PROTOCOL: SW846
CLIENT REP: Janice Jaeger	CUSTODY SEAL: PRESENT/ABSENT:	SHIPPING No.:
PROJECT: PETER COOPER SITE	CHAIN OF CUSTODY: PRESENT/ABSENT:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS SAMPLE CONDITION
414444QC	10060020	SOIL	8260,TOC,AS,CR,ZN,PH ,Cr6	10/6/00	10/6/00			
414452	100600021	SOIL	8260,TOC,AS,CR,ZN,PH ,Cr6	10/6/00	10/6/00			
414453	100600022	SOIL	8260,TOC,AS,CR,ZN,PH ,Cr6	10/6/00	10/6/00			

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CAS ASP/CLP BATCHING FORM / LOGIN SHEET

SDG #: 0021		BATCH COMPLETE: __yes_________	DATE REVISED:
SUBMISSION	R2004151	DISKETTE REQUESTED: Y___ N__x__	DATE DUE: 11/03/00
CLIENT:	Geomatrix Consultants Inc.	DATE: 10/24/00	PROTOCOL: SW846
CLIENT REP:	Janice Jaeger	CUSTODY SEAL: PRESENT/ABSENT:	SHIPPING No.:
PROJECT:	PETER COOPER SITE	CHAIN OF CUSTODY: PRESENT/ABSENT:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS SAMPLE CONDITION
414418	100500006	SOIL	8260,8270,TAL MET,CR6,TOC	10/5/00	10/6/00			
414420	100500007	SOIL	8260,8270,TAL MET,CR6,TOC	10/5/00	10/6/00			
414421	100500008	SOIL	8260,8270,TAL MET,CR6,TOC	10/5/00	10/6/00			
414422	100500009	SOIL	8260,8270,TAL MET,CR6,TOC	10/5/00	10/6/00			
414423QC	100500010	SOIL	8260,8270,TAL MET,CR6,TOC	10/5/00	10/6/00			
414424	100500011	SOIL	8260,8270,TAL MET,CR6,TOC	10/5/00	10/6/00			
414425	100600012	SOIL	8260,8270,TAL MET,CR6,TOC	10/6/00	10/6/00			
414426	100600013	SOIL	8260,8270,TAL MET,CR6,TOC	10/6/00	10/6/00			
414427	100600014	SOIL	8260,8270,TAL MET,CR6,TOC	10/6/00	10/6/00			
414428	100600015	SOIL	8260,8270,TAL MET,CR6,TOC	10/6/00	10/6/00			
414429	100600016	SOIL	8260,8270,TAL MET,CR6,TOC	10/6/00	10/6/00			
414430	100600017	SOIL	8260,8270,TAL MET,CR6,TOC	10/6/00	10/6/00			
414431	100600018	SOIL	8260,8270,TAL MET,CR6,TOC	10/6/00	10/6/00			
414432	100600019	SOIL	8260,8270,TAL MET,CR6,TOC	10/6/00	10/6/00			
414433	100600032	SOIL	8260,8270,TAL MET,CR6,TOC	10/6/00	10/6/00			
414434	100600033	SOIL	8260,8270,TAL MET,CR6,TOC	10/6/00	10/6/00			
414447	100600034	SOIL	8260,8270,TAL MET,CR6,TOC	10/6/00	10/6/00			
414448	100600035	SOIL	8260,8270,TAL MET,CR6,TOC	10/6/00	10/6/00			
414449	100600036	SOIL	8260,8270,TAL MET,CR6,TOC	10/6/00	10/6/00			
414450	100600037	SOIL	8260,8270,TAL MET,CR6,TOC	10/6/00	10/6/00			

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SDG #: 00023 | BATCH COMPLETE: yes | DATE REVISED:
SUBMISSION R2004164 | DISKETTE REQUESTED: Y___ N x | DATE DUE: 11/6/00
CLIENT: Geomatrix Consultants Inc. | DATE: 06/28/00 | PROTOCOL: CLP
CLIENT REP: Janice Jaeger | CUSTODY SEAL: PRESENT/ABSENT: | SHIPPING No.:
PROJECT: PETER COOPER SITE | CHAIN OF CUSTODY: PRESENT/ABSENT:

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS	% SOLIDS	REMARKS SAMPLE CONDITION
414653	00023	SOIL	See Below *	10/9/00	10/9/00			
414654	00024	SOIL	See Below *	10/9/00	10/9/00			
414667 QC	00038	SOIL	See Below * QC	10/9/00	10/9/00			
414668	00039	SOIL	See Below *	10/9/00	10/9/00			
414669	00040	SOIL	See Below *	10/9/00	10/9/00			
414670	00041	SOIL	See Below *	10/9/00	10/9/00			
414975	0025	SOIL	See Below *	10/9/00	10/10/00			
414976	0026	SOIL	See Below *	10/9/00	10/10/00			
414977	0027	SOIL	See Below *	10/9/00	10/10/00			
414978	0042	SOIL	See Below *	10/9/00	10/10/00			
414979	0043	SOIL	See Below *	10/9/00	10/10/00			
414980	0044	WATER	See Below *	10/9/00	10/10/00			
414981	TRIP BLANK	WATER	See Below *	10/9/00	10/10/00			
414982	0045	SOIL	See Below *	10/9/00	10/10/00			
414983	0046	SOIL	See Below *	10/9/00	10/10/00			
414984	0028	SOIL	See Below *	10/10/00	10/10/00			
414985	0029	SOIL	See Below *	10/10/00	10/10/00			
			* %Sol, Cr=6, TOC (WB), pH					
			As (LL),CR, Zn,					
			8260 - Special list, ~~update~~					
			Report to CLP PQL's					
			Some have new CLP list					

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CAS ASP/CLP BATCHING FORM / LOGIN SHEET

SDG #: 0086	BATCH COMPLETE: __yes_________	DATE REVISED:
SUBMISSION R2004604	DISKETTE REQUESTED: Y___ N__x__	DATE DUE: 12/05/00
CLIENT: Geomatrix Consultants Inc.	DATE: 11/13/00	PROTOCOL: SW846
CLIENT REP: Janice Jaeger	CUSTODY SEAL: PRESENT/ABSENT:	SHIPPING No.:
PROJECT: PETER COOPER SITE - PROJEC	CHAIN OF CUSTODY: PRESENT/ABSENT:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS SAMPLE CONDITION
422386	0086	WATER	8260,8270,TAL MET,WET*	11/6/00	11/7/00			
422387	0086 SOLUBLE	WATER	SOC	11/6/00	11/7/00			
422388	0086-1	WATER	CR6	11/6/00	11/7/00			
422389	0087	WATER	8260,8270,TAL MET,CR6,WET*	11/6/00	11/7/00			
422390	0088	WATER	8260,8270,TAL MET,CR6,WET*	11/7/00	11/7/00			
422391	0089	WATER	8260,8270,TAL MET,CR6,WET*	11/7/00	11/7/00			
422392	0090	WATER	8260,8270,TAL MET,CR6,WET*	11/7/00	11/7/00			
422393	0091	WATER	8260,8270,MET*,WET**	11/7/00	11/7/00			
422394	TB1107	WATER	8260	11/7/00	11/7/00			
422395	0087 SOLUBLE	WATER	SOC	11/7/00	11/7/00			
422396	0088 SOLUBLE	WATER	SOC	11/7/00	11/7/00			
422397	0089 SOLUBLE	WATER	SOC	11/7/00	11/7/00			
422398	0090 SOLUBLE	WATER	SOC	11/7/00	11/7/00			
422399	0091 SOLUBLE	WATER	SOC	11/7/00	11/7/00			
			WET*=TDS,SO4,ALK,CARB,SULF					
			BICARB,TOC					
			WET**=NH3,CL,HARD,TSS,NO3					
			TKN,TDS,SO4,ALK,BICARB					
			CARB,CR6,SULF,TOC					
			MET*=CA,CR,FE,MG,K,NA,ZN,AS					

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CAS ASP/CLP BATCHING FORM / LOGIN SHEET

SDG #: 0092	BATCH COMPLETE: __yes_________	DATE REVISED:
SUBMISSION R2004630	DISKETTE REQUESTED: Y___ N__x__	DATE DUE: 12/06/00
CLIENT: Geomatrix Consultants Inc.	DATE: 11/13/00	PROTOCOL:SW846
CLIENT REP: Janice Jaeger	CUSTODY SEAL: PRESENT/ABSENT:	SHIPPING No.:
PROJECT: PETER COOPER SITE PROJEC	CHAIN OF CUSTODY: PRESENT/ABSENT:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS SAMPLE CONDITION
422878QC	0092	SOIL	8260,8270,TAL MET,CR6,TOC*	11/7/00	11/8/00			
422879	0093	SOIL	8260,8270,TAL MET,CR6,TOC*	11/7/00	11/8/00			
422880	0094	SOIL	8260,8270,TAL MET,CR6,TOC*	11/7/00	11/8/00			
422881	0095	SOIL	8260,8270,TAL MET,CR6,TOC*	11/7/00	11/8/00			
422882	0096	SOIL	8260,8270,TAL MET,CR6,TOC*	11/8/00	11/8/00			
			*PH					

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CAS ASP/CLP BATCHING FORM / LOGIN SHEET

SDG #:0097	BATCH COMPLETE: __yes________	DATE REVISED:
SUBMISSION R2004629	DISKETTE REQUESTED: Y___ N__x__	DATE DUE:12/06/00
CLIENT: Geomatrix Consultants Inc.	DATE: 11/13/00	PROTOCOL: SW846
CLIENT REP: Janice Jaeger	CUSTODY SEAL: PRESENT/ABSENT:	SHIPPING No.:
PROJECT: PETER COOPER SITE PROJEC	CHAIN OF CUSTODY: PRESENT/ABSENT:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLEI	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS SAMPLE CONDITION
422823QC	0097	WATER	CL,NO3,SO4,CR6,TDS	11/7/00	11/8/00			
422824	0099	WATER	CL,NO3,SO4,CR6,TDS	11/7/00	11/8/00			
422825	0098	WATER	CL,NO3,SO4,CR6,TDS	11/7/00	11/8/00			
422826	0100	WATER	CL,NO3,SO4,CR6,TDS	11/7/00	11/8/00			
422827	0106	WATER	CR6	11/7/00	11/8/00			
422828	0105	WATER	CR6	11/7/00	11/8/00			
422829	0100	WATER	8260,8270,TAL MET,WET*	11/7/00	11/8/00			
422830	0101	WATER	8260,8270,TAL MET,WET**	11/8/00	11/8/00			
422831	0098	WATER	8260,8270,TAL MET,WET*	11/7/00	11/8/00			
422832	0099	WATER	8260,8270,TAL MET,WET*	11/7/00	11/8/00			
422833QC	0097	WATER	8260,8270,TAL MET,WET*	11/7/00	11/8/00			
422834	0105	WATER	8260,8270,MET*,WET***	11/7/00	11/8/00			
422835	0106	WATER	8260,8270,TAL MET,WET****	11/7/00	11/8/00			
422836	0107	WATER	8260,8270,CR6,MET*,WET***	11/8/00	11/8/00			
422837	0108	WATER	8260,8270,CR6,MET*,WET***	11/8/00	11/8/00			
422838	0109	WATER	8260,8270,CR6,MET*,WET***	11/8/00	11/8/00			
422839	TB1108	WATER	8260	11/7/00	11/8/00			
422840	105 SOLUBLE	WATER	SOC	11/7/00	11/8/00			
422841	106 SOLUBLE	WATER	SOC	11/7/00	11/8/00			
422842	107 SOLUBLE	WATER	SOC	11/8/00	11/8/00			
422843	108 SOLUBLE	WATER	SOC	11/8/00	11/8/00	WET****=TDS,SO4,ALK,BICARB,CARB		
422844	109 SOLUBLE	WATER	SOC	11/8/00	11/8/00	SULF,TOC		
422845	102	WATER	8270,CR6,MET*,WET***	11/8/00	11/8/00			
422846	103	WATER	8270,CR6,MET*,WET***	11/8/00	11/8/00			
422847	104	WATER	270,CR6,MET*,WET***LESS TO	11/8/00	11/8/00	WET***=TDS,CL,NO3,SO4,ALK,CARB		
422848	102 SOLUBLE	WATER	MET*,CR6	11/8/00	11/8/00	BICARB,NH3,TKN,SULF.TOC		
422849	103 SOLUBLE	WATER	MET*,CR6,SOC	11/8/00	11/8/00			
422850	104 SOLUBLE	WATER	MET*,CR6,SOC	11/8/00	11/8/00			
			/ET*=TSS,ALK,CARB,BICARB,NH			WET**=TDS,SS,CL,NO3,SO4,ALK		
			TKN,SULF,HARD			BICARB,CARB,NH3,TKN,CR6,SULF,TC		
			MET*=CA,CR,FE,MG,K,NA,ZN,AS			HARD		

04

301567

CAS ASP/CLP BATCHING FORM / LOGIN SHEET

04

SDG #: 0102	BATCH COMPLETE: __yes_________	DATE REVISED:
SUBMISSION R2004670	DISKETTE REQUESTED: Y___ N__x__	DATE DUE: 12/07/00
CLIENT: Geomatrix Consultants Inc.	DATE: 11/13/00	PROTOCOL: SW846
CLIENT REP: Janice Jaeger	CUSTODY SEAL: PRESENT/ABSENT:	SHIPPING No.:
PROJECT: PETER COOPER SITE PROJEC	CHAIN OF CUSTODY: PRESENT/ABSENT:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS SAMPLE CONDITION
423389	0110	WATER	8260,8270,MET*,WET*	11/8/00	11/9/00			
423390	0111	WATER	8270,MET*,WET*	11/9/00	11/9/00			
423391	0112	WATER	8270,MET*,WET*,FE+2	11/9/00	11/9/00			
423392	0113 SOLUBLE	WATER	MET*,CR6,SOC	11/9/00	11/9/00			
423393	0114	WATER	8270,MET*,WET*	11/9/00	11/9/00			
423394	TB1109	WATER	8260	11/9/00	11/9/00			
423395	0102	WATER	8260	11/8/00	11/9/00			
423396	0103	WATER	8260	11/8/00	11/9/00			
423397	0104	WATER	8260	11/8/00	11/9/00			
423398	0102 SOLUBLE	WATER	SOC	11/8/00	11/9/00			
423399	0110 SOLUBLE	WATER	SOC	11/8/00	11/9/00			
423400	0111 SOLUBLE	WATER	SOC	11/9/00	11/9/00			
423401	0112 SOLUBLE	WATER	SOC	11/9/00	11/9/00			
423402	0114 SOLUBLE	WATER	SOC	11/9/00	11/9/00			
			MET*=AS,CA,CR,FE,K,MG,NA,ZN					
			WET*=TDS,CL,NO3,SO4,ALK					
			CARB,BICARB.NH3,TKN,TOC					
			SULFIDE,CR6					

301568

CAS ASP/CLP BATCHING FORM / LOGIN SHEET

SDG #: 0110	BATCH COMPLETE: __yes_________	DATE REVISED:
SUBMISSION R2004632	DISKETTE REQUESTED: Y___ N__x__	DATE DUE: 12/11/00
CLIENT: Geomatrix Consultants Inc.	DATE: 11/13/00	PROTOCOL: SW846
CLIENT REP: Janice Jaeger	CUSTODY SEAL: PRESENT/~~ABSENT~~:	SHIPPING No.:
PROJECT: PETER COOPER SITE PROJEC	CHAIN OF CUSTODY: PRESENT/~~ABSENT~~:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS AMPLE CONDITION
422901	0110	WATER	CR6	11/8/00	11/9/00			
423844	0118	WATER	8260,8270,FE+2,MET*,WET*	11/10/00	11/10/00			
423845	0115	WATER	CR6	11/10/00	11/10/00			
423846	0116	WATER	8260,8270,MET*,WET*	11/9/00	11/10/00			
423847	0117	WATER	8260,8270,MET*,WET**	11/10/00	11/10/00			
423848	0112	WATER	8260	11/9/00	11/10/00			
423849	0111	WATER	8260	11/9/00	11/10/00			
423850	0114	WATER	8260	11/9/00	11/10/00			
423855	0115	WATER	8260,8270,MET*,WET*	11/9/00	11/10/00			
423858	0118 SOLUBLE	WATER	MET*,SOC,CR6	11/10/00	11/10/00			
423859	0117 SOLUBLE	WATER	SOC	11/10/00	11/10/00			
423860	0115 SOLUBLE	WATER	SOC	11/9/00	11/10/00			
423861	0120	WATER	8260,8270,MET*,WET*	11/10/00	11/11/00			
423862	0119	WATER	8260,8270,MET*,WET*	11/10/00	11/11/00			
423863	0116	WATER	8260	11/9/00	11/11/00			
423864	TB1111	WATER	8260	11/10/00	11/11/00			
423865	0120 SOLUBLE	WATER	SOC	11/10/00	11/11/00			
423866	0119 SOLUBLE	WATER	SOC,CR6,MET*	11/10/00	11/11/00			
423867	0116 SOLUBLE	WATER	SOC,CR6,MET*	11/9/00	11/11/00			
			MET*=AS,CA,CR,FE,K,MG,NA,ZN					
			WET*=TDS,CL,NO3,SO4,ALK					
			CARB,BICARB,NH3,TKN,CR6,TOC					
			SULFIDE					
			WET**=ALK,CARB,BICARB,CR6					
			SULFIDE,TOC					

301569

04

CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper Site
SUBMISSION #: R2004153

Geomatrix samples were collected on 10/06/00 and received at CAS on 10/06/00 in good condition at cooler temperatures of 3-6 C.

INORGANIC ANALYSIS

Three soil samples were analyzed for Arsenic, Chromium and Zinc by method 6010B from SW-846, TOC by the Walkley Black Titration and Hexavalent Chromium by method 7196.

Job specific QC was performed on 10060020 as requested. All MS recoveries were within limits except Zinc and has been flagged with an "N". All Blank Spike recoveries were within QC limits. All RPD's were within limits.

During the original analysis of Hexavalent Chromium, the Mg+2 in a phosphate buffer was not added to the alkaline extraction solution as requested. The samples were repeated within the recommended holding time with the addition of the buffer, and both sets of data have been reported out.

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Three soil samples were analyzed for a site specific list of Volatiles by method 8260 from SW-846.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits except 100600021 and 100600022. 100600021 was repeated and the internal standard was still outside limits. Only 2 useable encores were received for 100600021. One encore was placed in a low level vial and the other was placed in a medium level vial, therefore this sample could not be repeated low level. All outlying internal standards have been flagged with an "*".

All surrogate standard recoveries were within acceptance limits for all samples except Bromofluorobenzene for 100600021 and 100600022. 100600022 was repeated and again the surrogate was outside limits. 100600021 could not be repeated for the reason mentioned above.

Please note: All of the tops were loose on the encore samplers received and contained less than 4.5 grams of soil (many contained 3 grams or less).

Job specific QC was performed on 100600020 as requested. All MS and Reference Spike recoveries were within limits. All outlying MSD recoveries have been flagged with an "*". All RPD's were ouside limits and have been flagged with an "*".

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were analyzed within required holding times.

No other analytical or QC problems were encountered.

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CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper Site
SUBMISSION #: R2004151

Geomatrix samples were collected on 10/05-06/00 and received at CAS on 10/11/00 in good condition at cooler temperatures of 3-6 C.

INORGANIC ANALYSIS

Twenty soil samples were analyzed for TAL metals by methods 6010B/7000 from SW-846, TOC by the Walkley Black Titration and Hexavalent Chromium by method 7196.

Job specific QC was performed on 100500010 as requested. All Blank Spike recoveries were within limits. All MS recoveries were within limits except Antimony, Lead and Hexavalent Chromium and have been flagged with an "N". All RPD's were within limits except Arsenic, Barium, Copper, Iron and Zinc and have been flagged with an "*".

Zinc has been flagged with an "E" as being an estimated value due to the presence of interferences.

Thallium for 100600035 and 100600037 has been flagged with a "W" due to the Post digestion spike being outside control limits while the sample absorbance is less than 50% of the spike absorbance.

During the original analysis of Hexavalent Chromium, the Mg+2 in a phosphate buffer was not added to the alkaline extraction solution as requested. The samples were repeated within the recommended holding time with the addition of the buffer, and both sets of data have been reported out. The original analysis of 100500011 had a hit of Hexavalent Chromium while the repeat analysis did not. It is possible that the hit in the original analysis was a false positive since the buffer was not added.

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Twenty soil samples were analyzed for the new TCL list of Volatiles by method 8260 from SW-846.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

Many internal standard areas were outside QC limits. All samples were repeated and most of internal standards were still outside limits. Some of these replicates were analyzed outside the recommended holding time of 14 days. All outlying internal standards have been flagged with an "*".

Many surrogate standard recoveries were outside acceptance limits. All samples were repeated and many of the surrogates were still outside limits. All outlying surrogates have been flagged with an "*".

Job specific QC was performed on 100500010 as requested. All MS/MSD's and Reference Spike recoveries were within limits. All RPD's were within limits. 02

The Laboratory Blanks associated with these analyses were free of contamination except the blank from 10/19/00 contained a small hit of 1,2,4 Trichlorobenzene.

Acetone for 100600013RE, 100600034 and 100600034RE has been flagged with an "E" as being outside the calibration range of the instrument. The initial analysis of 100600013 had a hit of Acetone within the calibration range of the instrument. 100600034 was analyzed medium level on a non-compliant run and approximately 3 ppb of Acetone was present. The sample was repeated low level and the low level data has been reported out.

All samples were analyzed within required holding times except as mentioned above.

No other analytical or QC problems were encountered.

SEMIVOLATILE ORGANICS

Twenty soil samples were analyzed for the new TCL list of Semivolatiles by method 8270 from SW-846.

All the Tuning criteria for DFTPP was met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits except 100500007. The sample was repeated and again the internal standard was outside limits and has been flagged with an "*".

All surrogate standard recoveries were within limits.

Job specific QC was performed on 100500010 as requested. All MS recoveries were within limits except Acenaphthene. All MSD recoveries were within limits except Pyrene. All Reference spike recoveries were within limits except 3-Nitroaniline. All RPD's were within limits except Acenaphthene and Pyrene. All outlying QC has been flagged with an "*".

The Laboratory blanks associated with these samples were free of contamination except the blank from 10/09/00 contained a small hit of Di-n-butylphthalate.

All samples were extracted and analyzed within the recommended holding times.

No other analytical or QC problems were encountered.

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CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper Site
SUBMISSION #: R2004164

Geomatrix samples were collected on 10/05-06/00 and received at CAS on 10/11/00 in good condition at cooler temperatures of 3-6 C.

INORGANIC ANALYSIS

Five soil samples and one water sample were analyzed for TAL metals by methods 6010B/7000 from SW-846 and seven soil samples were analyzed for Arsenic, Chromium and Zinc by methods 6010B/7000. Twelve soil samples were analyzed for TOC by the Walkley Black Titration; pH by method 9045; and Hexavalent Chromium by method 7196.

Job specific QC was performed on 00038 as requested. All Blank Spike recoveries were within limits. All MS recoveries were within limits except Antimony and Thallium and have been flagged with an "N". All RPD's were within limits except Vanadium and has been flagged with an "*".

Iron has been flagged with an "E" since the ICP serial dilution was outside QC limits.

Thallium for 0038 has been flagged with a "W" due to the Post digestion spike being outside control limits while the sample absorbance is less than 50% of the spike absorbance.

During the original analysis of Hexavalent Chromium, the Mg+2 in a phosphate buffer was not added to the alkaline extraction solution as requested. The samples were repeated within the recommended holding time with the addition of the buffer, and both sets of data have been reported out.

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Eight soil samples and one water sample were analyzed for the new TCL list of Volatiles by method 8260 from SW-846 and seven soil samples were analyzed for a site specific list of Volatiles by method 8260.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

Many internal standard areas were outside QC limits. All samples were repeated and most of internal standards were still outside limits. Some of these replicates were analyzed outside the recommended holding time of 14 days. All outlying internal standards have been flagged with an "*".

Many surrogate standard recoveries were outside acceptance limits. All samples were repeated and many of the surrogates were still outside limits. All outlying surrogates have been flagged with an "*".

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Job specific QC was performed on 00038 as requested. All MS/MSD's and Reference Spike recoveries were within limits. All RPD's were within limits.

The Laboratory Blanks associated with these analyses were free of contamination.

The Trip Blank contained a small hit of Acetone.

Various compounds for 0039, 0040RE, 0041RE, 0042, 0043 and 0045 have been flagged with an "E" as being outside the calibration range of the instrument. The initial analysis of 0040 and 0041 had a hit of Acetone within the calibration range of the instrument.

Please note: Studies show that Acetone and 2-Butanone can be formed when samples that have a high Total Organic Carbon content combine with the Sodium Bisulfate contained in the low level vials. This could explain why 0042, 0043 and 0045 had higher Acetone and 2-Butanone in the low level analysis as compared to the medium level analysis.

Sample 0044 was originally analyzed on a soil analytical run on 10/21/00. It was unknown whether this sample was a blank associated with the soils or a true water sample so the sample was repeated on water analytical run outside the recommeded holding time of 14 days. Both sets of data have been reported out.

Please note: All of the tops were off the encore samplers when received for 0029 and all the tops were loose on the encore samplers for 0027, 0026, 0025 and 0028.

All samples were analyzed within required holding times except as mentioned above.

No other analytical or QC problems were encountered.

SEMIVOLATILE ORGANICS

Five soil samples and one water sample were analyzed for the new TCL list of Semivolatiles by method 8270 from SW-846.

All the Tuning criteria for DFTPP was met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within limits except 0046DL. All surrogates were diluted out and have been flagged with a "D".

Job specific QC was performed on sample 00038 as requested. All MS/MSD recoveries were within limits. All Reference spike recoveries were within limits except 3,3' Dichlorobenzidine and 3-Nitroaniline . All RPD's were within limits. All outlying QC has been flagged with an "*".

4-Methylphenol has been flagged with an "E" as being outside the calibration range of the instrument. The sample was repeated at a dilution and both sets of data have been reported out.

The Laboratory blanks associated with these samples were free of contamination.

All samples were extracted and analyzed within the recommended holding times.

No other analytical or QC problems were encountered.

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CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper Site
SUBMISSION #: R2004604

Geomatrix samples were collected on 11/06-07/00 and received at CAS on 11/07/00 in good condition.

INORGANIC ANALYSIS

Eight water samples were analyzed for a site specific list of inorganic analytes. Please see attached data pages for analysis and method numbers.

Job specific QC was not requested for these samples. All Blank Spike recoveries were within limits.

Hexavalent Chromium for 0086-1 and 0087 were analyzed between 5-35 minutes outside the recommended holding time of 24 hours.

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Five water samples and one trip blank were analyzed for the new TCL list of Volatiles by method 8260 from SW-846. One water sample was also analyzed for a site specific list of compounds by method 8260.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within acceptance limits.

Job specific QC was not requested for these samples. All Reference Spike recoveries were within limits.

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were analyzed within required holding times.

No other analytical or QC problems were encountered.

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SEMIVOLATILE ORGANICS

Five water samples were analyzed for the new TCL list of Semivolatiles by method 8270 from SW-846. One water sample was also analyzed for Acid Extractables by method 8270.

All the Tuning criteria for DFTPP was met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within limits except 0089. The sample was repeated and still the surrogates were outside limits. All outlying surrogates have been flagged with an "*". No extra sample remained to reextract and reanalyze.

Job specific QC was not requested for these samples, however was perfromed on 0086. All outlying MS/MSD recoveries have been flagged with an "*". All Reference spike recoveries were within limits. All outlying RPD's have been flagged with an "*".

The Laboratory blank associated with these samples was free of contamination.

All samples were extracted and analyzed within the recommended holding times.

No other analytical or QC problems were encountered.

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CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper Site
SUBMISSION #: R2004630

Geomatrix samples were collected on 11/07/00 and received at CAS on 11/08/00 in good condition.

INORGANIC ANALYSIS

Five soil samples were analyzed for TAL metals by methods 6010B/7000 from SW-846, TOC by the Walkley Black Titration; pH by method 9045; and Hexavalent Chromium by method 7196.

Job specific QC was performed on 0092 as requested. All Blank Spike recoveries were within limits. All MS recoveries were within limits except Antimony, Arsenic and Silver and have been flagged with an "N". All RPD's were within limits except Sodium and has been flagged with an "*".

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Five soil samples were analyzed for the new TCL list of Volatiles by method 8260 from SW-846.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within acceptance limits.

Job specific QC was performed on 00092 as requested. All MS/MSD's and Reference Spike recoveries were within limits. All RPD's were within limits.

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were analyzed within required holding times except as mentioned above.

No other analytical or QC problems were encountered.

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SEMIVOLATILE ORGANICS

Five soil samples were analyzed for the new TCL list of Semivolatiles by method 8270 from SW-846.

All the Tuning criteria for DFTPP was met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits except 0094 and 0095. The samples were repeated and 0094RE was still outside limits and 0095RE was within limits. All outlying internal standards have been flagged with an "*".

All surrogate standard recoveries were within limits.

Job specific QC was performed on sample 0092 as requested. All MS/MSD and Reference spike recoveries were within limits. All RPD's were within limits.

The Laboratory blank associated with these samples contained small hits for Di-n-butylphthalate and bis(2-ethylhexly)phthalate. All affected data has been flagged with a "B".

All samples were extracted and analyzed within the recommended holding times.

No other analytical or QC problems were encountered.

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CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper Site
SUBMISSION #: R2004629

Geomatrix samples were collected on 11/07-08/00 and received at CAS on 11/08/00 in good condition.

INORGANIC ANALYSIS

Twenty seven water samples were analyzed for a site specific list of inorganic analytes. Please see attached data pages for analysis and method numbers.

Job specific QC was performed on 0097 as requested. All MS/MSD recoveries were within limits. All Blank Spike recoveries were within limits except Ferrous Iron which has been flagged with an "N". All RPD's were within limits except TKN which has been flagged with an "*". The QC was repeated for TKN and the results were confirmed. Both sets of raw data have been included.

Hexavalent Chromium for 0097 was analyzed 5 minutes outside the recommended holding time of 24 hours.

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Six water samples and one trip blank were analyzed for the new TCL list of Volatiles by method 8260 from SW-846. Four water samples were also analyzed for a site specific list of compounds by method 8260.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within acceptance limits.

Job specific QC was performed on 0097 as requested. All MS/MSD and Reference Spike recoveries were within limits. All RPD's were within limits.

0107 and 0108 were analyzed at dilutions due to the matrix of the sample.

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were analyzed within required holding times.

No other analytical or QC problems were encountered.

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SEMIVOLATILE ORGANICS

Six water samples were analyzed for the new TCL list of Semivolatiles by method 8270 from SW-846. Seven water samples were also analyzed for Acid Extractables by method 8270.

All the Tuning criteria for DFTPP was met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within limits.

Job specific QC was performed on 0097 as requested. All outlying MS/MSD recoveries have been flagged with an "*". All Reference spike recoveries were within limits. All RPD's were within limits.

Caprolactum for 0106 has been flagged with an "E" as being outside the calibration range of the instrument. The sample was repeated at a dilution and both sets of data have been reported out.

The Laboratory blank associated with these samples was free of contamination.

All samples were extracted and analyzed within the recommended holding times.

No other analytical or QC problems were encountered.

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CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper Site
SUBMISSION #: R2004670

Geomatrix samples were collected on 11/08/00 and received at CAS on 11/09/00 in good condition.

INORGANIC ANALYSIS

Ten water samples were analyzed for a site specific list of inorganic analytes. Please see attached data pages for analysis and method numbers.

Job specific QC was not requested for these samples, however, was performed on 0113 Soluble for the Metals fraction. All MS and Blank Spike recoveries were within limits. All RPD's were within limits.

Nitrate for samples 0110, 0111, 0112 and 0114 was analyzed several hours outside the recommended holding time of 48 hours.

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Four water samples and one trip blank were analyzed for a site specific list of compounds by method 8260 from SW-846.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within acceptance limits.

Job specific QC was not requested for these samples. All Reference Spike recoveries were within limits.

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were analyzed within required holding times.

No other analytical or QC problems were encountered.

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SEMIVOLATILE ORGANICS

Four water samples were analyzed for Acid Extractables by method 8270 from SW-846.

All the Tuning criteria for DFTPP was met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within limits.

Job specific QC was not requested on these samples. All Reference spike recoveries were within limits.

The Laboratory blank associated with these samples was free of contamination.

All samples were extracted and analyzed within the recommended holding times.

No other analytical or QC problems were encountered.

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CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper Site
SUBMISSION #: R2004632

Geomatrix samples were collected on 11/08-10/00 and received at CAS on 11/09-11/00 in good condition.

INORGANIC ANALYSIS

Fourteen water samples were analyzed for a site specific list of inorganic analytes. Please see attached data pages for analysis and method numbers.

Job specific QC was not requested for these samples, however, was performed on 0118 for the Metals fraction. All MS and Blank Spike recoveries were within limits. All RPD's were within limits.

Hexavalent Chromium for samples 0118, 0116, 0116 Soluble, 0119 and 0119 Soluble was analyzed between 2 minutes and 3 days outside the recommended holding time of 24 hours. 0116 Soluble was received outside the holding time and due to a Laboratory error, the Hexavalent Chromium for 0118 was not brought into the Wet Chemistry Laboratory within holding time.

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Ten water samples and one trip blank were analyzed for a site specific list of compounds by method 8260 from SW-846.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within acceptance limits.

Job specific QC was not requested for these samples. All Reference Spike recoveries were within limits.

0117 was analyzed at a dilution due to matrix interferences.

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were analyzed within required holding times.

No other analytical or QC problems were encountered.

NY 14609-6925 • Telephone (716) 288-5380 • Fax (716) 288-8475

SEMIVOLATILE ORGANICS

Six water samples were analyzed for Acid Extractables by method 8270 from SW-846.

All the Tuning criteria for DFTPP was met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within limits except 0120. The sample was repeated and again the surrogates were outside limits and have been flagged with an "*". No extra sample remained to reextract and reanalyze.

Job specific QC was not requested on these samples. All Reference spike recoveries were within limits.

The Laboratory blank associated with these samples was free of contamination.

All samples were extracted and analyzed within the recommended holding times.

No other analytical or QC problems were encountered.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or his designee, as verified by the following signature. Michael K. Pe[illegible]

Data Validation Services

120 Cobble Creek Road   P. O. Box 208
North Creek, NY   12853
Phone (518) 251-4429
Facsimile (518) 251-4428

Facsimile Transmission

TO: Michael Perry

COMPANY: CAS

FAX NUMBER: 716 288 8475

FROM: Judy Harry

DATE: 01-17-01

No. of pages (including cover): 1

COMMENTS: RE: Geomatrix Consultants --Peter Cooper site

SGD 0030   Sub No. R2004164

1. The following numbered pages were not present in the data package. Please forward for review:80, 149, and 150

2. Please review the methyl acetate results for the initial analysis (10/20) of sample 0042 (lab ID 414978), which was reported as nondetection. The quant report shows detection not rejected by the analyst, but there is no spectrum provided. The reanalysis of the sample shows detection of the analyte. Please forward the spectrum for review, and a revised report page if applicable.

An urgent reply is respectfully requested. Please send to the fax number above, with copies of all communications to Jennifer Hagan at Geomatrix.

Thank you.

301588

Columbia Analytical Services Inc.

1 Mustard St., Suite 250
Rochester, NY 14609

Date: 1/17
Number of pages: 4

To: Judy Harry
Jennifer Hagen (cover only)

Phone:

Fax: 518 251 4428

CC: ~~565-0625~~

From: Janice Jaeger

Phone: (716) 288-5380

Fax: (716) 288-8475

RUSH REPORT

(1) Following are pages 80, 149 & 150 that were missing from your package

(2) methyl acetate for 0042
for the original analysis the value should have been rejected by the analyst (crossed off on the quant) therefore no spectra was ~~available~~ provided.
Upon reanalysis the compound showed up again on the quant and was reported out since it was below the PQL as an estimated value

Let me know if you need any further information or clarification

IMPORTANT NOTICE:

The edited Form I data sheets from data validation have been submitted to USEPA and NYSDEC under separate cover.

July 6, 2001
Data Validation Report

301590

Data Validation Services

120 Cobble Creek Road P. O. Box 208
North Creek, N. Y. 12853
Phone 518-251-4429

July 6, 2001

Jennifer Hagen
Geomatrix Consultants
336 Harris Hill Rd.
Williamsville, NY 14221

RE: Validation of Peter Cooper Site Data Packages
CAS Sub Nos. R2106774, R2106788, and R2106792

Dear Ms. Hagen:

Review has been completed for the data packages generated by Columbia Analytical Services pertaining to samples collected at the Peter Cooper site April 30, 2001 through May 4, 2001. Aqueous samples were analyzed for various combinations of site-specific volatiles by EPA 8260B, site-specific or acid analytes by EPA 8270C, TAL or site-specific metals by EPA 6000/7000, and/or various water quality parameters. Equipment and trip blanks, and matrix spikes/duplicates were also processed.

Data validation was performed with guidance from the most current editions of the USEPA CLP National Functional Guidelines for Organic and Inorganic Data Review and the USEPA Region 2 SOPs HW-2 and HW-6. The following items were reviewed:

* Data Completeness
* Custody Documentation
* Holding Times
* Surrogate and Internal Standard Recoveries
* Matrix Spike Recoveries/Duplicate Correlations
* Field Duplicate Correlation
* Preparation/Calibration Blanks
* Control Spike/Laboratory Control Samples
* Instrumental Tunes
* Calibration Standards
* Instrument IDLs
* Method Compliance
* Sample Result Verification

Those items showing deficiencies are discussed in the following sections of this report. All others were found to be acceptable as outlined in the above-mentioned validation procedures, and as applicable for the methodology. Unless noted specifically in the following text, reported results are substantiated by the raw data, and generated in compliance with protocol requirements.

In summary, most results are usable as reported, or with minor edits or qualification as estimated. However, due to apparent matrix effect, all hexavalent chromium results reporting nondetection are rejected, and detected values are estimated. These issues are discussed in the following analytical sections.

Attached to this narrative are summaries of sample identification/requirements, and copies of laboratory case narratives. Also included in this submission are red-ink edited client results tables, reflecting validation qualifiers.

General

Samples reported with a client ID of "05030141" and "05030142" should have shown identities of "050301141" and "050301142", respectively.

Accuracy and precision determinations were acceptable for all fractions, with the exception of that for hexavalent chromium, which showed no spike recovery.

Blind field duplicates were processed as 050201133 and 050201134, 050301141 and 050301142, and 050101126 and 050101127, and involved evaluation of volatiles, semivolatiles, four total and soluble metals (up to four), and two wet chemistry analytes. All correlations were acceptable, with the exception of one analyte in one set (noted below).

Volatile Analyses by EPA 8260

Although preserved, some samples were received at pHs above 2, but processed beyond a 7 day allowable technical holding time. The results are therefore considered estimated, with a possible low bias ("U" or "UJ" qualifiers). The affected samples are 050201136, 050201138, and 050201139.

Surrogate standard recoveries, internal standard responses, instrumental tunes, and blank responses were within required limits. Calibration standard responses were within action guidelines, with the exception of one elevated response for tetrachloroethene (29%D) in a standard associated with samples reporting either nondetection or values already qualified estimated. Sample reported results are not affected.

Matrix spikes of samples 040301121, 050201128, and 050301141 showed acceptable accuracy and precision. Laboratory Control Sample (LCS) recoveries were also acceptable.

Semivolatile Analyses by EPA 8270C

Holding times, surrogate standard recoveries, internal standard responses, instrumental tunes, calibration standard responses, and blank responses were within required limits.

Results for analytes initially reported with the "E" flag should be derived from the dilution analysis of the given sample. All other results can be used from the initial analysis.

Matrix spikes of samples 040301121, 050201128, and 050301141 showed acceptable accuracy and precision. Laboratory Control Sample (LCS) recoveries were also acceptable.
One of the report Forms 1 for an LCS incorrectly shows nondetection of an analyte.

Metals Analyses

Accuracy and precision evaluations were performed for 043001121 and 050201128, and for arsenic on 050301146 (not reported in the package), and showed acceptable recoveries and duplicate correlations.

ICP serial dilution evaluations of 043001121, 043001122 soluble, 050201128, and 050201130, and showed acceptable results, with the exception of that for iron (10.6%D) in 050201128. The result for iron in sample 050201124 is therefore qualified estimated, with a possible slight low bias.

It is noted that the evaluation is performed only to the reported project CRDLs. The laboratory reports IDLs for one instrument (QC summary Form 10) that are equal to CRDLs. Evaluation to actual lower instrument IDLs, which are not provided with this data, involves a more strict evaluation of matrix effect at low analyte concentrations.

Due to elevated recoveries of the low level standard (CRI), results for arsenic in 050201136 and 050301146 are qualified estimated ("J"), with a possible high bias.

Total and dissolved fraction results correlated well, with the exception of the values for arsenic and zinc in 50201136. For those elements, dissolved fractions showed concentrations greater than 110% of those of the unfiltered fraction. Results for arsenic and zinc in both fractions of that sample are therefore considered estimated ("J").

Some of the arsenic and zinc results were reported at elevated reporting limits due to elevated blank responses. Those for arsenic in some samples were re-reported from the elevated limits to lower ones, better reflecting the low sample concentrations (resubmitted forms are attached).

Hexavalent Chromium, TOC, and other Wet Chemistry Analyses

Review was conducted for method compliance, holding times, transcription, calculations, standard and blank acceptability, accuracy and precision, etc., as applicable to each procedure. All were acceptable unless noted below.

Hexavalent chromium matrix spikes of 043001121, 050201128, 050301143, and 050401152 showed no recovery (some with multiple evaluations), indicating that all sample results reporting nondetection of that analyte are unusable ("R" qualifier), and detected values may have a serious low bias ("J"). The lack of recovery appears to be matrix related, as all surrounding laboratory QC was acceptable. One additional sample showed no recovery on the initial sets of matrix spikes (with matrix interference), but improved recovery on reanalysis, indicating a possible variance in matrix effect. Results for those samples which show no detection of chromium in the metals analysis are not significantly affected, as one would expect no hexachrome to be present (because it would also have been detected a total chromium).

Holding times met method requirements, with the exception of that for hexavalent chromium in 050101126 Soluble and 043001122, which were performed one day beyond the allowable 24 hours from collection.

It is noted that samples 043001122 Soluble, 050401149, and 050401151 reported hexavalent chromium with detections just above the reporting limit, although no total chromium was detected in the metals analysis at the same limit. Therefore results for chromium and hexavalent chromium in both samples are to be qualified as estimated ("J" or "UJ").

The following nitrate results should edited as indicated:

Sample ID	Nitrate as N, mg/L
050201136	0.0500 U
050201137	0.545
050201138	0.0500 U
050201139	1.745
050201141	0.454
050201146	0.715

All but one of the LCSs for total sulfide produced recoveries (33% and 42%) below allowable limit. Therefore, results for associated samples are to be qualified estimated ("J" or "UJ"). Those affected are all in Sub Nos. R2106788 and R2106792, and samples 050201136, 050301143, 050301144, 050301145, 050301146, 050301145 Soluble, 050401148, 050401149, 050401151, and 050401152.

Accuracy and precision for wet chemistry parameters in 043001121 and 050201128 were acceptable, with the exception of that for hexachrome, noted above.

Field duplicates 050201133 and 050201134 showed an outlying correlation for bicarbonate alkalinity (and therefore total alkalinity) of 83%RPD. Results for those analytes in the two samples are therefore qualified estimated.

Total and dissolved fraction results correlated well, with the exception of that for TOC/SOC in the samples 050101124, 05050301145, and 050301146, where the filtered fraction showed higher concentrations than the unfiltered. Results for TOC/SOC in those samples are therefore qualified estimated ("J").

Total sulfide reporting limits for some samples were elevated twofold higher due to blank responses.

Please do not hesitate to contact me if questions or comments arise during your review of this report.

Very truly yours,

Judy Harry

Judy Harry

301595

SDG #: 50201130 BATCH COMPLETE: __yes________ DATE REVISED:
SUBMISSION R2106792 DISKETTE REQUESTED: Y___ N__x__ DATE DUE: 5/31/01
CLIENT: Geomatrix Consultants Inc. DATE: 05/07/01 PROTOCOL:SW846
CLIENT REP: Janice Jaeger CUSTODY SEAL: PRESENT/ABSENT: SHIPPING No.:
PROJECT: PETER COOPER-CATTARAUGU CHAIN OF CUSTODY: PRESENT/ABSENT:

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS SAMPLE CONDITION
460342	050201130	WATER	8260,8270,SULF,TOCQ,FE2*	5/2/01	5/2/01			
460343	050201131	WATER	8260,8270,SULF,TOCQ*	5/2/01	5/2/01			
460344	050201132	WATER	8260,8270,SULF,TOCQ*	5/2/01	5/2/01			
460345	TB050201	WATER	8260	5/2/01	5/2/01			
460581	050201133	WATER	8260,8270,SULF,TOCQ*	5/2/01	5/3/01			
460583	050201134	WATER	8260,8270,SULF,TOCQ*	5/2/01	5/3/01			
460830	TB050301	WATER	8260	5/3/01	5/3/01			
			HARD,TDS,TSS,CL,NO3,SO4,AL					
			BICARB,CARB,NH3,TKN,CR6,AS					
			CA,CR,FE,K,MG,MN,PB,ZN					

04

CAS ASP/CLP BATCHING FORM / LOGIN SHEET

301596

SDG #: 50101125	BATCH COMPLETE: __yes__________	DATE REVISED:
SUBMISSION R2106788	DISKETTE REQUESTED: Y___ N__x__	DATE DUE: 5/31/01
CLIENT: Geomatrix Consultants Inc.	DATE: 05/07/01	PROTOCOL: SW846
CLIENT REP: Janice Jaeger	CUSTODY SEAL: PRESENT/ABSENT:	SHIPPING No.:
PROJECT: PETER COOPER-FORMER MAN	CHAIN OF CUSTODY: PRESENT/ABSENT:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS SAMPLE CONDITION
460197	050101125	WATER	8260,8270,SULF,TOCQ*	5/1/01	5/2/01			
460198	050101126	WATER	8260,8270,SULF,TOCQ*	5/1/01	5/2/01			
460199	050101127	WATER	CR6,CR,FE,MN,PB,8260,8270	5/1/01	5/2/01			
460200	050101126 SOLUBLE	WATER	CR6,CR,FE,MN,PB,DOCQ	5/1/01	5/2/01			
460201	050101127 SOLUBLE	WATER	CR,CR,FE,MN,PB	5/1/01	5/2/01			
460332QC	050201128	WATER	8260,8270,SULF,TOCQ,FE2*	5/2/01	5/2/01			
460333	050201129	WATER	CR6,CR,FE,MN,PB,8260,8270	5/2/01	5/2/01			
460602	050201135	WATER	82608270,SULF,TOCQ*	5/2/01	5/3/01			
460874	050301140	WATER	8260,8270,SULF,TOCQ*	5/3/01	5/3/01			
			*CR6,CR,FE,MN,PB,CA,K,MG					
			NA,ALK,BICARB,CARB,CL,SO4					
			TDS					

04

301597

CAS ASP/CLP BATCHING FORM / LOGIN SHEET

SDG #: 43001121	BATCH COMPLETE: __yes________	DATE REVISED:
SUBMISSION R2106774	DISKETTE REQUESTED: Y___ N__x__	DATE DUE: 6/04/01
CLIENT: Geomatrix Consultants Inc.	DATE: 05/07/01	PROTOCOL: SW846
CLIENT REP: Janice Jaeger	CUSTODY SEAL: PRESENT/ABSENT:	SHIPPING No.:
PROJECT: PETER COOPER -INACTIVE LAN	CHAIN OF CUSTODY: PRESENT/ABSENT:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS SAMPLE CONDITION
459770QC	043001121	WATER	AS,CR,ZN	4/30/01	5/1/01			
459771QC	043001121	WATER	CR6	4/30/01	5/1/01			
459778	043001122	WATER	CR6,AS,CR,ZN	4/30/01	5/1/01			
459779	043001122 SOLUBLE	WATER	CR6,AS,CR,ZN	4/30/01	5/1/01			
459939QC	043001121	WATER	8260,8270,SULF,TOCQ,CL,NO3*	4/30/01	5/1/01			
459940	043001122	WATER	8260,8270,SULF,TOCQ,CL,NO3*	4/30/01	5/1/01			
459941	TB043001	WATER	8260	4/30/01	5/1/01			
459942	050101123	WATER	8260,8270,SULF,TOCQ,FE2**	5/1/01	5/1/01			
459943	050101124	WATER	8260,8270,SULF,TOCQ**	5/1/01	5/1/01			
~~459944~~	~~043001121 SOLUBLE~~	~~WATER~~		4/30/01	5/1/01			
459945	043001122 SOLUBLE	WATER	DOCQ	4/30/01	5/1/01			
~~459946~~	~~050101123 SOLUBLE~~	~~WATER~~		5/1/01	5/1/01			
459947	050101124 SOLUBLE	WATER	DOCQ	5/1/01	5/1/01			
460603	050201137	WATER	8260,8270,SULF,TOCQ**	5/2/01	5/3/01			
460604	050201138	WATER	8260,8270,SULF,TOCQ**	5/2/01	5/3/01			
460605	050201139	WATER	8260,8270,SULF,TOCQ**	5/2/01	5/3/01			
460606	050201136	WATER	8260,8270,SULF,TOCQ**	5/2/01	5/3/01			
460607	050201137 SOLUBLE	WATER	CR6	5/2/01	5/3/01			
460608	050201138 SOLUBLE	WATER	CR6	5/2/01	5/3/01			
460610	050201136 SOLUBLE	WATER	CR6,AS,CR,ZN,DOCQ	5/2/01	5/3/01			
460857	05030141	WATER	8260,8270,SULF,TOCQ,FE2**	5/3/01	5/3/01			
460858	05030142	WATER	8260,8270,AS,CR,ZN,CR6	5/3/01	5/3/01			
460937	050301143	WATER	8260,8270,SULF,TOCQ**	5/3/01	5/4/01			
460938	050301144	WATER	8260,8270,SULF,TOCQ**	5/3/01	5/4/01			
460939	050301145	WATER	8260,8270,SULF,TOCQ**	5/3/01	5/4/01			
460940	050301146	WATER	8260,8270,SULF,TOCQ**	5/3/01	5/4/01			
460941	050301145 SOLUBLE	WATER	CR6,AS,CR,ZN,DOCQ	5/3/01	5/4/01			
460942	050301146 SOLUBLE	WATER	CR6,AS,CR,ZN,DOCQ	5/3/01	5/3/01			
461140	TB050401	WATER	8260	5/4/01	5/4/01			
461146	050401147	WATER	8260,8270,SULF,TOCQ**	5/4/01	5/4/01			
461147	050401148	WATER	8260,8270,SULF,TOCQ**	5/4/01	5/4/01			

SDG #: 43001121 BATCH COMPLETE: __yes________ DATE REVISED:
SUBMISSION R2106774 DISKETTE REQUESTED: Y___ N__x__ DATE DUE: 6/04/01

CAS ASP/CLP BATCHING FORM / LOGIN SHEET

301598

CLIENT: Geomatrix Consultants Inc.
DATE: 05/07/01
PROTOCOL: SW846
CLIENT REP: Janice Jaeger
CUSTODY SEAL: PRESENT/ABSENT:
SHIPPING No.:
PROJECT: PETER COOPER -INACTIVE LAN
CHAIN OF CUSTODY: PRESENT/ABSENT:

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS SAMPLE CONDITION
461148	050401149	WATER	8260,8270,SULF,TOCQ**	5/4/01	5/4/01			
461149	050401150	WATER	8260,8270,CR6.AS,CR,ZN	5/4/01	5/4/01			
461151	050401151	WATER	8260,8270,SULF,TOCQ**	5/4/01	5/4/01			
461152	050401152	WATER	8260,8270,SULF,TOCQ**	5/4/01	5/5/01			
461153	TB050501	WATER	8260	5/4/01	5/5/01			
			*SO4,ALK,BICARB,CARB					
			NH3,TKN,CA,FE,K,MG,NA					
			**SO4,ALK,BICARB,CARB,NH3,					
			TKN,CA,FE,K,MG,NA,AS,CR					
			ZN,CR6,CL,NO3					

05

CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper - Cattaraugus Creek - 5771.001
SUBMISSION #: R2106792

Geomatrix samples were collected on 05/02-03/01 and received at CAS on 05/02-03/01 in good condition.

INORGANIC ANALYSIS

Five water samples were analyzed for a site specific list of paramters. Please see attached data pages for method numbers.

Job specific QC was not requested for these samples. All Blank Spike recoveries were within limits except Sulfide and has been flagged with an "*". The Blank Spike/samples were not repeated due to a laboratory error.

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Five water samples and two trip blanks were analyzed for a site specific list of Volatiles by method 8260 from SW-846.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within acceptance limits.

Job specific QC was not requeted for these samples. All Reference Spike recoveries were within limits.

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were analyzed within required holding times.

No other analytical or QC problems were encountered.

... NY 14623-4025 - Telephone (716) 288-5380 - Fax (716) 288-8475

SEMIVOLATILE ORGANICS

Five water samples were analyzed for a site specific list of Semivolatiles by method 8270 from SW-846.

All the Tuning criteria for DFTPP was met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within limits.

Job specific QC was not requested for these samples. All Reference spike recoveries were within limits.

The Laboratory blanks associated with these samples were free of contamination.

All samples were extracted and analyzed within the recommended holding times.

No other analytical or QC problems were encountered.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or his designee, as verified by the following signature. Michael K. P[illegible]

CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper - Former Manufacturing Plant - 5771.001
SUBMISSION #: R2106788

Geomatrix samples were collected on 05/01-03/01 and received at CAS on 05/02-03/01 in good condition.

INORGANIC ANALYSIS

Nine water samples were analyzed for a site specific list of paramters. Please see attached data pages for method numbers.

Job specific QC was performed on 050201128 as requested. All MS/MSD recoveries were within limits except Hexavalent Chromium and has been flagged with an "N". The matrix spike was repeated and again it was outside limits. All Blank Spike recoveries were within limits except Sulfide and has been flagged with an "N". The Blank Spike/samples were not repeated due to a laboratory error.

Due to a laboratory error, 050101126 Soluble and 050101127 were analyzed outside the recommended holding time of 24 hours for Hexavalent Chromium.

Iron has been flagged with an "E" as an estimated value due to the presence of interferences.

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Seven water samples were analyzed for a site specific list of Volatiles by method 8260 from SW-846.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within acceptance limits.

Job specific QC was performed on 050201128 as requested. All MS/MSD and Reference Spike recoveries were within limits. All RPD's were within limits.

The Laboratory Blanks associated with these analyses were free of contamination.

All samples were analyzed within required holding times.

No other analytical or QC problems were encountered.

... Rochester, NY 14609-6925 • Telephone (716) 288-5380 • Fax (716) 288-8475

SEMIVOLATILE ORGANICS

Seven water samples were analyzed for a site specific list of Semivolatiles by method 8270 from SW-846.

All the Tuning criteria for DFTPP was met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within limits.

Job specific QC was performed on 050201128 as requested. All MS/MSD and Reference spike recoveries were within limits. All RPD's were within limits.

The Laboratory blanks associated with these samples were free of contamination.

All samples were extracted and analyzed within the recommended holding times.

No other analytical or QC problems were encountered.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy package has been authorized by the Laboratory Manager or his designee, as verified by the following signature. Michael K. Perry

CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper - Inactive Landfill Area - 5771.001
SUBMISSION #: R2106774

Geomatrix samples were collected on 04/30/01-05/04/01 and received at CAS on 05/01-05/01 in good condition.

INORGANIC ANALYSIS

Thirty-one water samples were analyzed for a site specific list of parameters. Please see attached data pages for method numbers.

Job specific QC was performed on 043001121 as requested. All MS/MSD recoveries were within limits except Hexavalent Chromium and has been flagged with an "N". The matrix spike was repeated and again it was outside limits. All Blank Spike recoveries were within limits except Sulfide and which has been flagged with an "N". The Blank Spike/samples were not repeated due to a laboratory error.

050301146, 050301145 soluble, 050301146 soluble, 050401147, 050401148, 050401149, 050401150050401151, 050401152 and 050201136 soluble were digested twice and analyzed on seven separate occasions. The ICP analysis had internal standard drift for Arsenic and Zinc due to matrix interferences and the CCB's also failed for Arsenic. The PQL's for Arsenic and Zinc have been raised due to this.

No other analytical or QC problems were encountered with these analyses.

VOLATILE ORGANICS

Twenty water samples and three trip blanks were analyzed for a site-specific list of Volatiles by method 8260 from SW-846.

All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within acceptance limits.

Job specific QC was performed on 043001121 as requested. All MS/MSD and Reference Spike recoveries were within limits. All RPD's were within limits.

The Laboratory Blanks associated with these analyses were free of contamination

Samples 050201137, 050201138, 050201139, 050201136, 050301143, 050301144, 050301145, 050401147, 050401148, 050401152 all had a pH of greater than 2.

All samples were analyzed within required holding times.

No other analytical or QC problems were encountered.

... Rochester, NY 14609-6925 • Telephone (716) 288-5380 • Fax (716) 288-8475

SEMIVOLATILE ORGANICS

Twenty water samples were analyzed for a site-specific list of Semivolatiles by method 8270 from SW-846.

All the Tuning criteria for DFTPP was met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits.

All surrogate standard recoveries were within limits except 050201136DL and 050401147. These surrogates were diluted out and have been flagged with a "D".

Job specific QC was performed on 043001121 as requested. All MS/MSD were within limits. All Reference spike recoveries were within limits. All RPD's were within limits.

Various compounds for 050201136 and 050401147 have been flagged with an "E" as being outside the calibration range of the instrument. The samples were repeated at dilutions and both sets of data have been reported out.

The Laboratory blanks associated with these samples were free of contamination.

All samples were extracted and analyzed within the recommended holding times.

No other analytical or QC problems were encountered.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy package, has been authorized by the Laboratory Manager or his designee, as verified by the following signature. ____________________

CASE NARRATIVE

COMPANY: Geomatrix Consultants, Inc.
Peter Cooper - Inactive Landfill Area - 5771.001
SUBMISSION #: R2106774

Geomatrix samples were collected on 04/30/01-05/04/01 and received at CAS on 05/01-05/01 in good condition.

HEXAVALENT CHROMIUM

Water samples were analyzed for Hexavalent Chromium by EPA Method 7196A.

These samples were analyzed on three separate days as follows:

Analyzed 5/1/01
043001121
043001122
043001122 soluble
050101123
050101124
050101124 soluble

Analyzed 5/3/01
050201137
050201138
050201139
050201136
050201137 soluble
050201138 soluble
050201136 soluble

Analyzed 5/4/01
05030141
05030142
050301143
050301144
050301145
050301146
050301145 soluble
050301146 soluble
050401147
050401148
050401149
050401150
050401151

For each analytical run all QA/QC criteria used to demonstrate a compliant analysis were within limits. This includes the initial calibration which demonstrates linearity and linear range, continuing calibration checks which demonstrate that the initial calibration is still accurate and precise, LCS (Blank Spikes) which demonstrate that the analyte has been recovered from a DI water matrix sufficiently, and Method blanks that demonstrate that the analyte has not been detected above the Reporting limit in blank water.

1 Mustard Street, Suite 250 ■ Rochester, NY 14609-6925 ■ Telephone (716) 288-5380 ■ Fax (716) 288-8475

Case Narrative R2106774 Page 2

Duplicate and Matrix Spike QC was performed each day of sample analysis. For 5/1/01, QC was performed on 043001121. Recovery was 0% for each of two analysis of this sample. All blank spike recoveries were within QC limits. Negative interferences are suspected. Substances which can reduce Cr (VI) upon acidification (e.g. Cyanides, Thiosulfate, organic matter) will cause negative interferences in the determination of Cr (VI).

For analysis on 5/3/01, batch QC was performed on a sample not associated with this project. Matrix spike recovery was within limits at 104%, and all blank spike recoveries were also within limits.

For analysis on 5/4/01, QC was performed on sample 050401148. Matrix spike recovery was 71%, outside the limits of 85-115%. All blank spike recoveries were within QC limits. Again, negative interferences are suspected, however not to the extent that the recovery was affected for the analysis on 5/1/01.

Columbia Analytical Services

METALS

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INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

050301145 SOLUBLE

Contract: R2006774

Lab Code: Case No.: SAS No.: SDG NO.: 43001121

Matrix (soil/water): WATER Lab Sample ID: 460941

Level (low/med): LOW Date Received: 05/04/01

Concentration Units (ug/L or mg/kg dry weight): µG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	25.0	U		P
7440-47-3	Chromium	82.1			P
7440-66-6	Zinc	30.0	U		P

Color Before: YELLOW Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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Columbia Analytical Services

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

050301146 SOLUBLE

Contract: R2006774

Lab Code: Case No.: SAS No.: SDG NO.: 43001121

Matrix (soil/water): WATER Lab Sample ID: 460942

Level (low/med): LOW Date Received: 05/03/01

Concentration Units (ug/L or mg/kg dry weight): µG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	25.0	U		P
7440-47-3	Chromium	11.4			P
7440-66-6	Zinc	78.4			P

Color Before: YELLOW Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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Columbia Analytical Services

METALS

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INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

050401148

Contract: R2006774

Lab Code: Case No.: SAS No.: SDG NO.: 43001121

Matrix (soil/water): WATER Lab Sample ID: 461147

Level (low/med): LOW Date Received: 05/04/01

Concentration Units (ug/L or mg/kg dry weight): µG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	28.3			P
7440-70-2	Calcium	252000			P
7440-47-3	Chromium	55.1			P
7439-89-6	Iron	115			P
7439-95-4	Magnesium	107000			P
7440-09-7	Potassium	25200			P
7440-23-5	Sodium	297000			P
7440-66-6	Zinc	30.0	U		P

Color Before: YELLOW Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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Columbia Analytical Services

METALS

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INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

050401149

Contract: R2006774

Lab Code: Case No.: SAS No.: SDG NO.: 43001121

Matrix (soil/water): WATER Lab Sample ID: 461148

Level (low/med): LOW Date Received: 05/04/01

Concentration Units (ug/L or mg/kg dry weight): µG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	25.0	U		P
7440-70-2	Calcium	54000			P
7440-47-3	Chromium	10.0	U		P
7439-89-6	Iron	1810			P
7439-95-4	Magnesium	15700			P
7440-09-7	Potassium	4690			P
7440-23-5	Sodium	347000			P
7440-66-6	Zinc	30.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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Columbia Analytical Services

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

050401150

Contract: R2006774

Lab Code: Case No.: SAS No.: SDG NO.: 43001121

Matrix (soil/water): WATER Lab Sample ID: 461149

Level (low/med): LOW Date Received: 05/04/01

Concentration Units (ug/L or mg/kg dry weight): µG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	25.0	U		P
7440-47-3	Chromium	10.0	U		P
7440-66-6	Zinc	30.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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Columbia Analytical Services

METALS

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INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

050401151

Contract: R2006774

Lab Code: Case No.: SAS No.: SDG NO.: 43001121

Matrix (soil/water): WATER Lab Sample ID: 461151

Level (low/med): LOW Date Received: 05/04/01

Concentration Units (ug/L or mg/kg dry weight): µG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	25.0	U		P
7440-70-2	Calcium	235000			P
7440-47-3	Chromium	10.0	U		P
7439-89-6	Iron	2290			P
7439-95-4	Magnesium	34000			P
7440-09-7	Potassium	22200			P
7440-23-5	Sodium	229000			P
7440-66-6	Zinc	30.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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Columbia Analytical Services

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

050401152

Contract: R2006774

Lab Code: Case No.: SAS No.: SDG NO.: 43001121

Matrix (soil/water): WATER Lab Sample ID: 461152

Level (low/med): LOW Date Received: 05/05/01

Concentration Units (ug/L or mg/kg dry weight): µG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	25.0	U		P
7440-70-2	Calcium	213000			P
7440-47-3	Chromium	22.8			P
7439-89-6	Iron	16600			P
7439-95-4	Magnesium	61800			P
7440-09-7	Potassium	4670			P
7440-23-5	Sodium	5000	U		P
7440-66-6	Zinc	30.0	U		P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Columbia Analytical Services

METALS

-3-

BLANKS

Contract: R2006774

Lab Code: Case No.: SAS No.: SDG NO.: 43001121

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Arsenic	25.0	U	25.0	U	25.0	U	25.0	U	25.000	U	P
Calcium	500.0	U	500.0	U	500.0	U	500.0	U	500.000	U	P
Chromium	10.0	U	10.0	U	10.0	U	10.0	U	10.000	U	P
Iron	100.0	U	100.0	U	100.0	U	100.0	U	100.000	U	P
Magnesium	500.0	U	500.0	U	500.0	U	500.0	U	500.000	U	P
Potassium	2000.0	U	2000.0	U	2000.0	U	2000.0	U	2000.000	U	P
Sodium	5000.0	U	5000.0	U	5000.0	U	5000.0	U	5000.000	U	P
Zinc	30.0	U	30.0	U	30.0	U	30.0	U	30.000	U	P

Columbia Analytical Services

METALS

-3-

BLANKS

Contract: R2006774

Lab Code: Case No.: SAS No.: SDG NO.: 43001121

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Arsenic			25.0	U							P
Calcium			500.0	U	500.0	U					P
Chromium			10.0	U							P
Iron			100.0	U	100.0	U					P
Magnesium			500.0	U	500.0	U					P
Potassium			2000.0	U	2000.0	U					P
Sodium			5000.0	U	5000.0	U					P
Zinc			30.0	U							P

TABLE X

ANALYTICAL SUMMARY OF INACTIVE LANDFILL SEEPS

Inactive Landfill Area
Peter Cooper Site
Gowanda, New York

		110800102		110800103		110800104		50201137		50201138		50201139	
CONSTITUENT	UNIT	L-1 SEEP		L-2 SEEP		L-3 SEEP		L-1 SEEP		L-2 SEEP		L-3 SEEP	
BENZENE	ug/l	-10	U	-10	U	-10	U	-10	U	-10	U J	-10	U J
CHLOROBENZENE	ug/l	-10	U	-10	U	-10	U	-10	U	-10	U	-10	U
1,2-DICHLOROBENZENE	ug/l	-10	U	-10	U	-10	U	-10	U	-10	U	-10	U
1,4-DICHLOROBENZENE	ug/l	-10	U	-10	U	-10	U	-10	U	-10	U	-10	U
ETHYLBENZENE	ug/l	-10	U	-10	U	-10	U	-10	U	-10	U	-10	U
TOLUENE	ug/l	3.1	J	2.0	J	-10	U	2.8	J	3.5	J	-10	U
M+P-XYLENE	ug/l	-10	U	-10	U	-10	U	-10	U	-10	U	-10	U
O-XYLENE	ug/l	-10	U	-10	U	-10	U	-10	U	-10	U	-10	U
SOLUBLE ORGANIC CARBONS (1)	MG/L	100		83.0		31.0		na		na		na	
SOLUBLE ORGANIC CARBONS (2)	MG/L	97.4		81.2		31.3		na		na		na	
SOLUBLE ORGANIC CARBONS (3)	MG/L	99.6		81.7		31.0		na		na		na	
SOLUBLE ORGANIC CARBONS (4)	MG/L	94.5		81.8		30.8		na		na		na	
Semi-Volatile Compounds													
2-CHLOROPHENOL	ug/l	-10	U	-10	U	-10	U	-9.4	U	-10	U	-16	U
2,4-DICHLOROPHENOL	ug/l	-10	U	-10	U	-10	U	-9.4	U	-10	U	-16	U
2,4-DIMETHYLPHENOL	ug/l	-10	U	-10	U	-10	U	-9.4	U	-10	U	-16	U
2,4-DINITROPHENOL	ug/l	-50	U	-50	U	-50	U	-24	U	-25	U	-40	U
4,6-DINITRO-2-METHYLPHENOL	ug/l	-50	U	-50	U	-50	U	-24	U	-25	U	-40	U
4-CHLORO-3-METHYLPHENOL	ug/l	-10	U	-10	U	-10	U	-9.4	U	-10	U	-16	U
2-METHYLPHENOL	ug/l	-10	U	-10	U	-10	U	-9.4	U	-10	U	-16	U
4-METHYLPHENOL	ug/l	-10	U	-10	U	-10	U	-9.4	U	-10	U	-16	U
2-NITROPHENOL	ug/l	-10	U	-10	U	-10	U	-9.4	U	-10	U	-16	U
4-NITROPHENOL	ug/l	-50	U	-50	U	-50	U	-24	U	-25	U	-40	U
PENTACHLOROPHENOL	ug/l	-50	U	-50	U	-50	U	-24	U	-25	U	-40	U
PHENOL	ug/l	-10	U	1.8	J	1.8	J	-9.4	U	-10	U	-16	U
2,4,6-TRICHLOROPHENOL	ug/l	-10	U	-10	U	-10	U	-9.4	U	-10	U	-16	U
2,4,5-TRICHLOROPHENOL	ug/l	-10	U	-10	U	-10	U	-24	U	-25	U	-40	U
Total Metals													
CALCIUM	ug/l	156000		150000		116000		171000		156000		170000	
CHROMIUM	ug/l	374		423		94.9		221		312		129	
IRON	ug/l	3010		28600		390		1180		-100	U	123	
MAGNESIUM	ug/l	190000		163000		82900		102000		123000		90500	
POTASSIUM	ug/l	10900		8790		3560		7710		6190		4120	
SODIUM	ug/l	26800		19700		17500		18100		18300		18000	
ZINC	ug/l	-20	U	74.7		-20	U	-20	U	-20	U	-20	U
ARSENIC	ug/l	71.0		52.0		62.1		52.1		38.1		31.4	
AMMONIA	MG/L	891		734		381		627		678		393	
HEXAVALENT CHROMIUM	MG/L	-0.04	U	-0.04	U	-0.01	U	~~-0.01~~	~~U~~ R	~~-0.01~~	~~U~~ R	~~-0.01~~	~~U~~ R
Fate and Transport Parameters													
TOTAL ORGANIC CARBON (1)	MG/L	102		83.3			na	56.1		62.9		38.7	
TOTAL ORGANIC CARBON (2)	MG/L	98.7		84.1			na	54.6		66.2		38.6	
TOTAL ORGANIC CARBON (3)	MG/L	100		77.5			na	55.4		65.4		38.5	
TOTAL ORGANIC CARBON (4)	MG/L	102		80.8			na	56.0		65		37.9	
TOTAL DISSOLVED SOLIDS	MG/L	1060		1030		855							
TOTAL SULFIDE	MG/L	9.00		3.70		-1	U	5.9		5.2		1	
CARBONATE ALKALINITY	MG/L	-2	U	-2	U	-2	U	-2	U	-2	U	-2	U
CHLORIDE	MG/L	33.9		29.9		17.5		17.3		20.6		20.3	
NITRATE NITROGEN	MG/L	2.35		0.746		2.84		0.545 ~~0.576~~		0.05 ~~0.0573~~	U	1.74 ~~2.04~~	
SULFATE	MG/L	241		157		595		242		150		632	
TOTAL HARDNESS	MG/L	1100		800		608							
TOTAL ALKALINITY	MG/L	4000		3150		1340		2800		3100		1550	
BICARBONATE ALKALINITY	MG/L	4000		3150		1340		2800		3100		1550	
TOTAL KJELDAHL NITROGEN	MG/L	836		721		380		602		667		392	
Soluble Metals													
CALCIUM	ug/l	155000		132000		113000		na		na		na	
CHROMIUM	ug/l	369		325		96.9		na		na		na	
IRON	ug/l	4780		914		107		na		na		na	
MAGNESIUM	ug/l	184000		144000		84100		na		na		na	
POTASSIUM	ug/l	10500		6400		3700		na		na		na	
SODIUM	ug/l	26000		19600		17000		na		na		na	
ZINC	ug/l	-20	U	-20	U	-20	U	na		na		na	
ARSENIC	ug/l	66.5		52.8		59.9		na		na		na	
HEXAVALENT CHROMIUM	MG/L	-0.04	U	-0.04	U	-0.04	U	~~-0.01~~	~~U~~ R	~~-0.01~~	~~U~~ R	~~-0.01~~	~~U~~ R

TABLE X

ANALYTICAL SUMMARY OF SHALLOW GROUNDWATER

Former Manufacturing Plant Area
Peter Cooper Site
Gowanda, New York

Compound	UNIT	-088 11/7/00 MWFP-3S	-089 11/7/00 MWFP-3S	-128 5/2/01 MWFP-3S		-106 11/7/00 MWFP-2S	-140 5/3/01 MWFP-2S	
ACENAPHTHENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
ACENAPHTHYLENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
ACETOPHENONE	ug/l	-10 U	-10 U	NA		-10 U	NA	
ANTHRACENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
ATRAZINE	ug/l	-10 U	-10 U	NA		-10 U	NA	
BENZALDEHYDE	ug/l	-10 U	-10 U	NA		-10 U	NA	
BENZO(A)ANTHRACENE	ug/l	-10 U	-10 U	-9.4	U	-10 U	-9.5	U
BENZO(A)PYRENE	ug/l	-10 U	-10 U	-9.4	U	-10 U	-9.5	U
BENZO(B)FLUORANTHENE	ug/l	-10 U	-10 U	-9.4	U	-10 U	-9.5	U
BENZO(G,H,I)PERYLENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
BENZO(K)FLUORANTHENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
1,1'-BIPHENYL	ug/l	-10 U	-10 U	NA		-10 U	NA	
BUTYL BENZYL PHTHALATE	ug/l	-10 U	-10 U	NA		-10 U	NA	
DI-N-BUTYLPHTHALATE	ug/l	1.1 J	-10 U	NA		-10 U	NA	
CAPROLACTAM	ug/l	-10 U	-10 U	NA		290 D	NA	
CARBAZOLE	ug/l	-10 U	-10 U	NA		-10 U	NA	
INDENO(1,2,3-CD)PYRENE	ug/l	-10 U	-10 U	-9.4	U	-10 U	-9.5	U
4-CHLOROANILINE	ug/l	-10 U	-10 U	NA		-10 U	NA	
BIS(-2-CHLOROETHOXY)METHANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
BIS(2-CHLOROETHYL)ETHER	ug/l	-10 U	-10 U	NA		-10 U	NA	
2-CHLORONAPHTHALENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
2-CHLOROPHENOL	ug/l	-10 U	R	NA		-10 U	NA	
2,2'-OXYBIS(1-CHLOROPROPANE)	ug/l	-10 U	-10 U	NA		-10 U	NA	
CHRYSENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
DIBENZO(A,H)ANTHRACENE	ug/l	-10 U	-10 U	-9.4	U	-10 U	-9.5	U
DIBENZOFURAN	ug/l	-10 U	-10 U	NA		-10 U	NA	
3,3'-DICHLOROBENZIDINE	ug/l	-10 U	-10 U	NA		-10 U	NA	
2,4-DICHLOROPHENOL	ug/l	-10 U	R	NA		-10 U	NA	
DIETHYLPHTHALATE	ug/l	-10 U	-10 U	NA		-10 U	NA	
DIMETHYL PHTHALATE	ug/l	-10 U	-10 U	NA		-10 U	NA	
2,4-DIMETHYLPHENOL	ug/l	-10 U	R	NA		-10 U	NA	
2,4-DINITROPHENOL	ug/l	-25 U	R	NA		-25 U	NA	
2,4-DINITROTOLUENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
2,6-DINITROTOLUENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
BIS(2-ETHYLHEXYL)PHTHALATE	ug/l	-10 U	-10 U	NA		4.0 J	NA	
FLUORANTHENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
FLUORENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
HEXACHLOROBENZENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
HEXACHLOROBUTADIENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
HEXACHLOROCYCLOPENTADIENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
HEXACHLOROETHANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
ISOPHORONE	ug/l	-10 U	-10 U	NA		-10 U	NA	
2-METHYLNAPHTHALENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
4,6-DINITRO-2-METHYLPHENOL	ug/l	-25 U	R	NA		-25 U	NA	
4-CHLORO-3-METHYLPHENOL	ug/l	-10 U	R	NA		-10 U	NA	
2-METHYLPHENOL	ug/l	-10 U	R	NA		-10 U	NA	
4-METHYLPHENOL	ug/l	-10 U	R	NA		-10 U	NA	
NAPHTHALENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
2-NITROANILINE	ug/l	-25 U	-25 U	NA		-25 U	NA	
3-NITROANILINE	ug/l	-25 U	-25 U	NA		-25 U	NA	
4-NITROANILINE	ug/l	-25 U	-25 U	NA		-25 U	NA	
NITROBENZENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
2-NITROPHENOL	ug/l	-10 U	R	NA		-10 U	NA	
4-NITROPHENOL	ug/l	-25 U	R	NA		-25 U	NA	

TABLE X

ANALYTICAL SUMMARY OF SHALLOW GROUNDWATER

Former Manufacturing Plant Area
Peter Cooper Site
Gowanda, New York

Compound	UNIT	-088 11/7/00 MWFP-3S	-089 11/7/00 MWFP-3S	-128 5/2/01 MWFP-3S		-106 11/7/00 MWFP-2S	-140 5/3/01 MWFP-2S	
N-NITROSODIPHENYLAMINE	ug/l	-10 U	-10 U	NA		-10 U	NA	
DI-N-OCTYL PHTHALATE	ug/l	-10 U	-10 U	NA		-10 U	NA	
PENTACHLOROPHENOL	ug/l	-25 U	R	NA		-25 U	NA	
PHENANTHRENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
PHENOL	ug/l	-10 U	R	NA		-10 U	NA	
4-BROMOPHENYL-PHENYLETHER	ug/l	-10 U	-10 U	NA		-10 U	NA	
4-CHLOROPHENYL-PHENYLETHER	ug/l	-10 U	-10 U	NA		-10 U	NA	
N-NITROSO-DI-N-PROPYLAMINE	ug/l	-10 U	-10 U	NA		-10 U	NA	
PYRENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
2,4,6-TRICHLOROPHENOL	ug/l	-10 U	R	NA		-10 U	NA	
2,4,5-TRICHLOROPHENOL	ug/l	-25 U	R	NA		-25 U	NA	
METALS								
ALUMINUM	ug/l	406	557	NA		331	NA	
ANTIMONY	ug/l	-60 U	-60 U	NA		-60 U	NA	
BARIUM	ug/l	103	99.6	NA		112	NA	
BERYLLIUM	ug/l	-5 U	-5 U	NA		-5 U	NA	
CADMIUM	ug/l	-5 U	-5 U	NA		-5 U	NA	
CALCIUM	ug/l	360000	344000	312000		313000	337000	
CHROMIUM	ug/l	-10 U	-10 U	-10	U	11.4	[illegible]	
COPPER	ug/l	-20 U	-20 U	NA		-20 U	NA	
IRON	ug/l	16000	14800	5510		535	4210	
LEAD	ug/l	-5 U	-5 U	-5	U	-5 U	-5	U
MAGNESIUM	ug/l	17500	16700	17000		32800	26400	
MANGANESE	ug/l	2080	2240	1490		430	680	
NICKEL	ug/l	-40 U	-40 U	NA		-40 U	NA	
POTASSIUM	ug/l	6600	6630	4630		10700	6410	
SELENIUM	ug/l	6.10	-5 U	NA		-5 U	NA	
SILVER	ug/l	-10 U	-10 U	NA		-10 U	NA	
SODIUM	ug/l	122000	115000	45900		18700	9980	
THALLIUM	ug/l	-10 U	-10 U	NA		-10 U	NA	
ZINC	ug/l	55.1	41.2	NA		124	NA	
VANADIUM	ug/l	-50 U	-50 U	NA		-50 U	NA	
COBALT	ug/l	-50 U	-50 U	NA		-50 U	NA	
MERCURY	ug/l	-0.3 U	-0.3 U	NA		-0.3 U	NA	
ARSENIC	ug/l	-10 U	-10 U	NA		-10 U	NA	
VOCS								
ACETONE	ug/l	-10 U	-10 U	NA		22	NA	
BENZENE	ug/l	-10 U	-10 U	-10	U	-10 U	-10	U
BROMODICHLOROMETHANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
BROMOFORM	ug/l	-10 U	-10 U	NA		-10 U	NA	
BROMOMETHANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
2-BUTANONE (MEK)	ug/l	-10 U	-10 U	NA		-10 U	NA	
METHYL TERT-BUTYL ETHER	ug/l	-10 U	-10 U	NA		-10 U	NA	
CARBON DISULFIDE	ug/l	-10 U	-10 U	NA		-10 U	NA	
CARBON TETRACHLORIDE	ug/l	-10 U	-10 U	-10	U	-10 U	-10	U
CHLOROBENZENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
CHLOROETHANE	ug/l	-10 U	-10 U	[illegible]		-10 U	[illegible]	
CHLOROFORM	ug/l	-10 U	-10 U	-10	U	-10 U	-10	U
CHLOROMETHANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
1,2-DIBROMO-3-CHLOROPROPANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
CYCLOHEXANE	ug/l	-10 U	-10 U	NA		11	NA	
DIBROMOCHLOROMETHANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
1,2-DIBROMOETHANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
1,2-DICHLOROBENZENE	ug/l	-10 U	-10 U	NA		-10 U	NA	

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TABLE X

ANALYTICAL SUMMARY OF SHALLOW GROUNDWATER

Former Manufacturing Plant Area
Peter Cooper Site
Gowanda, New York

Compound	UNIT	-088 11/7/00 MWFP-3S	-089 11/7/00 MWFP-3S	-128 5/2/01 MWFP-3S		-106 11/7/00 MWFP-2S	-140 5/3/01 MWFP-2S	
1,4-DICHLOROBENZENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
1,3-DICHLOROBENZENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
DICHLORODIFLUOROMETHANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
1,1-DICHLOROETHANE	ug/l	2.0 J	2.1 J	NA		-10 U	NA	
1,2-DICHLOROETHANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
1,1-DICHLOROETHENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
TRANS-1,2-DICHLOROETHENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
CIS-1,2-DICHLOROETHENE	ug/l	5.0 J	5.1 J	NA		-10 U	NA	
1,2-DICHLOROPROPANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
TRANS-1,3-DICHLOROPROPENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
CIS-1,3-DICHLOROPROPENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
ETHYLBENZENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
2-HEXANONE	ug/l	-10 U	-10 U	NA		-10 U	NA	
ISOPROPYLBENZENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
METHYL ACETATE	ug/l	-10 U	-10 U	NA		-10 U	NA	
METHYLCYCLOHEXANE	ug/l	-10 U	-10 U	NA		16	NA	
METHYLENE CHLORIDE	ug/l	-10 U	-10 U	NA		-10 U	NA	
4-METHYL-2-PENTANONE	ug/l	-10 U	-10 U	NA		-10 U	NA	
STYRENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
1,1,2,2-TETRACHLOROETHANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
TETRACHLOROETHENE	ug/l	5.5 J	5.6 J	3.1	J	-10 U	-10	U
TOLUENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
1,2,4-TRICHLOROBENZENE	ug/l	-10 U	-10 U	NA		-10 U	NA	
1,1,1-TRICHLOROETHANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
1,1,2-TRICHLOROETHANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
TRICHLOROETHENE	ug/l	2.9 J	2.2 J	3.6	J	-10 U	-10	U
TRICHLOROFLUOROMETHANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/l	-10 U	-10 U	NA		-10 U	NA	
VINYL CHLORIDE	ug/l	-10 U	-10 U	NA		-10 U	NA	
M+P-XYLENE	ug/l	-10 U	-10 U	NA		4.6	NA	
O-XYLENE	ug/l	-10 U	-10 U	NA		1.9	NA	
OTHER				NA			NA	
TOTAL ORGANIC CARBON (1)	mg/l	5.28 U	4.98 U	3.18	U	8.53 U	4.68	U
TOTAL ORGANIC CARBON (2)	mg/l	5.28 U	5.28 U	3.14	U	8.67 U	4.88	U
TOTAL ORGANIC CARBON (3)	mg/l	5.12 U	5.36 U	3.16	U	8.68 U	4.95	U
TOTAL ORGANIC CARBON (4)	mg/l	5.06 U	5.29 U	3.12	U	8.67 U	4.56	U
TOTAL DISSOLVED SOLIDS	mg/l	1570	1590	1180		1190	1170	
TOTAL SULFIDE	mg/l	-1.1 U	-1.1 U	-1.3	U J	-1 U	-1	U J
CARBONATE ALKALINITY	mg/l	-2 U	-2 U	-2	U	-2 U	-2	U
SULFATE	mg/l	651	631	448		346	301	
TOTAL ALKALINITY	mg/l	558	550	435		700	680	
BICARBONATE ALKALINITY	mg/l	558	550	435		700	680	
SOLUBLE ORGANIC CARBONS (1)	mg/l	5.38 U	5.62 U	NA		9.22 U	NA	
SOLUBLE ORGANIC CARBONS (2)	mg/l	5.41 U	5.42 U	NA		9.26 U	NA	
SOLUBLE ORGANIC CARBONS (3)	mg/l	5.28 U	5.39 U	NA		9.17 U	NA	
SOLUBLE ORGANIC CARBONS (4)	mg/l	5.55 U	5.26 U	NA		9.23 U	NA	
HEXAVALENT CHROMIUM	mg/l	-0.01 U	-0.01 U	~~-0.01~~	~~U~~ R	-0.01 U	~~-0.02~~	~~U~~ R

1. Data qualifications reflect 100% data validation performed by Data Validation Services.

TABLE X

ANALYTICAL SUMMARY OF DEEP GROUNDWATER

Former Manufacturing Plant Area
Peter Cooper Site
Gowanda, New York

Compound	UNIT	-086 11/6/00 MWFP-1D	-125 5/1/01 MWFP-1D	-087 11/6/00 MWFP-2D	-135 5/2/01 MWFP-2D	-090 11/7/00 MWFP-3D	-126 5/1/01 MWFP-3D	-127 5/1/01 MWFP-3D
SVOCS								
ACENAPHTHENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
ACENAPHTHYLENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
ACETOPHENONE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
ANTHRACENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
ATRAZINE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
BENZALDEHYDE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
BENZO(A)ANTHRACENE	UG/L	-10 U	-9.4 U	-10 U	-9.5 U	-10 U	-9.4 U	-9.4 U
BENZO(A)PYRENE	UG/L	-10 U	-9.4 U	-10 U	-9.5 U	-10 U	-9.4 U	-9.4 U
BENZO(B)FLUORANTHENE	UG/L	-10 U	-9.4 U	-10 U	-9.5 U	-10 U	-9.4 U	-9.4 U
BENZO(G,H,I)PERYLENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
BENZO(K)FLUORANTHENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
1,1'-BIPHENYL	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
BUTYL BENZYL PHTHALATE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
DI-N-BUTYLPHTHALATE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
CAPROLACTAM	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
CARBAZOLE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
INDENO(1,2,3-CD)PYRENE	UG/L	-10 U	-9.4 U	-10 U	-9.5 U	-10 U	-9.4 U	-9.4 U
4-CHLOROANILINE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
BIS(-2-CHLOROETHOXY)METHANE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
BIS(2-CHLOROETHYL)ETHER	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
2-CHLORONAPHTHALENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
2-CHLOROPHENOL	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
CHRYSENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
DIBENZO(A,H)ANTHRACENE	UG/L	-10 U	-9.4 U	-10 U	-9.5 U	-10 U	-9.4 U	-9.4 U
DIBENZOFURAN	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
3,3'-DICHLOROBENZIDINE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
2,4-DICHLOROPHENOL	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
DIETHYLPHTHALATE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
DIMETHYL PHTHALATE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
2,4-DIMETHYLPHENOL	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
2,4-DINITROPHENOL	UG/L	-25 U	NA	-25 U	NA	-25 U	NA	NA
2,4-DINITROTOLUENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
2,6-DINITROTOLUENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	-10 U	NA	3.7 J	NA	-10 U	NA	NA
FLUORANTHENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
FLUORENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
HEXACHLOROBENZENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
HEXACHLOROBUTADIENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
HEXACHLOROCYCLOPENTADIENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
HEXACHLOROETHANE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
ISOPHORONE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
2-METHYLNAPHTHALENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
4,6-DINITRO-2-METHYLPHENOL	UG/L	-25 U	NA	-25 U	NA	-25 U	NA	NA
4-CHLORO-3-METHYLPHENOL	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
2-METHYLPHENOL	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
4-METHYLPHENOL	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
NAPHTHALENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
2-NITROANILINE	UG/L	-25 U	NA	-25 U	NA	-25 U	NA	NA
3-NITROANILINE	UG/L	-25 U	NA	-25 U	NA	-25 U	NA	NA
4-NITROANILINE	UG/L	-25 U	NA	-25 U	NA	-25 U	NA	NA
NITROBENZENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
2-NITROPHENOL	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
4-NITROPHENOL	UG/L	-25 U	NA	-25 U	NA	-25 U	NA	NA
N-NITROSODIPHENYLAMINE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
DI-N-OCTYL PHTHALATE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
PENTACHLOROPHENOL	UG/L	-25 U	NA	-25 U	NA	-25 U	NA	NA
PHENANTHRENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
PHENOL	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
4-BROMOPHENYL-PHENYLETHER	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
4-CHLOROPHENYL-PHENYLETHER	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
N-NITROSO-DI-N-PROPYLAMINE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
PYRENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
2,4,6-TRICHLOROPHENOL	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
2,4,5-TRICHLOROPHENOL	UG/L	-25 U	NA	-25 U	NA	-25 U	NA	NA

TABLE X

ANALYTICAL SUMMARY OF DEEP GROUNDWATER

Former Manufacturing Plant Area
Peter Cooper Site
Gowanda, New York

Compound	UNIT	-086 11/6/00 MWFP-1D		-125 5/1/01 MWFP-1D		-087 11/6/00 MWFP-2D		-135 5/2/01 MWFP-2D		-090 11/7/00 MWFP-3D		-126 5/1/01 MWFP-3D		-127 5/1/01 MWFP-3D	
Metals															
ALUMINUM	UG/L	120		NA		641		NA		116		NA		NA	
ANTIMONY	UG/L	-60	U	NA		-60	U	NA		-60	U	NA		NA	
BARIUM	UG/L	275		NA		77.5		NA		72.2		NA		NA	
BERYLLIUM	UG/L	-5	U	NA		-5	U	NA		-5	U	NA		NA	
CADMIUM	UG/L	-5	U	NA		-5	U	NA		-5	U	NA		NA	
CALCIUM	UG/L	62000		64500		18900		28800		370000		348000		NA	
CHROMIUM	UG/L	-10	U	-10	U	-10	U	-10	U	-10	U	-10	U	-10	U
COPPER	UG/L	-20	U	NA		-20	U	NA		-20	U	NA		NA	
IRON	UG/L	417		211		1890		348		21500		17700		17600	
LEAD	UG/L	-5	U	-5	U	-5	U	-5	U	-5	U	-5	U	-5	U
MAGNESIUM	UG/L	11000		10600		4250		5970		18700		17900		NA	
MANGANESE	UG/L	112		122		44.6		57.9		2060		1960		1960	
MERCURY	UG/L	-0.3	U	NA		-0.3	U	NA		-0.3	U	NA		NA	
NICKEL	UG/L	-40	U	NA		-40	U	NA		-40	U	NA		NA	
POTASSIUM	UG/L	-2000	U	-2000	U	3720		3040		7040		5680		5680	
SELENIUM	UG/L	-5	U	NA		-5	U	NA		-5	U	NA		NA	
SILVER	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
SODIUM	UG/L	26700		25000		293000		352000		119000		78900		NA	
THALLIUM	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
ZINC	UG/L	-20	U	NA		-20	U	NA		-20	U	NA		NA	
VANADIUM	UG/L	-50	U	NA		-50	U	NA		-50	U	NA		NA	
COBALT	UG/L	-50	U	NA		-50	U	NA		-50	U	NA		NA	
ARSENIC	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
VOCs															
ACETONE	UG/L	-10	U	NA		80		NA		6.7	J	NA		NA	
BENZENE	UG/L	-10	U	-10	U	3.6	J	2.4	J	-10	U	1.2	J	1.5	J
BROMODICHLOROMETHANE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
BROMOFORM	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
BROMOMETHANE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
2-BUTANONE (MEK)	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
METHYL TERT-BUTYL ETHER	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
CARBON DISULFIDE	UG/L	-10	U	NA		1.3	J	NA		-10	U	NA		NA	
CARBON TETRACHLORIDE	UG/L	-10	U	-10	U	-10	U	-10	U	-10	U	-10	U	-10	U
CHLOROBENZENE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
CHLOROETHANE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
CHLOROFORM	UG/L	-10	U	NA		-10	U	-10	U	-10	U	-10	U	-10	U
CHLOROMETHANE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
1,2-DIBROMO-3-CHLOROPROPANE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
CYCLOHEXANE	UG/L	-10	U	NA		14		NA		8.8	J	NA		NA	
DIBROMOCHLOROMETHANE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
1,2-DIBROMOETHANE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
1,2-DICHLOROBENZENE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
1,4-DICHLOROBENZENE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
1,3-DICHLOROBENZENE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
DICHLORODIFLUOROMETHANE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
1,1-DICHLOROETHANE	UG/L	-10	U	NA		-10	U	NA		2.3	J	NA		NA	
1,2-DICHLOROETHANE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
1,1-DICHLOROETHENE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
TRANS-1,2-DICHLOROETHENE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
CIS-1,2-DICHLOROETHENE	UG/L	-10	U	NA		-10	U	NA		8.2	J	NA		NA	
1,2-DICHLOROPROPANE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
TRANS-1,3-DICHLOROPROPENE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	
CIS-1,3-DICHLOROPROPENE	UG/L	-10	U	NA		-10	U	NA		-10	U	NA		NA	

TABLE X

ANALYTICAL SUMMARY OF DEEP GROUNDWATER

Former Manufacturing Plant Area
Peter Cooper Site
Gowanda, New York

Compound	UNIT	-086 11/6/00 MWFP-1D	-125 5/1/01 MWFP-1D	-087 11/6/00 MWFP-2D	-135 5/2/01 MWFP-2D	-090 11/7/00 MWFP-3D	-126 5/1/01 MWFP-3D	-127 5/1/01 MWFP-3D
ETHYLBENZENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
2-HEXANONE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
ISOPROPYLBENZENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
METHYL ACETATE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
METHYLCYCLOHEXANE	UG/L	-10 U	NA	15	NA	4.9 J	NA	NA
METHYLENE CHLORIDE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
4-METHYL-2-PENTANONE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
STYRENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
1,1,2,2-TETRACHLOROETHANE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
TETRACHLOROETHENE	UG/L	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
TOLUENE	UG/L	-10 U	NA	6.8 J	NA	-10 U	NA	NA
1,2,4-TRICHLOROBENZENE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
1,1,1-TRICHLOROETHANE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
1,1,2-TRICHLOROETHANE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
TRICHLOROETHENE	UG/L	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
TRICHLOROFLUOROMETHANE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
VINYL CHLORIDE	UG/L	-10 U	NA	-10 U	NA	-10 U	NA	NA
M+P-XYLENE	UG/L	-10 U	NA	6.4 J	NA	-10 U	NA	NA
O-XYLENE	UG/L	-10 U	NA	3.7 J	NA	-10 U	NA	NA
Other								
TOTAL ORGANIC CARBON (1)	MG/L	1.32 U	1.84 U	3.40 U	6.75 U	5.24 U	4.41 U	NA
TOTAL ORGANIC CARBON (2)	MG/L	1.30 U	1.79 U	3.37 U	6.63 U	5.10 U	4.35 U	NA
TOTAL ORGANIC CARBON (3)	MG/L	1.25 U	1.73 U	3.37 U	5.99 U	4.86 U	4.37 U	NA
TOTAL ORGANIC CARBON (4)	MG/L	1.28 U	1.76 U	3.47 U	6.27 U	4.89 U	4.29 U	NA
TOTAL DISSOLVED SOLIDS	MG/L	290	293	917	1000	1660	1350	NA
TOTAL SULFIDE	MG/L	-1.1 U	-1 U J	-1.1 U	-1.1 U J	-1.1 U	-1 U J	NA
CARBONATE ALKALINITY	MG/L	-2 U	-2 U	-2 U	-2 U	-2 U	-2 U	NA
SULFATE	MG/L	45.5	NA	56.7	241	695	544	NA
TOTAL ALKALINITY	MG/L	200	47.2	288	355	575	480	NA
BICARBONATE ALKALINITY	MG/L	200	187	288	355	575	480	NA
SOLUBLE ORGANIC CARBONS (1)	MG/L	9.00 U	NA	3.6 U	NA	5.96 U	NA	NA
SOLUBLE ORGANIC CARBONS (2)	MG/L	9.00 U	NA	3.27 U	NA	6.08 U	NA	NA
SOLUBLE ORGANIC CARBONS (3)	MG/L	9.22 U	NA	3.24 U	NA	6.01 U	NA	NA
SOLUBLE ORGANIC CARBONS (4)	MG/L	9.21 U	NA	3.14 U	NA	6.01 U	NA	NA
HEXAVALENT CHROMIUM	MG/L	-0.01 U	~~-0.01 U~~ R	-0.01 U	~~-0.01 U~~ R	-0.01 U	~~-0.01 U~~ R	~~-0.01 U~~ R

1. Data qualifications reflect 100% data validation performed by Data Validation Services.

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TABLE X

ANALYTICAL SUMMARY OF SHALLOW GROUNDWATER

Inactive Landfill Area
Peter Cooper Site
Gowanda, New York

Compound	UNIT	-108 11/7/00 MW-2SR	-147 5/4/01 MW-2SR	-109 11/7/00 MW-3SR	-136 5/2/01 MW-3SR	-110 11/7/00 MW-6S	-152 5/4/01 MW-6S	-112 11/9/00 MW-5S	-143 5/3/01 MW-5S
2-CHLOROPHENOL	UG/L	-10 U	-9.4 U	-20 U	-9.7 U	1.4 J	1.8 J	-10 U	-9.4 U
2,4-DICHLOROPHENOL	UG/L	-10 U	-69.4 U	-20 U	-9.7 U	-10 U	-9.4 U	-10 U	-9.4 U
2,4-DIMETHYLPHENOL	UG/L	-10 U	-9.4 U	2.6 J	3 J	-10 U	-9.4 U	-10 U	-9.4 U
2,4-DINITROPHENOL	UG/L	-50 U	-24 U	-100 UJ	-24 U	-50 UJ	-24 U	-50 UJ	-24 U
4,6-DINITRO-2-METHYLPHENOL	UG/L	-50 U	-24 U	-100 U	-24 U	-50 U	-24 U	-50 U	-24 U
4-CHLORO-3-METHYLPHENOL	UG/L	-10 U	-9.4 U	-20 U	9.7 U	-10 U	-9.4 U	-10 U	-9.4 U
2-METHYLPHENOL	UG/L	1.3 J	8.2 J	18 J	8.1 J	-10 U	-9.4 U	-10 U	-9.4 U
4-METHYLPHENOL	UG/L	96	2200 ~~2300~~ E	210	2400 ~~2900~~ E	-10 U	-9.4 U	-10 U	-9.4 U
2-NITROPHENOL	UG/L	-10 U	-9.4 U	-20 U	-9.7 U	-10 U	-9.4 U	-10 U	-9.4 U
4-NITROPHENOL	UG/L	-50 U	-24 U	-100 U	-24 U	-50 U	-24 U	-50 U	-24 U
PENTACHLOROPHENOL	UG/L	-50 U	-24 U	-100 U	-24 U	-50 U	-24 U	-50 U	-24 U
PHENOL	UG/L	15	220 ~~360~~ E	38	180 ~~500~~ E	-10 U	-9.4 U	-10 U	-9.4 U
2,4,6-TRICHLOROPHENOL	UG/L	-10 U	-9.4 U	-20 U	-9.7 U	-10 U	-9.4 U	-10 U	-9.4 U
2,4,5-TRICHLOROPHENOL	UG/L	-10 U	-24 U	-20 U	-24 U	-10 U	-24 U	-10 U	-24 U
CALCIUM	UG/L	160000	209000	127000	164000	203000	213000	323000	473000
CHROMIUM	UG/L	143	251	436	366	29.3	22.8	-10 U	-10 U
IRON	UG/L	107	-100 U	-100 U	130	13400	16600	23000	41000
MAGNESIUM	UG/L	90200	154000	167000	136000	73900	61800	41600	37000
POTASSIUM	UG/L	4070	5740	5830	5930	5850	4670	9860	7870
SODIUM	UG/L	17600	22100	20900	18500	8310	-5000 U	25800	12400
ZINC	UG/L	20.8	-30 U	-20 U	23.4 J	-20 U	-30 U	178	-20 U
ARSENIC	UG/L	151	196	62.1	47.9	33.8	35 ~~-40~~ U	-10 U	-3.55 U
BENZENE	UG/L	-100 U	-10 U	-100 U	-10 U	1.6 J	1.5 J	-10 U	-10 U
CHLOROBENZENE	UG/L	-100 U	-10 U	-100 U	-10 U	160	190	-10 U	-10 U
1,2-DICHLOROBENZENE	UG/L	-100 U	-10 U	-100 U	-10 U	-10 U	10 U	-10 U	-10 U
1,4-DICHLOROBENZENE	UG/L	-100 U	-10 U	-100 U	-10 U	-10 U	10 U	-10 U	-10 U
ETHYLBENZENE	UG/L	-100 U	-10 U	-100 U	1.6 J	-10 U	10 U	-10 U	-10 U
TOLUENE	UG/L	-100 U	10	17 J	10	-10 U	10 U	-10 U	-10 U
M+P-XYLENE	UG/L	-100 U	10 U	-100 U	-10 U	-10 U	10 U	-10 U	-10 U
O-XYLENE	UG/L	-100 U	10 U	-100 U	-10 U	-10 U	10 U	-10 U	-10 U
AMMONIA	MG/L	523	633	837	693	219	153	23.9	6.32
HEXAVALENT CHROMIUM	MG/L	-0.01 U	~~-0.02 U~~ R	-0.04 U	~~-0.01 U~~ R	0.01 U	~~-0.01 U~~ R	-0.01 U	~~-0.01 U~~ R
TOTAL ORGANIC CARBON	MG/L	56.3	191	110	108	14.7	12.3	5.94 U	7.63
TOTAL ORGANIC CARBON	MG/L	57.1	186	115	105	15.4	12.2	5.98 U	7.64
TOTAL ORGANIC CARBON	MG/L	55.4	187	114	103	15.8	11.9	5.73 U	7.53
TOTAL ORGANIC CARBON	MG/L	57.0	186	112	104	15.9	11.9	5.75 U	7.57
TOTAL DISSOLVED SOLIDS	MG/L	729		995		839		1290	
TOTAL SULFIDE	MG/L	38.0	55	52.0	37.0 J	-1 U	-1 U J	-1 U	-1 U J
CARBONATE ALKALINITY	MG/L	-2 U	-2 U	-2 U	-2 U	-2 U	-2 U	-2 U	-2 U
FERROUS IRON	MG/L	0.128 J							
CHLORIDE	MG/L	21.7	17.2	32.8	22.7	10.6	3.82	6.82	6.9
NITRATE NITROGEN	MG/L	-0.5 U	-0.04 U	-0.5 U	-0.05 U	-0.5 UJ	0.0502	-0.5 UJ	-0.05 U
SULFATE	MG/L	463	48.2	24.0	99.3	2.64	4.22	575	966
TOTAL ALKALINITY	MG/L	2250	3200	3720	3350	1610	1280	622	410
BICARBONATE ALKALINITY	MG/L	2250	3200	3720	3350	1610	1280	622	410
TOTAL KJELDAHL NITROGEN	MG/L	494	625	762	698	227	148	22.8	6.41
SOLUBLE ORGANIC CARBONS (1)	MG/L	37.9		114	103	16.5		6.11 U	
SOLUBLE ORGANIC CARBONS (2)	MG/L	35.7		114	102	15.8		5.81 U	
SOLUBLE ORGANIC CARBONS (3)	MG/L	35.8		112	101	16.4		5.96 U	
SOLUBLE ORGANIC CARBONS (4)	MG/L	34.5		111	104	17.4		6.02 U	
CALCIUM (soluble)	UG/L								
CHROMIUM (soluble)	UG/L				354				
IRON (soluble)	UG/L								
MAGNESIUM (soluble)	UG/L								
POTASSIUM (soluble)	UG/L								
SODIUM (soluble)	UG/L								
ZINC (soluble)	UG/L				105 J				
ARSENIC (soluble)	UG/L				53.8 J				
HEXAVALENT CHROMIUM (soluble)	MG/L				~~-0.01 U~~ R				
TOTAL HARDNESS	MG/L								
TOTAL SUSPENDED SOLIDS	MG/L								

Compound	UNIT	-116 11/10/00 MW-7S	-151 5/4/01 MW-7S	-117 11/10/00 MW-4S	-144 5/3/01 MW-4S	-120 11/10/00 MW-1S	-123 5/1/01 MW-1S	-091 11/8/00 MW-8S	-121 4/30/01 MW-8S
2-CHLOROPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	R	-9.4 U	-10 U	-9.4 U
2,4-DICHLOROPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	R	-9.4 U	-10 U	-9.4 U
2,4-DIMETHYLPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	R	-9.4 U	-10 U	-9.4 U
2,4-DINITROPHENOL	UG/L	-50 UJ	-24 U	-50 UJ	-24 U	R	-24 U	-50 U	-24 U
4,6-DINITRO-2-METHYLPHENOL	UG/L	-50 U	-24 U	-50 U	-24 U	R	-24 U	-50 U	-24 U
4-CHLORO-3-METHYLPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	R	-9.4 U	-10 U	-9.4 U
2-METHYLPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	R	-9.4 U	-10 U	-9.4 U
4-METHYLPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	R	-9.4 U	-10 U	-9.4 U
2-NITROPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	R	-9.4 U	-10 U	-9.4 U
4-NITROPHENOL	UG/L	-50 U	-24 U	-50 U	-24 U	R	-24 U	-50 U	-24 U
PENTACHLOROPHENOL	UG/L	-50 U	-24 U	-50 U	-24 U	R	-24 U	-50 U	-24 U
PHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	R	-9.4 U	-10 U	-9.4 U
2,4,6-TRICHLOROPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	R	-9.4 U	-10 U	-9.4 U
2,4,5-TRICHLOROPHENOL	UG/L	-10 U	-24 U	-10 U	-24 U	R	-24 U	-10 U	-24 U
CALCIUM	UG/L	106000	235000	116000	209000	286000	213000	179000	167000
CHROMIUM	UG/L	13.7	-10 U J	209	371	-10 U	-10 U	-10 U	-10 U
IRON	UG/L	9040	2290	-100 U	140	-100 U	-100 U	10500	11700
MAGNESIUM	UG/L	22900	34000	86300	150000	25000	16800	23700	20700
POTASSIUM	UG/L	37600	22200	8880	9490	6400	4280	5100	4280
SODIUM	UG/L	1670000	229000	22100	26100	11600	9080	28200	28600
ZINC	UG/L	151	-30 U	-20 U	-20 U	22.3	29.7	65.6	204
ARSENIC	UG/L	17.2	35 ~~-40~~ U	71.4	38.2	-10 U	-3.55 U	-10 U	-10 U
BENZENE	UG/L	-10 U	-10 U	-100 U	1.3 J	-10 U	-10 U	-10 U	-10 U
CHLOROBENZENE	UG/L	-10 U	-10 U	-100 U	47	-10 U	-10 U	-10 U	-10 U
1,2-DICHLOROBENZENE	UG/L	-10 U	-10 U	-100 U	5.0 J	-10 U	-10 U	-10 U	-10 U
1,4-DICHLOROBENZENE	UG/L	-10 U	-10 U	-100 U	2.4 J	-10 U	-10 U	-10 U	-10 U
ETHYLBENZENE	UG/L	-10 U	-10 U	-100 U	-10 U	-10 U	-10 U	-10 U	-10 U
TOLUENE	UG/L	-10 U	-10 U	-100 U	3.2 J	-10 U	-10 U	-10 U	-10 U
M+P-XYLENE	UG/L	-10 U	-10 U	-100 U	1.0 J	-10 U	-10 U	-10 U	-10 U
O-XYLENE	UG/L	-10 U	-10 U	-100 U	-10 U	-10 U	-10 U	-10 U	-10 U
AMMONIA	MG/L	151	93.7		810	3.26	1.05	2.49	2.29
HEXAVALENT CHROMIUM	MG/L	-0.01 UJ	0.0172 J	0.0215	~~-0.04 U~~ R	-0.01 U	~~-0.01 U~~ R	-0.01 U	-0.01 U R
TOTAL ORGANIC CARBON	MG/L	69.4	21.3	54.2	89.0	3.02 U	2.72	3.43 U	2.35
TOTAL ORGANIC CARBON	MG/L	70.9	21.4	56.4	90.8	2.80 U	2.66	3.38 U	2.50
TOTAL ORGANIC CARBON	MG/L	69.6	21.2	56.3	89.8	2.94 U	2.36	3.35 U	2.48
TOTAL ORGANIC CARBON	MG/L	70.6	21.1	54.5	90.5	2.73 U	2.52	3.28 U	2.39
TOTAL DISSOLVED SOLIDS	MG/L	4900				1070		770	
TOTAL SULFIDE	MG/L	-1 U	-1 U J	34.0	19 J	-1 U	1.00	-1.1 U	1.10
CARBONATE ALKALINITY	MG/L	-2 U	-2 U	-2 U	-2 U	-2 U	-2 U	-2 U	-2 U
FERROUS IRON	MG/L						-0.1 U		
CHLORIDE	MG/L	2310	587		26.4	8.13	9.74	22.3	61.5
NITRATE NITROGEN	MG/L	22.7	-0.05 U		-0.05	1.16	1.72	-0.5 U	-0.5 U
SULFATE	MG/L	127	236		209	416	168	260	181
TOTAL ALKALINITY	MG/L	1480	1000	2570	3850	469	433	371	321
BICARBONATE ALKALINITY	MG/L	1480	1000	2570	3850	469	433	371	321
TOTAL KJELDAHL NITROGEN	MG/L	165	90.3		839	3.20	1.51	2.37	2.65
SOLUBLE ORGANIC CARBONS (1)	MG/L	77.3		58.1		4.45 U		5.79 U	
SOLUBLE ORGANIC CARBONS (2)	MG/L	81.0		57.8		4.23 U		5.70 U	
SOLUBLE ORGANIC CARBONS (3)	MG/L	79.1		56.9		4.16 U		5.69 U	
SOLUBLE ORGANIC CARBONS (4)	MG/L	75.6		56.7		4.05 U		5.68 U	
CALCIUM (soluble)	UG/L	114000							
CHROMIUM (soluble)	UG/L	-10 UJ							
IRON (soluble)	UG/L	4610							
MAGNESIUM (soluble)	UG/L	23700							
POTASSIUM (soluble)	UG/L	38500							
SODIUM (soluble)	UG/L	1630000							
ZINC (soluble)	UG/L	79							
ARSENIC (soluble)	UG/L	14.5							
HEXAVALENT CHROMIUM (soluble)	MG/L	0.0130 J							
TOTAL HARDNESS	MG/L							570	
TOTAL SUSPENDED SOLIDS	MG/L							13.1	

150NTU

1. Data qualifications reflects 100% data validation performed by Data Validation Services.

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TABLE X

ANALYTICAL SUMMARY OF SURFACE WATER SAMPLING

Peter Cooper Site
Gowanda, New York

COMPOUND	UNIT	110700097 Creek Water #4	110700098 Creek Water #3	110700099 Creek Water #3 dup	110700100 Creek Water #2	110700101 Creek Water #1	58201134 Creek Water #1	58201133 Creek Water #1 dup	58201130 Creek Water #2	58201131 Creek Water #3	58201132 Creek Water #4
Semi-Volatile Organic Compounds											
ACENAPHTHENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
ACENAPHTHYLENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
ACETOPHENONE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
ANTHRACENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
ATRAZINE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
BENZALDEHYDE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
BENZO(A)ANTHRACENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-9.5 U	-10 U	-10 U	-10 U	-9.5 U
BENZO(A)PYRENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-9.5 U	-10 U	-10 U	-10 U	-9.5 U
BENZO(B)FLUORANTHENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-9.5 U	-10 U	-10 U	-10 U	-9.5 U
BENZO(G,H,I)PERYLENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
BENZO(K)FLUORANTHENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
1,1'-BIPHENYL	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
BUTYL BENZYL PHTHALATE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
DI-N-BUTYLPHTHALATE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
CAPROLACTAM	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
CARBAZOLE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
INDENO(1,2,3-CD)PYRENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-9.5 U	-10 U	-10 U	-10 U	-9.5 U
4-CHLOROANILINE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
BIS(-2-CHLOROETHOXY)METHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
BIS(2-CHLOROETHYL)ETHER	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
2-CHLORONAPHTHALENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
2-CHLOROPHENOL	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-9.5 U	-10 U	-10 U	-10 U	-9.5 U
2,2'-OXYBIS(1-CHLOROPROPANE)	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
CHRYSENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
DIBENZO(A,H)ANTHRACENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-9.5 U	-10 U	-10 U	-10 U	-9.5 U
DIBENZOFURAN	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
3,3'-DICHLOROBENZIDINE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
2,4-DICHLOROPHENOL	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-9.5 U	-10 U	-10 U	-10 U	-9.5 U
DIETHYLPHTHALATE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
DIMETHYL PHTHALATE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
2,4-DIMETHYLPHENOL	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-9.5 U	-10 U	-10 U	-10 U	-9.5 U
2,4-DINITROPHENOL	ug/l	-25 U	-25 U	-25 U	-25 U	-25 U	-24 U	-25 U	-25 U	-25 U	-24 U
2,4-DINITROTOLUENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
2,6-DINITROTOLUENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
BIS(2-ETHYLHEXYL)PHTHALATE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
FLUORANTHENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
FLUORENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
HEXACHLOROBENZENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
HEXACHLOROBUTADIENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
HEXACHLOROCYCLOPENTADIENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
HEXACHLOROETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
ISOPHORONE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
2-METHYLNAPHTHALENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
4,6-DINITRO-2-METHYLPHENOL	ug/l	-25 U	-25 U	-25 U	-25 U	-25 U	-24 U	-25 U	-25 U	-25 U	-24 U
4-CHLORO-3-METHYLPHENOL	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-9.5 U	-10 U	-10 U	-10 U	-9.5 U
2-METHYLPHENOL	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-9.5 U	-10 U	-10 U	-10 U	-9.5 U
4-METHYLPHENOL	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-9.5 U	-10 U	-10 U	-10 U	-9.5 U
NAPHTHALENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
2-NITROANILINE	ug/l	-25 U	-25 U	-25 U	-25 U	-25 U					
3-NITROANILINE	ug/l	-25 U	-25 U	-25 U	-25 U	-25 U					
4-NITROANILINE	ug/l	-25 U	-25 U	-25 U	-25 U	-25 U					
NITROBENZENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
2-NITROPHENOL	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-9.5 U	-10 U	-10 U	-10 U	-9.5 U
4-NITROPHENOL	ug/l	-25 U	-25 U	-25 U	-25 U	-25 U	-24 U	-25 U	-25 U	-25 U	-24 U
N-NITROSODIPHENYLAMINE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
DI-N-OCTYL PHTHALATE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
PENTACHLOROPHENOL	ug/l	-25 U	-25 U	-25 U	-25 U	-25 U	-24 U	-25 U	-25 U	-25 U	-24 U
PHENANTHRENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
PHENOL	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-9.5 U	-10 U	-10 U	-10 U	-9.5 U
4-BROMOPHENYL-PHENYLETHER	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
4-CHLOROPHENYL-PHENYLETHER	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
N-NITROSO-DI-N-PROPYLAMINE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
PYRENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
2,4,6-TRICHLOROPHENOL	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-9.5 U	-10	-10	-10	-9.5 U
2,4,5-TRICHLOROPHENOL	ug/l	-25 U	-25 U	-25 U	-25 U	-25 U	-24 U	-25	-25	-25	-24 U
Metals											
ALUMINUM	ug/l	-100 U	-100 U	-100 U	-100 U	-100 U					
ANTIMONY	ug/l	-60 U	-60 U	-60 U	-60 U	-60 U					
BARIUM	ug/l	69.3	61.8	63.1	64.7	64.1					
BERYLLIUM	ug/l	-5 U	-5 U	-5 U	-5 U	-5 U					
CADMIUM	ug/l	-5 U	-5 U	-5 U	-5 U	-5 U					
CALCIUM	ug/l	59100	58300	57600	59600	57800	56600	54100	51900	53400	56600
CHROMIUM	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10	-10 U	-10 U	-10 U
HEXAVALENT CHROMIUM	mg/l	-0.01 U	-0.01 U	-0.01 U	-0.01 U	-0.04 U					
COPPER	ug/l	-20 U	-20 U	-20 U	-20 U	-20 U					
IRON	ug/l	151	143	134	126	129	344	413	403	470	344
LEAD	ug/l	-5 U	-5 U	-5 U	-5 U	-5 U	-5 U	-5 U	-5 U	-5 U	-5 U
MAGNESIUM	ug/l	10800	9880	10000	10300	10300	9990	9370	9450	9210	9990
MANGANESE	ug/l	18.4	12.9	13.1	13.8	11.5	20.6	16.5	14.9	21.6	20.6
NICKEL	ug/l	-40 U	-40 U	-40 U	-40 U	-40 U					
POTASSIUM	ug/l	-2000 U	-2000 U	-2000 U	-2000 U	-2000 U	-2000 U	-2000 U	-2000 U	-2000 U	-2000 U
SELENIUM	ug/l	-5 U	-5 U	-5 U	-5 U	-5 U					
SILVER	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
SODIUM	ug/l	16200	13400	13200	13900	13700					
THALLIUM	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
ZINC	ug/l	-20 U	-20 U	-20 U	-20 U	-20 U	-20 U	-20 U	-20 U	-20 U	-20 U
VANADIUM	ug/l	-50 U	-50 U	-50 U	-50 U	-50 U					
COBALT	ug/l	-50 U	-50 U	-50 U	-50 U	-50 U					
MERCURY	UG/L	-0.3 U	-0.3 U	-0.3 U	-0.3 U	-0.3 U					
ARSENIC	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
Volatile Organic Compounds											
ACETONE	ug/l	3.2 J	-10 U	4.0 J	-10 U	3.5 J					
BENZENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
BROMODICHLOROMETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
BROMOFORM	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
BROMOMETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
2-BUTANONE (MEK)	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
METHYL TERT-BUTYL ETHER	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
CARBON DISULFIDE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
CARBON TETRACHLORIDE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
CHLOROBENZENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
CHLOROETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
CHLOROFORM	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
CHLOROMETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
1,2-DIBROMO-3-CHLOROPROPANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
CYCLOHEXANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
DIBROMOCHLOROMETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
1,2-DIBROMOETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
1,2-DICHLOROBENZENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U

TABLE X

ANALYTICAL SUMMARY OF SURFACE WATER SAMPLING

Peter Cooper Site
Gowanda, New York

		110700097	110700098	110700099	110700100	110700101	58201134	58201133	58201130	58201131	58201132
COMPOUND	UNIT	Creek Water #4	Creek Water #3	Creek Water #3 dup	Creek Water #2	Creek Water #1	Creek Water #1	Creek Water #1 dup	Creek Water #2	Creek Water #3	Creek Water #4
1,4-DICHLOROBENZENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
1,3-DICHLOROBENZENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
DICHLORODIFLUOROMETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
1,1-DICHLOROETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
1,2-DICHLOROETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
1,1-DICHLOROETHENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
TRANS-1,2-DICHLOROETHENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
CIS-1,2-DICHLOROETHENE	ug/l	-10 U	-10 U	-10 U	-10 U	2.7 J					
1,2-DICHLOROPROPANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
TRANS-1,3-DICHLOROPROPENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
CIS-1,3-DICHLOROPROPENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
ETHYLBENZENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
2-HEXANONE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
ISOPROPYLBENZENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
METHYL ACETATE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
METHYLCYCLOHEXANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
METHYLENE CHLORIDE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
4-METHYL-2-PENTANONE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
STYRENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
1,1,2,2-TETRACHLOROETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
TETRACHLOROETHENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
TOLUENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
1,2,4-TRICHLOROBENZENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
1,1,1-TRICHLOROETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
1,1,2-TRICHLOROETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
TRICHLOROETHENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
TRICHLOROFLUOROMETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
VINYL CHLORIDE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U					
M+P-XYLENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
O-XYLENE	ug/l	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
Fate and Transport Parameters											
AMMONIA	mg/l	0.170	0.234	0.234	-0.05 U	-0.05 U	0.442	-0.05 U	-0.05 U	0.306	0.442
TOTAL ORGANIC CARBON (1)	mg/l	1.98 U	2.11 U	2.02 U	1.97 U	1.96 U	1.78	1.79	1.74	1.68	1.78
TOTAL ORGANIC CARBON (2)	mg/l	2.00 U	2.14 U	2.00 U	1.89 U	2.00 U	1.73	1.75	1.64	1.69	1.73
TOTAL ORGANIC CARBON (3)	mg/l	1.98 U	2.15 U	1.97 U	1.87 U	1.98 U	1.7	1.73	1.63	1.66	1.7
TOTAL ORGANIC CARBON (4)	mg/l	1.99 U	2.14 U	1.96 U	1.82 U	1.96 U	1.68	1.65	1.6	1.67	1.68
TOTAL DISSOLVED SOLIDS	mg/l	255	249	254	250	254	264	215	221	216	264
CHLORIDE	mg/l	28.7	23.4	22.8	22.9	24.0	46.9	26.5	27	27.1	46.9
NITRATE NITROGEN	mg/l	1.90	1.81	1.79	1.81	1.78	1.12	1.04	1.11	1.07	1.12
SULFATE	mg/l	28.5	27.5	27.6	27.6	28.8	28	24.7	25.9	24.9	28
TOTAL SUSPENDED SOLIDS	mg/l	1.90	1.30 J	2.76 J	1.60	1.30	4.9	6.4	7.1	8.2	4.9
TOTAL SULFIDE	mg/l	-1 U	-1 U	-1 U	-1 U	-1 U	-1 U J	-1 U J	1.3 J	1 J	-1 U J
CARBONATE ALKALINITY	mg/l	-2 U	-2 U	-2 U	-2 U	-2 U	-2 U	-2 U	-2 U	-2 U	-2 U
TOTAL HARDNESS	mg/l	200	195	191	198	191	175	165	164	161	175
TOTAL ALKALINITY	mg/l	169	164	164	166	167	175 J	112 J	133	135	140
BICARBONATE ALKALINITY	mg/l	169	164	164	166	167	140 J	112 J	133	135	140
TOTAL KJELDAHL NITROGEN	mg/l	0.344	0.417	0.239	0.412	0.308	0.648	0.281	-0.2 U	0.445	0.648
HEXAVALENT CHROMIUM							~~-0.01 U~~ R	~~-0.01 U~~ R	~~-0.01 U~~ R	~~-0.01 U~~ R	~~-0.01 U~~ R
1. Data qualifications reflect 100% data validation performed by Data Validation Services											

these values are incorrect

no qual for alkalinity on 1130

TABLE X

ANALYTICAL SUMMARY OF DEEP GROUNDWATER

Inactive Landfill Area
Peter Cooper Site
Gowanda, New York

Compound	UNIT	-105 11/7/00 MW-7D	-149 5/4/01 MW-7D	-107 11/8/00 MW-2D	-148 5/4/01 MW-2D	-111 11/9/00 MW-5D	-141 5/3/01 MW-5D	-142 5/3/01 MW-5D	-114 11/9/00 MW-8D	-122 4/30/01 MW-8D	-115 11/9/00 MW-4D2	-146 5/3/01 MW-4D2	-118 11/10/00 MW-4DR	-145 5/3/01 MW-4DR	-119 11/10/00 MW-1D	-124 5/1/01 MW-1D
2-CHLOROPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	-10 U	-9.4 U	-9.4 U	-10 U	-9.4 U	-10 U	-10 U	-10 U	-9.4 U	-10 U	-9.4 U
2,4-DICHLOROPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	-10 U	-9.4 U	-9.4 U	-10 U	-9.4 U	-10 U	-10 U	-10 U	-9.4 U	-10 U	-9.4 U
2,4-DIMETHYLPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	-10 U	-9.4 U	-9.4 U	-10 U	-9.4 U	-10 U	-10 U	-10 U	-9.4 U	-10 U	-9.4 U
2,4-DINITROPHENOL	UG/L	-50 U	-24 U	-50 U	-24 U	-50 UJ	-24 U	-24 U	-50 UJ	-24 U	-50 UJ	-26 U	-50 UJ	-24 U	-50 UJ	-24 U
4,6-DINITRO-2-METHYLPHENOL	UG/L	-50 U	-24 U	-50 U	-24 U	-50 U	-24 U	-24 U	-50 U	-24 U	-50 U	-26 U	-50 U	-24 U	-50 U	-24 U
4-CHLORO-3-METHYLPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	-10 U	-9.4 U	-9.4 U	-10 U	-9.4 U	-10 U	-10 U	-10 U	-9.4 U	-10 U	-9.4 U
2-METHYLPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	-10 U	-9.4 U	-9.4 U	-10 U	-9.4 U	-10 U	-10 U	-10 U	-9.4 U	-10 U	-9.4 U
4-METHYLPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	-10 U	-9.4 U	-9.4 U	-10 U	-9.4 U	-10 U	-10 U	-10 U	-9.4 U	-10 U	-9.4 U
2-NITROPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	-10 U	-9.4 U	-9.4 U	-10 U	-9.4 U	-10 U	-10 U	-10 U	-9.4 U	-10 U	-9.4 U
4-NITROPHENOL	UG/L	-50 U	-24 U	-50 U	-24 U	-50 U	-24 U	-24 U	-50 U	-24 U	-50 U	-26 U	-50 U	-24 U	-50 U	-24 U
PENTACHLOROPHENOL	UG/L	-50 U	-24 U	-50 U	-24 U	-50 U	-24 U	-24 U	-50 U	-24 U	-50 U	-26 U	-50 U	-24 U	-50 U	-24 U
PHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	-10 U	-9.4 U	-9.4 U	-10 U	-9.4 U	-10 U	-10 U	-10 U	-9.4 U	-10 U	-9.4 U
2,4,6-TRICHLOROPHENOL	UG/L	-10 U	-9.4 U	-10 U	-9.4 U	-10 U	-9.4 U	-9.4 U	-10 U	-9.4 U	-10 U	-10 U	-10 U	-9.4 U	-10 U	-9.4 U
2,4,5-TRICHLOROPHENOL	UG/L	-10 U	-24 U	-10 U	-24 U	-10 U	-24 U	-24 U	-10 U	-24 U	-10 U	-26 U	-10 U	-24 U	-10 U	-24 U
CALCIUM	UG/L	21600	54000	232000	252000	562000	586000		27500	45200	49900	59800	206000	211000	18800	28300
CHROMIUM	UG/L	-10 U	-10 U	52.4	55.1	-10 U	-10 U	-10 U	-10 U		13.4	49.2	133	88.0	-10 U	11.3
IRON	UG/L	378	1810	146	115	66900	71400		6920	8400	8450	70000	1980	4810	13500	16100 J
MAGNESIUM	UG/L	5840	15700	104000	107000	36000	35400		9050	2600	15900	22500	89400	75200	6810	8300
POTASSIUM	UG/L	3330	4690	24300	25200	3430	3760		4240	5280	7690	13900	23700	20800	2590	2660
SODIUM	UG/L	384000	347000	295000	297000	21200	27000		163000	109000	950000	1030000	19700	185000	154000	144000
ZINC	UG/L	-20 U	-30 U	140	-30 U	34.8	-20 U	22.6	65.5		118	416	-20 U	45.1	42	65.2
ARSENIC	UG/L	-10 U	25 ~~-10~~ U	24.8	28 ~~-10 U~~	-10 U	-3.55 U	-3.55 U	-10 U		-10 U	48.3 J	19.2	-3.55 U	-10 U	-3.55 U
BENZENE	UG/L	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
CHLOROBENZENE	UG/L	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	10	6.8 J	-10 U	-10 U
1,2-DICHLOROBENZENE	UG/L	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
1,4-DICHLOROBENZENE	UG/L	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
ETHYLBENZENE	UG/L	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
TOLUENE	UG/L	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	1.5 J	-10 U	-10 U	-10 U	-10 U	-10 U
M+P-XYLENE	UG/L	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
O-XYLENE	UG/L	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U	-10 U
AMMONIA	MG/L	1.31	1.80	353	349	10.4	10.5		0.762	0.716	9.35	8.99	241	186	0.826	0.800
HEXAVALENT CHROMIUM	MG/L	-0.01 U	0.0225 J	-0.04 U	0.0592 J	-0.01 U	~~-0.01~~ U R	-0.01 U R	-0.01 U		-0.01 U	~~-0.01~~ U R	R	~~-0.01~~ U R	-0.01 U	~~-0.01~~ U R
TOTAL ORGANIC CARBON	MG/L	3.79 U	5.71	39.7	37.7	3.83 U	5.53		1.59 U	15.4	11.8	10.7 J	43.3	32.2 J	-1.07 U	3.22 J
TOTAL ORGANIC CARBON	MG/L	3.80 U	5.49	37.2	37.1	3.72 U	5.08		1.65 U	15.5	11.2	10.6	41.4	31.5	-1.07 U	3.17
TOTAL ORGANIC CARBON	MG/L	3.80 U	5.44	39.1	37.4	3.68 U	5.32		1.59 U	15.5	11.8	10.6	42.9	31.4	-1.04 U	3.13
TOTAL ORGANIC CARBON	MG/L	3.71 U	5.34	39.6	36.7	3.56 U	5.31		1.61 U	15.4	11.9	10.5	39.5	31.4	-1.06 U	3.14
TOTAL DISSOLVED SOLIDS	MG/L	1070		1930		2460			533		1980		1170		451	
TOTAL SULFIDE	MG/L	-1 U	1.2 J	9.70	6.4 J	-1 U	-1 U		-1 U	-1 U	-1 U	-1 U J	7.60	6.8 J	-1 U	1.2
CARBONATE ALKALINITY	MG/L	-2 U	-2 U	-2 U	-2 U	-2 U	-2 U		-2 U	85.3	-2 U	-2 U	-2 U	-2 U	-2 U	-2 U
FERROUS IRON	MG/L						22.0						0.524			
CHLORIDE	MG/L	249	464	177	148	14.2	11.0		87.1	148	579	914	62.5	44.6	111	98.5
NITRATE NITROGEN	MG/L	-0.5 U	0.0753	-0.5 U	0.0548	-0.5 UJ	.454 [illegible]		-0.5 UJ	0.548	-0.5 U	.315 [illegible]	-0.5 U	-0.05 U	-0.5 U	-0.5 U
SULFATE	MG/L	30.5	50.8	715	745	1620	1460		17.4	30.7	13.2	3.4	162	266	2.07	10.4
TOTAL ALKALINITY	MG/L	902	620	1980	1980	289	275		350	90	1100	2000	2010	1550	274	260
BICARBONATE ALKALINITY	MG/L	902	620	1980	1980	289	275		350	4.67	1100	2000	2010	1550	274	260
TOTAL KJELDAHL NITROGEN	MG/L	2.06	2.73	336	351	10.1	10.2		1.29	2.05	11.3	10.4	238	181	1.37	1.37
SOLUBLE ORGANIC CARBONS (1)	MG/L	3.85 U		43.2		3.56 U			2.61 U	15.8	12.2	12.6 J	40.1	40.9 J	1.46 U	8.10 J
SOLUBLE ORGANIC CARBONS (2)	MG/L	3.86 U		41.8		3.58 U			2.66 U	16.0	12.1	13.0	42.4	39.7	1.46 U	7.98
SOLUBLE ORGANIC CARBONS (3)	MG/L	3.82 U		43.2		3.56 U			2.53 U	15.9	12.2	12.6	39.4	39.0	1.43 U	7.78
SOLUBLE ORGANIC CARBONS (4)	MG/L	3.81 U		40.2		3.43 U			2.57 U	16.9	12.6	12.6	41.8	38.9	1.37 U	7.62
CALCIUM (soluble)	UG/L												209000		14900	
CHROMIUM (soluble)	UG/L									-10 U J		11.4	134	82.1	-10 U	-10 U
IRON (soluble)	UG/L												926		708	
MAGNESIUM (soluble)	UG/L												90800		4760	
POTASSIUM (soluble)	UG/L												24400		-2000 U	
SODIUM (soluble)	UG/L												203000		154000	
ZINC (soluble)	UG/L									-20 U		78.4	-20 U	-30 U	-20 U	23.6
ARSENIC (soluble)	UG/L									-3.55 U		25 ~~-10~~ U	15.2	25 ~~-10~~ U	-10 U	-3.55 U
HEXAVALENT CHROMIUM (soluble)	MG/L									0.0118 J		0.0103 J	~~-0.01~~ U R	~~-0.01~~ U R	~~-0.01~~ U R	-0.01 U R

1. Data qualifications reflect 100% data validation performed by Data Validation Services

ok
no edit to old data

301626

The edited Form I data sheets from data validation have been submitted to USEPA and NYSDEC under separate cover.

APPENDIX L

Village of Gowanda Zoning Map Presented in the 1999 Master Plan

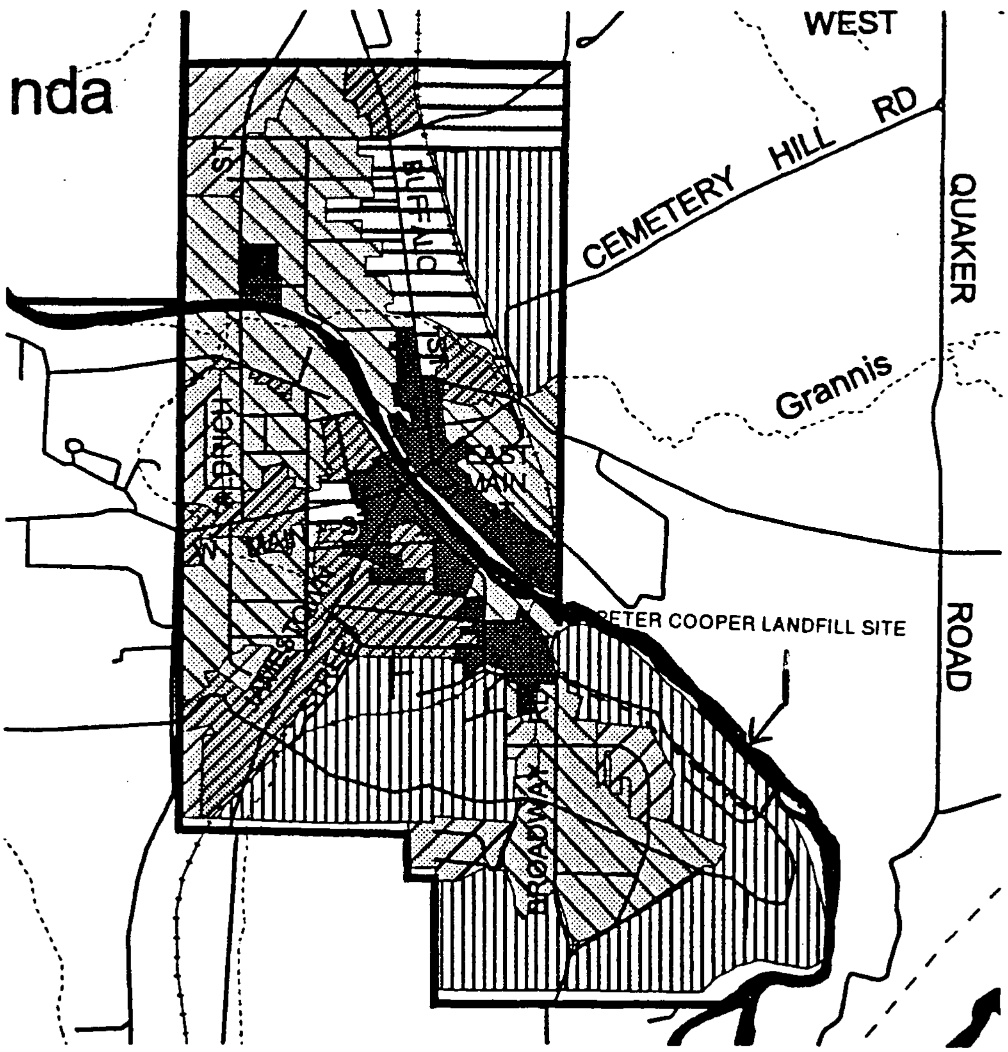
Town of Collins/
Village of Gowanda
1999 Master Plan

Map 12

Current Zoning

Village of Gowanda

See Collins Zoning Map
for Details on Town Zoning



Gowanda Zoning

- General Commercial
- Neighborhood Commercial
- Industrial
- Residential- Single Class A
- Residential- Single Class B
- Residential- Multi
- Roads
- Railroads
- Utility/ Trail Corridors
- Streams

500 0 500 1000 1500 2000 Feet

Base map copyrighted by the N.Y.S. Dept. of Transportation

Map prepared by the Erie County Planning Division
June, 1998

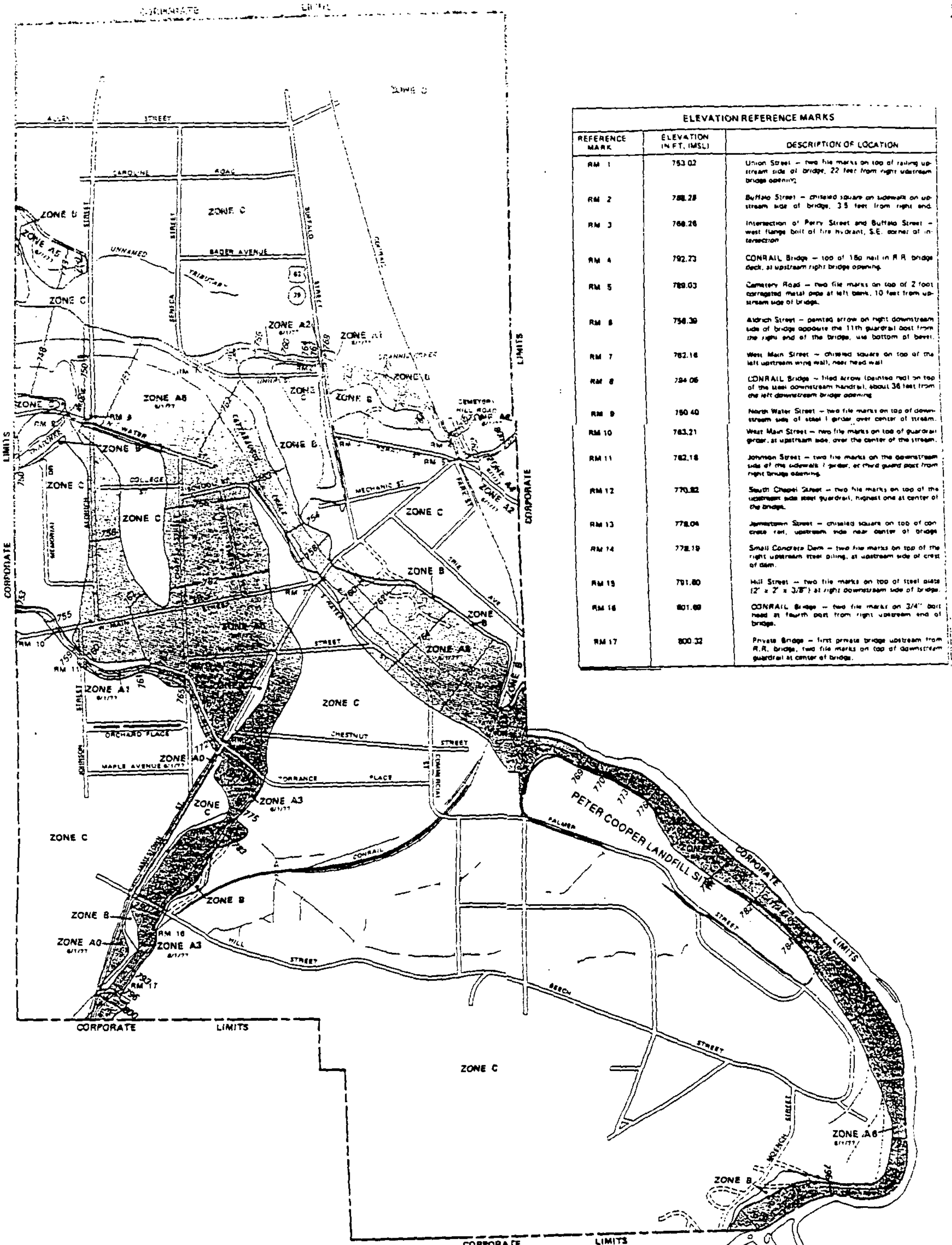
301630

APPENDIX M

APPENDIX M

Floodplain Map

301632



ELEVATION REFERENCE MARKS		
REFERENCE MARK	ELEVATION IN FT. (MSL)	DESCRIPTION OF LOCATION
RM 1	753.02	Union Street – two file marks on top of railing upstream side of bridge, 22 feet from right upstream bridge opening.
RM 2	788.28	Buffalo Street – chiseled square on sidewalk on upstream side of bridge, 3.5 feet from right end.
RM 3	768.26	Intersection of Perry Street and Buffalo Street – west flange bolt of fire hydrant, S.E. corner of intersection
RM 4	792.73	CONRAIL Bridge – top of 16p nail in R.R. bridge deck, at upstream right bridge opening.
RM 5	789.03	Cemetery Road – two file marks on top of 2 foot corrugated metal pipe at left bank, 10 feet from upstream side of bridge.
RM 6	758.39	Aldrich Street – painted arrow on right downstream side of bridge opposite the 11th guardrail post from the right end of the bridge, use bottom of bevel.
RM 7	762.16	West Main Street – chiseled square on top of the left upstream wing wall, near head wall
RM 8	794.06	CONRAIL Bridge – filed arrow (painted red) on top of the steel downstream handrail, about 38 feet from the left downstream bridge opening
RM 9	760.40	North Water Street – two file marks on top of downstream side of steel I girder over center of stream.
RM 10	763.21	West Main Street – two file marks on top of guardrail girder, at upstream side, over the center of the stream.
RM 11	762.18	Johnson Street – two file marks on the downstream side of the sidewalk I girder, at third guard post from right bridge opening.
RM 12	770.82	South Chapel Street – two file marks on top of the upstream side steel guardrail, highest one at center of the bridge.
RM 13	778.04	Jamestown Street – chiseled square on top of concrete rail, upstream side near center of bridge
RM 14	778.19	Small Concrete Dam – two file marks on top of the right upstream steel piling, at upstream side of crest of dam.
RM 15	791.80	Hill Street – two file marks on top of steel plate (2' x 2' x 3/8") at right downstream side of bridge.
RM 16	801.69	CONRAIL Bridge – two file marks on 3/4" bolt head at fourth post from right upstream end of bridge.
RM 17	800.32	Private Bridge – first private bridge upstream from R.R. bridge, two file marks on top of downstream guardrail at center of bridge.

FLOOD HAZARD BOUNDARY MAP H-01
FLOOD INSURANCE RATE MAP I-01

VILLAGE OF GOWANDA, NEW YORK

CATTARAUGUS COUNTY
ERIE COUNTY

PANEL H&I-01

PAGE 1 OF 1 PRINTED

EFFECTIVE DATE:
JUNE 1, 1977

COMMUNITY NUMBER:
360076A

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

KEY TO SYMBOLS

301633

APPENDIX N

APPENDIX N

Darcy Flux to Creek

Subject: Groundwater Discharge Rate to Creek

By: RHF
Checked By: [initials]
Date: 11/02/02
Date: 11/13/02

Project No. 5771.001
Task No.
File No. 5D
Sheet 1 of 4

Rate of Discharge (Flux) from Site to Creek

$$Q = T\,i\,W$$

T = transmissivity (ft^2/day)
i = gradient (hydraulic)
W = Length of Segment ft

T = K × B   K = hydraulic Conductivity
B = Saturated Thickness

Inactive Landfill Area (overburden)

Q = ft^3/day

Q = T i W

T = 2.9 ft/day × 4 ft

T = 11.6 ft^2/day

Q = 11.6 ft^2/day × 0.02 × 1,150 ft

Q = 266.8 ft^3/day

or

Q = 2 000 gallons/day

B = 4 ft
K = 2.9 ft/day - Geometric mean of All on-site wells

i = MW-1S to MW-4S
Feb 2001 W.L. data
773 to 763
ΔH = 10 ft

ΔL = 450 ft
i = 0.02

W = 1150 ft

Subject ______ Project No. ______

By ______ Checked By ______ Task No. ______

File No. ______

Date ______ Date ______ Sheet 2 of 4

Former Manufacturing Plant Area (overburden)

$Q = T i W$ $\quad B = 6 ft$

$T = 2.9 ft/day \times 6 ft$ $\quad K = 2.9 ft/day$

$T = 17.4 ft^2/day$ $\quad i =$ estimate since overburden is unsaturated @ FTP-1D

$Q = 17.4 ft^2/day \times 0.01 \times 1600 ft$ $\quad i = 0.01$

$W = 1,600 ft$

$Q = 278.4 ft^3/day$

or

2080 gallons/day

Q from Site Overburden

$Q_{site} = Q_{Landfill\ Area} + Q_{FMPA}$

$Q = 267 + 278 ft^3/day$

$Q_{site} = 545 ft^3/day$

or

$Q_{site} = 0.378 ft^3/min$

or

$\boxed{Q_{site} = 0.006 ft^3/sec}$

Subject ______ Project No. ______

By ______ Checked By ______ Task No. ______

File No. ______

Date ______ Date ______ Sheet 3 of 4

Inactive Lanfill Area (Bedrock)

$Q = T i W$

$B = 35\ ft$

$K = 1\ ft/day$

Geometric mean of all Slug test data

$T = 1\ ft/day \times 35\ ft$

$T = 35\ ft^2/day$

i : MW-1D to 4D(R)

Feb 2001 WL

767.7 to 754.3

$Q = 35\ ft^2/day \times 0.029 \times 1150\ ft$

$Q = 1167\ ft^3/day$

$\Delta H = 13.4$

$\Delta L = 450\ ft$

$Q = 8,700$ gallons/day

$i = 0.029$

$W = 1,150\ ft$

Former Manufacturing Plant Area (Bedrock)

$Q = T i W$

$B = 35\ ft$

$Q = 35\ ft^2/day \times 0.024 \times 1600\ ft$

$k = 1\ ft/day$

i = FMP1D to FMP2D

$Q = 1344\ ft^3/day$

Feb 2001 WL 777.14 to 772.4

$Q = 10,050$ gallons/day

$\Delta H = 4.74$

$\Delta L = 200$ distance to Equipotential

Q from Site Bedrock

$i = 0.024$

$W = 1600\ ft$

$Q_{site} = Q_{Landfill Area} + Q_{FMPA}$

$Q_{site} = 1167\ ft^3/day + 1344\ ft^3/day$

$Q_{site} = 2,510\ ft^3/day$

$\boxed{Q_{site} = 0.029\ ft^3/sec}$

301638 GEOMATRIX CONSULTANTS

Subject

By

Checked By

Date

Date

Project No.

Task No.

File No.

Sheet 4 of 4

TOTAL Groundwater Flux to Creek

$$Q_{(Total)} = Q_{(Overburden)} + Q_{(Bedrock)}$$

$$Q_{(Total)} = 545\ ft^3/day + 2,510\ ft^3/day$$

$$Q_{(Total)} = 3,055\ ft^3/day$$

or

$$\boxed{Q_{(Total)}\ 0.035\ ft^3/sec}$$

APPENDIX O

APPENDIX O

Geotechnical Testing of Site Fill/Soil/Sediment

Geotechnics

LABORATORY TEST REPORT

December 4, 2000

Project No. 00306-01

Ms. Jeanne M. Asquith
Benchmark Environmental Engineering & Science
50 Fountain Plaza
Suite 1350
Buffalo, NY 14202

RE: Soils Testing : Peter Cooper

Transmitted herein are the results of the soils testing performed for the above referenced project, verified on the Project Verification Form, submitted November 15, 2000. The testing was performed in general accordance with the ASTM methods listed on the enclosed data sheets. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

Disclaimer

The test results are believed to be representative of the samples submitted but are indicative only of the specimens which were evaluated. Geotechnics has no direct knowledge of the origin of the samples, implies no position with regard to the disposition of the test results, i.e., pass/fail, and makes no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization of the Client and Geotechnics. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please do not hesitate to contact our office.

Respectively submitted,

David R. Backstrom
Laboratory Director

301642

FINAL PERMEABILITY REPORT

3rd rock

Project Name:	Peter Cooper-Gowanda	Date:	01/15/01
Project No.:	00-005	Tested By:	JMA
Sample No.:	ST#1	Check By:	RD
Sample I.D.:	00-177	Date of Test:	10/12/00
Laboratory Method:	ASTM D5084, Method C	Date Test Complete:	10/14/00
		CELL NO.:	2

INITIAL SAMPLE DATA:

Height, in.:	2.302	Wet Density, pcf:	135.9
Diameter, in.:	2.832	Dry Density, pcf:	117.2
Moisture Content,%:	15.90	Compaction, %:	NA

FINAL SAMPLE DATA:

Height, in.:	2.324	Wet Density, pcf:	134.1
Diameter, in.:	2.850	Dry Density, pcf:	115.5
Moisture Content,%:	16.10		

SATURATION AND CONSOLIDATION DATA:

Consolidation Pressure: 83 psi

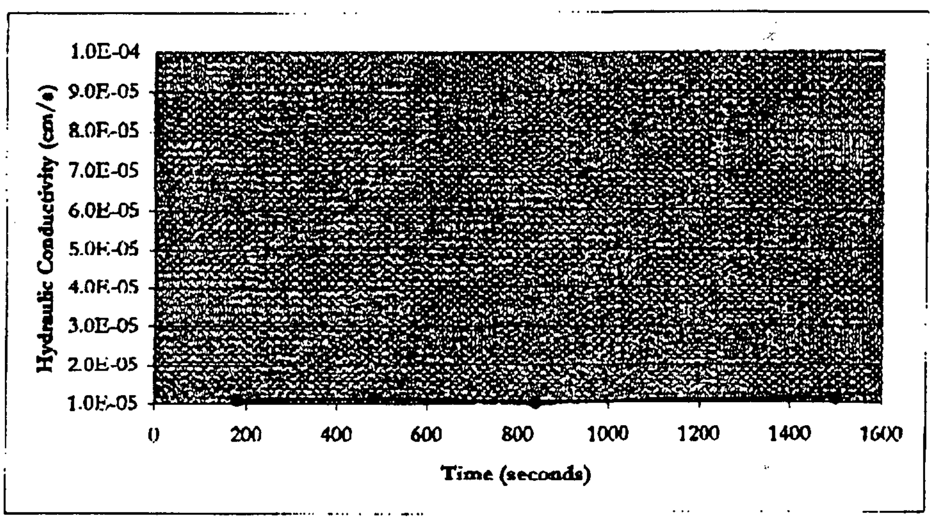
Backpressure: 80 psi

Saturation (B parameter): 95%

AVERAGE PERMEABILITY RESULT (average of last 4 readings, K, cm/s):

Trial #	Testing Pressures (psi)			Q (ml/sec)	Final K (cm/s)
	1	2	3		
1	83	81.2	80	6.28E-03	1.1E-05
2	83	81	80	5.50E-03	1.1E-05
3	83	81	80	4.94E-03	1.0E-05
4	83	81	80	5.50E-03	1.1E-05

Average K: 1.1E-05



301643

FINAL PERMEABILITY REPORT

3rd rock

Project Name:	Peter Cooper-Gowanda	Date:	01/15/01
Project No.:	00-005	Tested By:	JMA
Sample No.:	ST#2	Check By:	RD
Sample I.D.:	00-178	Date of Test:	10/17/00
Laboratory Method:	ASTM D5084, Method C	Date Test Complete:	10/19/00
		CELL NO.:	1

INITIAL SAMPLE DATA:

Height, in.:	2.376	Wet Density, pcf:	127.2
Diameter, in.:	2.813	Dry Density, pcf:	105.6
Moisture Content,%:	20.40	Compaction, %:	NA

FINAL SAMPLE DATA:

Height, in.:	2.343	Wet Density, pcf:	127.1
Diameter, in.:	2.841	Dry Density, pcf:	102.1
Moisture Content,%:	24.50		

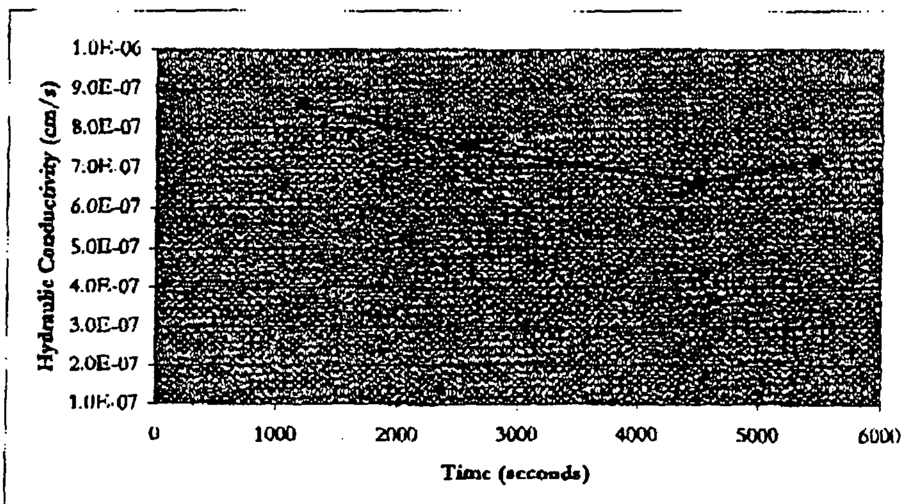
SATURATION AND CONSOLIDATION DATA:

Consolidation Pressure: 83 psi
Backpressure: 80 psi
Saturation (B parameter): 99%

AVERAGE PERMEABILITY RESULT (average of last 4 readings, K, cm/s):

Trial #	Testing Pressures (psi)			Q (ml/sec)	Final K (cm/s)
	1	2	3		
1	83.1	81.1	80	4.58E-04	8.6E-07
2	83.1	81	79.8	4.35E-04	7.5E-07
3	83.1	81.1	79.8	4.17E-04	6.6E-07
4	83.1	81	79.8	4.17E-04	7.2E-07

Average K: 7.5E-07



301644

3rd rock

FINAL PERMEABILITY REPORT

Project Name:	Peter Cooper-Gowanda	Date:	01/15/01
Project No.:	00-005	Tested By:	JMA
Sample No.:	ST#3	Check By:	RD
Sample I.D.:	00-180	Date of Test:	10/17/00
Laboratory Method:	ASTM D5084, Method C	Date Test Complete:	10/19/00
		CELL NO.:	2

INITIAL SAMPLE DATA:

Height, in.:	2.809	Wet Density, pcf:	134.0
Diameter, in.:	2.796	Dry Density, pcf:	112.5
Moisture Content,%:	19.10	Compaction, %:	NA

FINAL SAMPLE DATA:

Height, in.:	2.720	Wet Density, pcf:	137.9
Diameter, in.:	2.807	Dry Density, pcf:	119.2
Moisture Content,%:	15.70		

SATURATION AND CONSOLIDATION DATA:

Consolidation Pressure: 83.5 psi

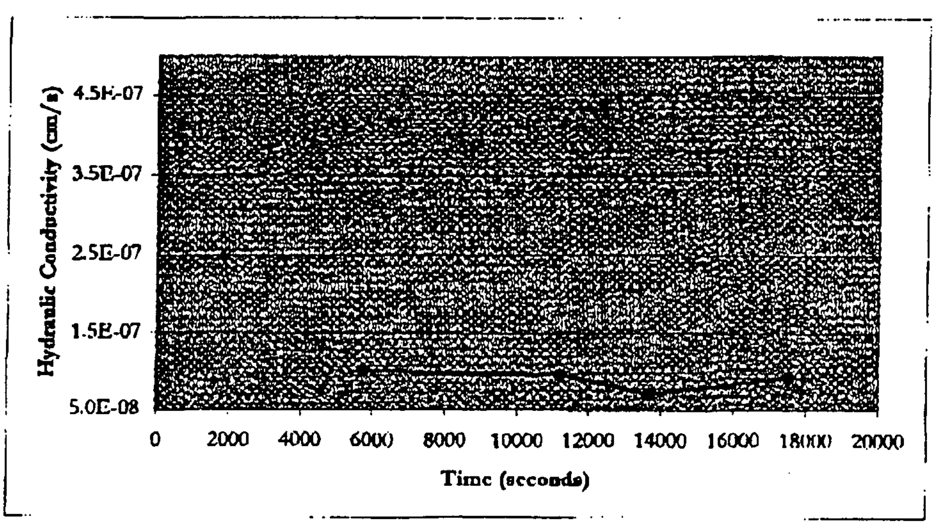
Backpressure: 80 psi

Saturation (B parameter): 98%

AVERAGE PERMEABILITY RESULT (average of last 4 readings, K, cm/s):

Trial #	Testing Pressures (psi)			Q (ml/sec)	Final K (cm/s)
	1	2	3		
1	83.5	81.7	79.8	7.81E-05	1.0E-07
2	83.5	81.6	79.5	8.24E-05	9.7E-08
3	83.5	81.6	79.5	6.10E-05	7.1E-08
4	83.5	81.6	79.5	7.81E-05	9.2E-08

Average K: 9.0E-08



301645

FINAL PERMEABILITY REPORT

3rd rock

Project Name:	Peter Cooper-Gowanda	Date:	01/15/01
Project No.:	00-005	Tested By:	JMA
Sample No.:	ST#4	Check By:	RD
Sample I.D.:	00-181	Date of Test:	10/26/00
Laboratory Method:	ASTM D5084, Method C	Date Test Complete:	10/29/00
		CELL NO.:	2

INITIAL SAMPLE DATA:

Height, in.:	2.467	Wet Density, pcf:	129.7
Diameter, in.:	2.823	Dry Density, pcf:	107.6
Moisture Content,%:	20.50	Compaction, %:	NA

FINAL SAMPLE DATA:

Height, in.:	2.373	Wet Density, pcf:	132.5
Diameter, in.:	2.852	Dry Density, pcf:	114.3
Moisture Content,%:	15.90		

SATURATION AND CONSOLIDATION DATA:

Consolidation Pressure: 83.1 psi

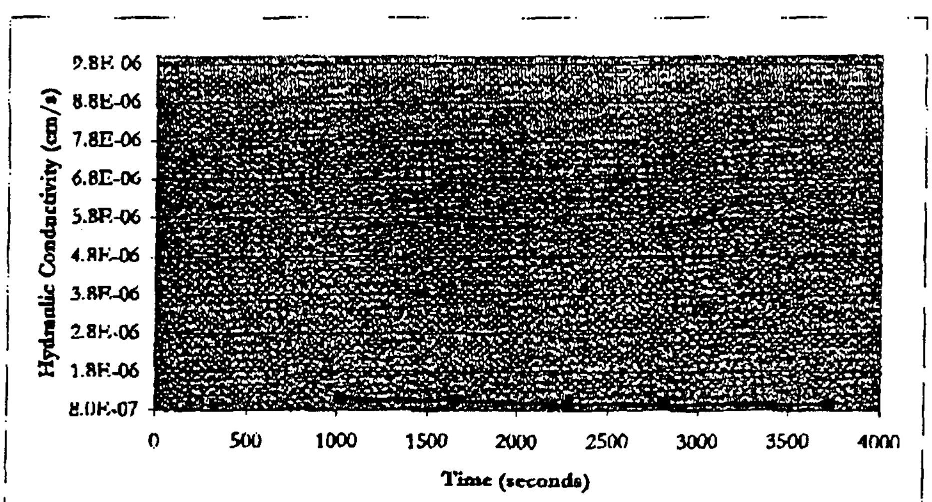
Backpressure: 80 psi

Saturation (B parameter): 98%

AVERAGE PERMEABILITY RESULT (average of last 4 readings, K, cm/s):

Trial #	Testing Pressures (psi)			Q (ml/sec)	Final K (cm/s)
	1	2	3		
1	83.1	81	79.8	6.38E-04	1.1E-06
2	83.1	81	79.8	5.57E-04	9.7E-07
3	83.1	81	79.8	5.46E-04	9.5E-07
4	83.1	81	79.8	5.55E-04	9.6E-07

Average K: 1.0E-06



301646

FINAL PERMEABILITY REPORT

3rd rock

Project Name:	Peter Cooper-Gowanda	Date:	01/15/01
Project No.:	00-005	Tested By:	JMA
Sample No.:	ST#5	Check By:	RD
Sample I.D.:	00-182	Date of Test:	12/04/00
Laboratory Method:	ASTM D5084, Method C	Date Test Complete:	12/06/00
		CELL NO.:	1

INITIAL SAMPLE DATA:

Height, in.:	2.653	Wet Density, pcf:	140.1
Diameter, in.:	2.845	Dry Density, pcf:	126.2
Moisture Content,%:	11.00	Compaction, %:	NA

FINAL SAMPLE DATA:

Height, in.:	2.626	Wet Density, pcf:	140.1
Diameter, in.:	2.831	Dry Density, pcf:	123.9
Moisture Content,%:	13.10		

SATURATION AND CONSOLIDATION DATA:

Consolidation Pressure: 83.0 psi

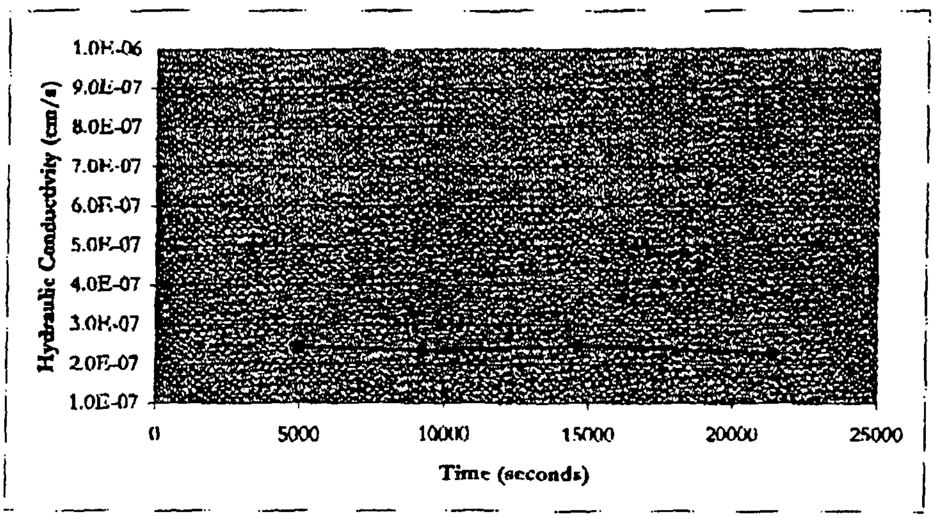
Backpressure: 80 psi

Saturation (B parameter): 96%

AVERAGE PERMEABILITY RESULT (average of last 4 readings, K, cm/s):

Trial #	Testing Pressures (psi)			Q (ml/sec)	Final K (cm/s)
	1	2	3		
1	83	81	79.6	1.47E-04	2.5E-07
2	83	81	79.6	1.41E-04	2.4E-07
3	83	81	79.6	1.48E-04	2.5E-07
4	83	81	79.6	1.37E-04	2.3E-07

Average K: 2.4E-07



301647

FINAL PERMEABILITY REPORT

3rd rock

Project Name:	Peter Couper-Gowanda	Date:	01/15/01
Project No.:	00-005	Tested By:	JMA
Sample No.:	ST#6	Check By:	RD
Sample I.D.:	00-183	Date of Test:	10/12/00
Laboratory Method:	ASTM D5084, Method C	Date Test Complete:	10/14/00
		CELL NO.:	1

INITIAL SAMPLE DATA:

Height, in.:	2.411	Wet Density, pcf:	123.1
Diameter, in.:	2.833	Dry Density, pcf:	103.0
Moisture Content,%:	19.50	Compaction, %:	NA

FINAL SAMPLE DATA:

Height, in.:	2.399	Wet Density, pcf:	126.5
Diameter, in.:	2.804	Dry Density, pcf:	105.1
Moisture Content,%:	20.40		

SATURATION AND CONSOLIDATION DATA:

Consolidation Pressure: 83.1 psi

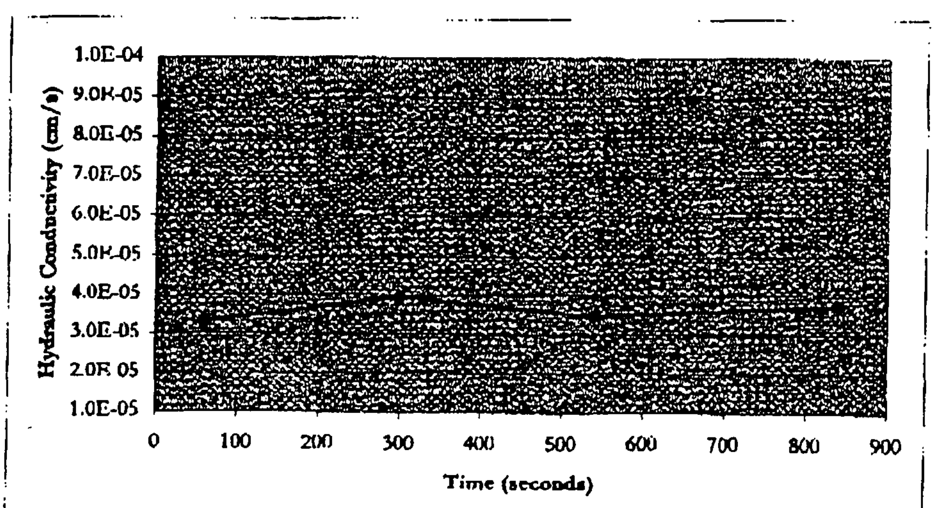
Backpressure: 80 psi

Saturation (B parameter): 99%

AVERAGE PERMEABILITY RESULT (average of last 4 readings, K, cm/s):

Trial #	Testing Pressures (psi)			Q (ml/sec)	Final K (cm/s)
	1	2	3		
1	83.1	81	79.9	1.67E-02	3.3E-05
2	83.1	81	80.3	1.27E-02	3.9E-05
3	83.1	81	80.2	1.27E-02	3.5E-05
4	83.1	81	80.3	1.20E-02	3.7E-05

Average K 3.6E-05



301648

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DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-3
Lab ID	00306-01.001	Visual Description	GRAY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Maximum Shear Stress		Normal Stress
0	Origin	**0**
3.59	(1)	**3.05**
4.36	(2)	**6.22**
7.40	(3)	**8.8**

Overall Regression Analysis

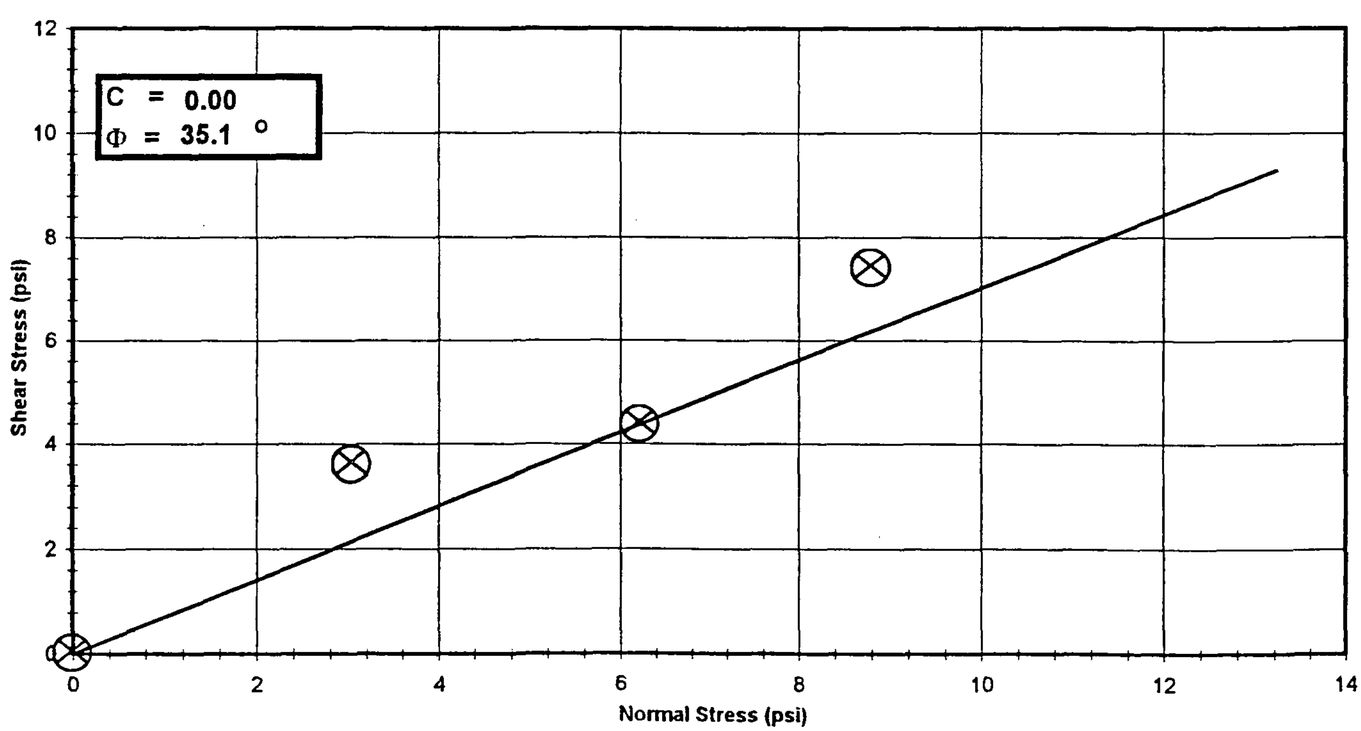
Slope = 0.77
C = 0.35
Φ = 37.70 degrees

Selected Points	Shear Stress	Normal Stress
Origin	0.00	0
2	4.36	6.22

Selected Points Regression

Slope = 0.70
C = 0.00
Φ = 35.1 degrees

SHEAR STRESS vs. NORMAL STRESS



301649

Note: Graph not to scale

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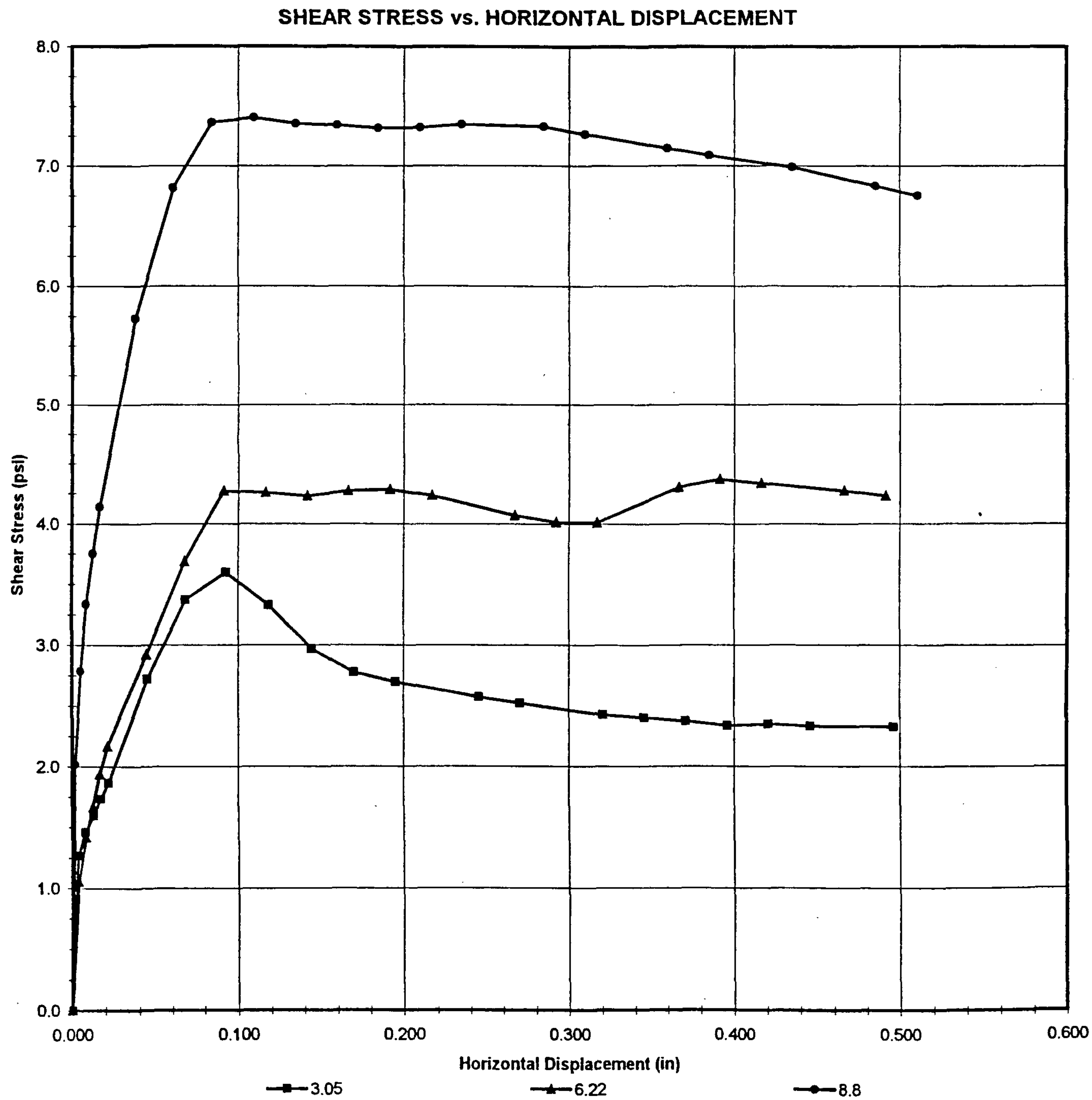
DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-3
Lab ID	00306-01.001	Visual Description	GRAY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



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DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-3
Lab ID	00306-01.001	Visual Description	GRAY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

SHEAR BOX DATA

Wt.of Wet Specimen & Ring(gm)	288.17	Specific Gravity (Assumed)	2.70
Weight of Ring (gm)	110.72	Volume of Solids(cc)	57.2
Weight of Wet Specimen (gm)	177.45	Initial Consolidation Dial Reading	0
Initial Specimen Height(in)	1	Final Consolidation Dial Reading	50.1
Specimen Diameter(in)	2.5	Corrected Final Cons. Reading	44.1
Wet Density(pcf)	137.7	Void Ratio Before Consolidation	0.41
Dry Density(pcf)	**119.8**	**Void Ratio After Consolidation**	0.40

Moisture Content	*Before Test*	*After Test*	*Testing Parameters*	
Tare ID	444	170		
Wt. Wet Soil & Tare (gm)	222.41	185.55	Normal Stress(psi)	**3.05**
Wt. Dry Soil & Tare (gm)	206.49	161.97		
Wt. Tare (gm)	99.85	8.18	Strain Rate(in/min)	0.00144
Wt. of Water (gm)	15.92	23.58		
Wt. of Dry Soil (gm)	106.64	153.79	Machine Deflection(div)	6
Moisture Content (%)	**14.9**	**15.3**		

Horizontal Dial Reading 1 div=0.001"	Horizontal Displacement (in)	Proving Ring Reading 1 div=0.0001"	Shear Force (lbs)	Shear Stress (psi)	Vertical Dial Reading 1 div= 0.0001"	Vertical Displacement (+)incr,(-)decr (in)	Shear To Normal Ratio
0.0	0.000	0.0	0.0	**0.00**	50.1	0.0000	0.00
5.0	0.004	15.0	6.2	**1.26**	52.1	-0.0002	0.41
10.0	0.008	19.5	7.2	**1.46**	53.0	-0.0003	0.48
15.0	0.013	22.6	7.8	**1.60**	53.4	-0.0003	0.52
20.0	0.017	25.7	8.5	**1.73**	52.4	-0.0002	0.57
25.0	0.022	28.8	9.2	**1.87**	51.3	-0.0001	0.61
50.0	0.045	48.2	13.4	**2.72**	31.4	0.0019	0.89
75.0	0.069	63.0	16.5	**3.37**	1.1	0.0049	1.10
100.0	0.093	68.1	17.6	**3.59**	-28.1	0.0078	1.18
125.0	0.119	62.0	16.3	**3.32**	-39.3	0.0089	1.09
150.0	0.145	53.8	14.6	**2.97**	-40.8	0.0091	0.97
175.0	0.170	49.4	13.6	**2.77**	-41.9	0.0092	0.91
200.0	0.195	47.6	13.2	**2.69**	-44.1	0.0094	0.88
250.0	0.246	44.8	12.6	**2.57**	-49.9	0.0100	0.84
275.0	0.271	43.7	12.4	**2.52**	-51.9	0.0102	0.83
325.0	0.321	41.6	11.9	**2.43**	-55.7	0.0106	0.80
350.0	0.346	41.0	11.8	**2.40**	-56.9	0.0107	0.79
375.0	0.371	40.3	11.6	**2.37**	-57.9	0.0108	0.78
400.0	0.396	39.4	11.5	**2.33**	-59.1	0.0109	0.77
425.0	0.421	39.7	11.5	**2.35**	-59.9	0.0110	0.77
450.0	0.446	39.3	11.4	**2.33**	-61.1	0.0111	0.76
500.0	0.496	39.3	11.4	**2.33**	-63.4	0.0114	0.76

Tested By TM *Date* 11/16/00 *Checked By* GO *Date* 11-18-00

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DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-3
Lab ID	00306-01.001	Visual Description	GRAY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

SHEAR BOX DATA

Wt.of Wet Specimen & Ring(gm)	287.42	Specific Gravity (Assumed)	2.70
Weight of Ring (gm)	110.73	Volume of Solids(cc)	57.0
Weight of Wet Specimen (gm)	176.69	Initial Consolidation Dial Reading	0
Initial Specimen Height(in)	1	Final Consolidation Dial Reading	82.5
Specimen Diameter(in)	2.5	Corrected Final Cons. Reading	65.5
Wet Density(pcf)	137.1	Void Ratio Before Consolidation	0.41
Dry Density(pcf)	**119.3**	**Void Ratio After Consolidation**	0.40

Moisture Content	*Before Test*	*After Test*	*Testing Parameters*	
Tare ID	1393	11170		
Wt. Wet Soil & Tare (gm)	177.36	271.04	Normal Stress(psi)	**6.22**
Wt. Dry Soil & Tare (gm)	160.90	247.67		
Wt. Tare (gm)	50.49	94.05	Strain Rate(in/min)	0.00144
Wt. of Water (gm)	16.46	23.37		
Wt. of Dry Soil (gm)	110.41	153.62	Machine Deflection(div)	17
Moisture Content (%)	**14.9**	**15.2**		

Horizontal Dial Reading 1 div=0.001"	*Horizontal* Displacement (in)	*Proving Ring* Reading 1 div=0.0001"	*Shear* Force (lbs)	*Shear* Stress (psi)	*Vertical Dial* Reading 1 div= 0.0001"	Vertical Displacement (+)incr,(-)decr (in)	Shear To Normal Ratio
0.0	0.000	0.0	0.0	**0.00**	82.5	0.0000	0.00
5.0	0.004	10.1	5.2	**1.05**	86.3	-0.0004	0.17
10.0	0.008	18.5	6.9	**1.42**	89.2	-0.0007	0.23
15.0	0.013	24.2	8.2	**1.67**	91.2	-0.0009	0.27
20.0	0.017	30.4	9.5	**1.94**	92.6	-0.0010	0.31
25.0	0.021	35.6	10.6	**2.17**	93.8	-0.0011	0.35
50.0	0.045	52.7	14.3	**2.92**	93.5	-0.0011	0.47
75.0	0.068	70.1	18.1	**3.68**	83.5	-0.0001	0.59
100.0	0.092	83.5	21.0	**4.27**	70.1	0.0012	0.69
125.0	0.117	83.2	20.9	**4.25**	58.4	0.0024	0.68
150.0	0.142	82.5	20.7	**4.22**	54.6	0.0028	0.68
175.0	0.167	83.5	20.9	**4.27**	50.4	0.0032	0.69
200.0	0.192	83.7	21.0	**4.28**	45.7	0.0037	0.69
225.0	0.217	82.6	20.8	**4.23**	40.2	0.0042	0.68
275.0	0.267	78.8	19.9	**4.06**	33.0	0.0050	0.65
300.0	0.292	77.6	19.7	**4.01**	30.9	0.0052	0.64
325.0	0.317	77.5	19.7	**4.01**	30.4	0.0052	0.64
375.0	0.367	84.1	21.1	**4.30**	33.9	0.0049	0.69
400.0	0.391	85.7	21.4	**4.36**	33.4	0.0049	0.70
425.0	0.417	84.9	21.3	**4.33**	31.3	0.0051	0.70
475.0	0.467	83.5	21.0	**4.27**	26.4	0.0056	0.69
500.0	0.492	82.6	20.8	**4.23**	24.3	0.0058	0.68

Tested By *TM* *Date* *11/17/00* *Checked By* GU *Date* 11-19-00

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DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-3
Lab ID	00306-01.001	Visual Description	GRAY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

SHEAR BOX DATA

Wt.of Wet Specimen & Ring(gm)	272.49	Specific Gravity (Assumed)	2.70
Weight of Ring (gm)	110.73	Volume of Solids(cc)	49.8
Weight of Wet Specimen (gm)	161.76	Initial Consolidation Dial Reading	0
Initial Specimen Height(in)	1	Final Consolidation Dial Reading	245.1
Specimen Diameter(in)	2.5	Corrected Final Cons. Reading	222.1
Wet Density(pcf)	125.5	Void Ratio Before Consolidation	0.62
Dry Density(pcf)	**104.4**	**Void Ratio After Consolidation**	0.58

Moisture Content	*Before Test*	*After Test*	*Testing Parameters*	
Tare ID	1310	40		
Wt. Wet Soil & Tare (gm)	173.73	250.33	Normal Stress(psi)	**8.8**
Wt. Dry Soil & Tare (gm)	161.74	224.61		
Wt. Tare (gm)	102.64	101.53	Strain Rate(in/min)	0.00144
Wt. of Water (gm)	11.99	25.72		
Wt. of Dry Soil (gm)	59.1	123.08	Machine Deflection(div)	23
Moisture Content (%)	**20.3**	**20.9**		

Horizontal Dial Reading 1 div=0.001"	Horizontal Displacement (in)	Proving Ring Reading 1 div=0.0001"	Shear Force (lbs)	Shear Stress (psi)	Vertical Dial Reading 1 div= 0.0001"	Vertical Displacement (+)incr,(-)decr (in)	Shear To Normal Ratio
0.0	0.000	0.0	0.0	**0.00**	245.1	0.0000	0.00
5.0	0.002	32.2	9.9	**2.02**	247.1	-0.0002	0.23
10.0	0.005	49.7	13.7	**2.79**	251.7	-0.0007	0.32
15.0	0.009	62.1	16.4	**3.33**	256.6	-0.0011	0.38
20.0	0.013	71.6	18.4	**3.75**	260.6	-0.0015	0.43
25.0	0.017	80.5	20.3	**4.14**	264.3	-0.0019	0.47
50.0	0.038	116.7	28.1	**5.73**	276.7	-0.0032	0.65
75.0	0.061	141.6	33.5	**6.82**	282.0	-0.0037	0.77
100.0	0.085	154.0	36.1	**7.36**	281.1	-0.0036	0.84
125.0	0.110	154.9	36.3	**7.40**	279.0	-0.0034	0.84
150.0	0.135	153.8	36.1	**7.35**	281.7	-0.0037	0.84
175.0	0.160	153.5	36.0	**7.34**	287.7	-0.0043	0.83
200.0	0.185	152.9	35.9	**7.32**	295.2	-0.0050	0.83
225.0	0.210	153.0	35.9	**7.32**	303.5	-0.0058	0.83
250.0	0.235	153.6	36.0	**7.34**	310.7	-0.0066	0.83
300.0	0.285	153.2	36.0	**7.33**	324.0	-0.0079	0.83
325.0	0.310	151.8	35.7	**7.26**	328.7	-0.0084	0.83
375.0	0.360	149.0	35.1	**7.14**	338.3	-0.0093	0.81
400.0	0.385	147.7	34.8	**7.09**	342.8	-0.0098	0.81
450.0	0.435	145.5	34.3	**6.99**	350.1	-0.0105	0.79
500.0	0.486	141.9	33.5	**6.83**	355.4	-0.0110	0.78
525.0	0.511	140.1	33.1	**6.75**	357.7	-0.0113	0.77

Tested By TM *Date* 11/18/00 *Checked By* GU *Date* 11-19-00

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DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-4
Lab ID	00306-01.002	Visual Description	BROWNISH GRAY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Maximum Shear Stress		Normal Stress
5.05	(1)	**3**
7.70	(2)	**6**
8.76	(3)	**9**

Overall Regression Analysis

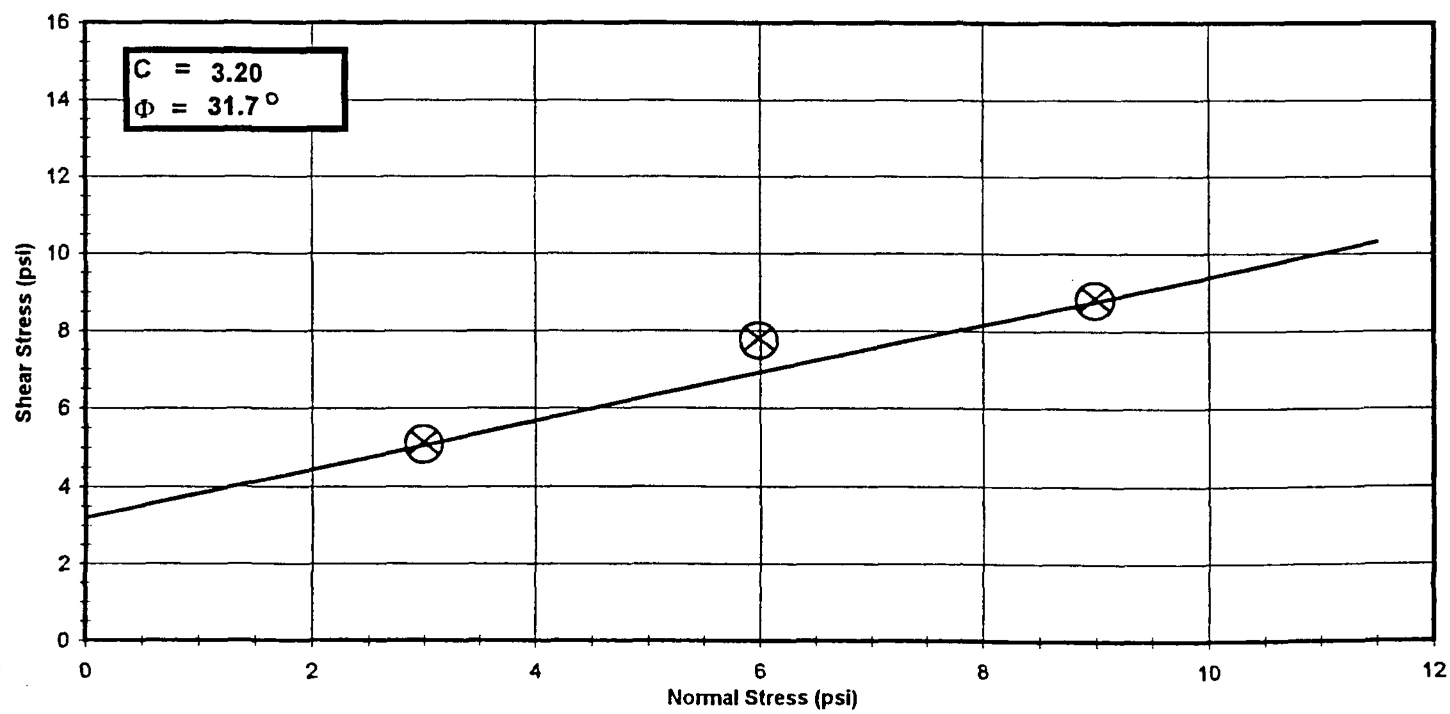
Slope = 0.62
C = 3.46
Φ = 31.7 degrees

Selected Points	Shear Stress	Normal Stress
1	5.05	3
3	8.76	9

Selected Points Regression

Slope = 0.62
C = 3.20
Φ = 31.7 degrees

SHEAR STRESS vs. NORMAL STRESS



Note: Graph not to scale

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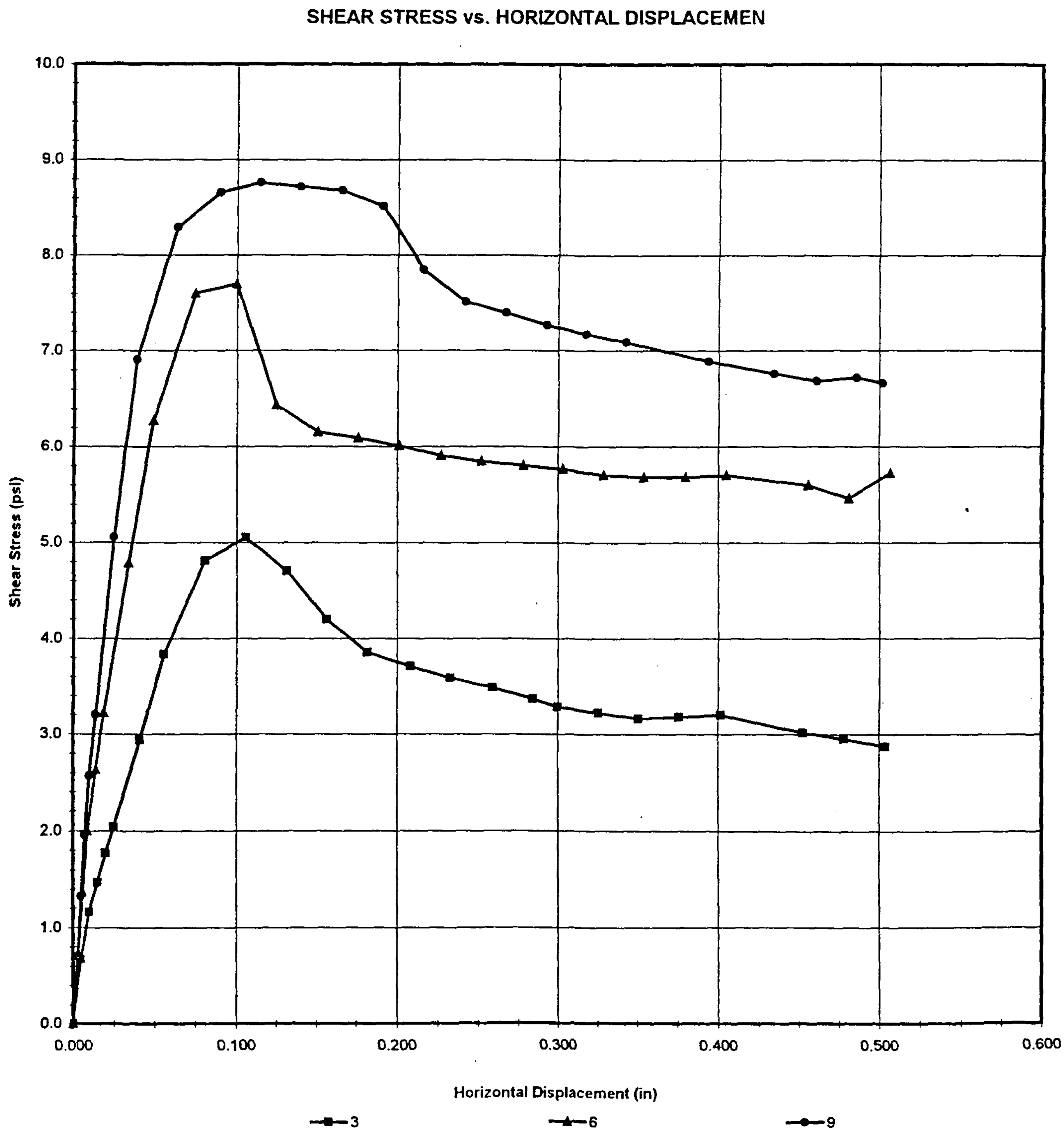
DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-4
Lab ID	00306-01.002	Visual Description	BROWNISH GRAY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



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DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-4
Lab ID	00306-01.002	Visual Description	BROWNISH GRAY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

SHEAR BOX DATA

Wt.of Wet Specimen & Ring(gm)	395.00	Specific Gravity (Assumed)	2.70
Weight of Ring (gm)	214.36	Volume of Solids(cc)	59.2
Weight of Wet Specimen (gm)	180.64	Initial Consolidation Dial Reading	0.0
Initial Specimen Height(in)	1	Final Consolidation Dial Reading	70.0
Specimen Diameter(in)	2.5	Corrected Final Cons. Reading	55.8
Wet Density(pcf)	140.2	Void Ratio Before Consolidation	0.36
Dry Density(pcf)	**124.0**	**Void Ratio After Consolidation**	0.35

Moisture Content	*Before Test*	*After Test*	*Testing Parameters*	
Tare ID	24	40		
Wt. Wet Soil & Tare (gm)	159.81	282.61	Normal Stress(psi)	3
Wt. Dry Soil & Tare (gm)	151.90	261.52		
Wt. Tare (gm)	91.21	101.55	Strain Rate(in/min)	0.00144
Wt. of Water (gm)	7.91	21.09		
Wt. of Dry Soil (gm)	60.69	159.97	Machine Deflection(div)	14
Moisture Content (%)	**13.0**	**13.2**		

Horizontal Displacement (in)	Shear Force (lbs)	Shear Stress (psi)	Vertical Dial Reading 1 div= 0.0001"	Vertical Displacement (+)incr,(-)decr (in)	Shear To Normal Ratio
0.000	0.0	**0.00**	0.0	0.0000	0.00
0.005	3.3	**0.67**	0.0	0.0000	0.22
0.010	5.7	**1.16**	3.0	-0.0003	0.39
0.015	7.2	**1.47**	4.0	-0.0004	0.49
0.020	8.7	**1.77**	4.0	-0.0004	0.59
0.025	10.0	**2.04**	4.0	-0.0004	0.68
0.041	14.4	**2.93**	-2.0	0.0002	0.98
0.056	18.8	**3.83**	-17.0	0.0017	1.28
0.081	23.6	**4.81**	-47.0	0.0047	1.60
0.106	24.8	**5.05**	-80.0	0.0080	1.68
0.132	23.1	**4.71**	-102.0	0.0102	1.57
0.157	20.6	**4.20**	-113.0	0.0113	1.40
0.182	18.9	**3.85**	-120.0	0.0120	1.28
0.208	18.2	**3.71**	-124.0	0.0124	1.24
0.233	17.6	**3.59**	-130.0	0.0130	1.20
0.259	17.1	**3.48**	-137.0	0.0137	1.16
0.284	16.5	**3.36**	-142.0	0.0142	1.12
0.300	16.1	**3.28**	-144.0	0.0144	1.09
0.326	15.8	**3.22**	-150.0	0.0150	1.07
0.351	15.5	**3.16**	-152.0	0.0152	1.05
0.376	15.6	**3.18**	-154.0	0.0154	1.06
0.402	15.7	**3.20**	-158.0	0.0158	1.07
0.453	14.8	**3.02**	-165.0	0.0165	1.01
0.478	14.5	**2.95**	-167.0	0.0167	0.98
0.504	14.1	**2.87**	-167.0	0.0167	0.96

Tested By TM *Date* 11/16/00 *Checked By* GU *Date* 11-19-00

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DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-4
Lab ID	00306-01.002	Visual Description	BROWNISH GRAY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

SHEAR BOX DATA

Wt.of Wet Specimen & Ring(gm)	389.34	Specific Gravity (Assumed)	2.70
Weight of Ring (gm)	214.32	Volume of Solids(cc)	55.0
Weight of Wet Specimen (gm)	175.02	Initial Consolidation Dial Reading	0.0
Initial Specimen Height(in)	1	Final Consolidation Dial Reading	213.0
Specimen Diameter(in)	2.5	Corrected Final Cons. Reading	176.4
Wet Density(pcf)	135.8	Void Ratio Before Consolidation	0.46
Dry Density(pcf)	**115.3**	**Void Ratio After Consolidation**	**0.44**

Moisture Content	*Before Test*	*After Test*	Testing Parameters	
Tare ID	1393	19		
Wt. Wet Soil & Tare (gm)	108.61	265.42	Normal Stress(psi)	9
Wt. Dry Soil & Tare (gm)	99.82	241.23		
Wt. Tare (gm)	50.49	90.95	Strain Rate(in/min)	0.00144
Wt. of Water (gm)	8.79	24.19		
Wt. of Dry Soil (gm)	49.33	150.28	Machine Deflection(div)	37
Moisture Content (%)	**17.8**	**16.1**		

Horizontal Displacement (in)	Shear Force (lbs)	Shear Stress (psi)	Vertical Dial Reading 1 div= 0.0001"	Vertical Displacement (+)incr,(-)decr (in)	Shear To Normal Ratio
0.000	0.0	**0.00**	0.0	0.0000	0.00
0.003	3.4	**0.69**	-2.0	0.0002	0.08
0.005	6.5	**1.32**	-2.0	0.0002	0.15
0.007	9.6	**1.96**	1.0	-0.0001	0.22
0.010	12.6	**2.57**	4.0	-0.0004	0.29
0.014	15.7	**3.20**	9.0	-0.0009	0.36
0.025	24.8	**5.05**	15.0	-0.0015	0.56
0.039	33.9	**6.91**	15.0	-0.0015	0.77
0.064	40.7	**8.29**	4.0	-0.0004	0.92
0.090	42.5	**8.66**	-1.0	0.0001	0.96
0.115	43.0	**8.76**	-14.0	0.0014	0.97
0.140	42.8	**8.72**	-28.0	0.0028	0.97
0.166	42.6	**8.68**	-38.0	0.0038	0.96
0.191	41.8	**8.52**	-45.0	0.0045	0.95
0.216	38.5	**7.84**	-50.0	0.0050	0.87
0.242	36.9	**7.52**	-52.0	0.0052	0.84
0.267	36.3	**7.39**	-55.0	0.0055	0.82
0.293	35.7	**7.27**	-55.0	0.0055	0.81
0.318	35.2	**7.17**	-56.0	0.0056	0.80
0.343	34.8	**7.09**	-56.0	0.0056	0.79
0.394	33.8	**6.89**	-57.0	0.0057	0.77
0.435	33.2	**6.76**	-57.0	0.0057	0.75
0.461	32.8	**6.68**	-57.0	0.0057	0.74
0.486	33.0	**6.72**	-57.0	0.0057	0.75
0.502	32.7	**6.66**	-57.0	0.0057	0.74

Tested By TM *Date* 11/18/00 *Checked By* GU *Date* 11-19-00

C:\My Documents\DSHEAR\BENCHMARKST4.xls]THIRD

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DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-4
Lab ID	00306-01.002	Visual Description	BROWNISH GRAY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

SHEAR BOX DATA

Wt.of Wet Specimen & Ring(gm)	392.16	Specific Gravity (Assumed)	2.70
Weight of Ring (gm)	214.34	Volume of Solids(cc)	58.4
Weight of Wet Specimen (gm)	177.82	Initial Consolidation Dial Reading	0.0
Initial Specimen Height(in)	1	Final Consolidation Dial Reading	166.0
Specimen Diameter(in)	2.5	Corrected Final Cons. Reading	139.2
Wet Density(pcf)	138.0	Void Ratio Before Consolidation	0.38
Dry Density(pcf)	**122.3**	**Void Ratio After Consolidation**	0.36

Moisture Content	*Before Test*	*After Test*	*Testing Parameters*	
Tare ID	1310	40		
Wt. Wet Soil & Tare (gm)	190.00	261.88	Normal Stress(psi)	6
Wt. Dry Soil & Tare (gm)	180.07	241.80		
Wt. Tare (gm)	102.70	101.56	Strain Rate(in/min)	0.00144
Wt. of Water (gm)	9.93	20.08		
Wt. of Dry Soil (gm)	77.37	140.24	Machine Deflection(div)	27
Moisture Content (%)	**12.8**	**14.3**		

Horizontal Displacement (in)	Shear Force (lbs)	Shear Stress (psi)	Vertical Dial Reading 1 div= 0.0001"	Vertical Displacement (+)incr,(-)decr (in)	Shear To Normal Ratio
0.000	0.0	**0.00**	0.0	0.0000	0.00
0.003	3.6	**0.73**	0.0	0.0000	0.12
0.006	6.7	**1.36**	4.0	-0.0004	0.23
0.009	9.8	**2.00**	10.0	-0.0010	0.33
0.014	12.9	**2.63**	14.0	-0.0014	0.44
0.019	15.8	**3.22**	18.0	-0.0018	0.54
0.034	23.5	**4.79**	20.0	-0.0020	0.80
0.049	30.8	**6.27**	20.0	-0.0020	1.05
0.075	37.3	**7.60**	-3.0	0.0003	1.27
0.100	37.8	**7.70**	-26.0	0.0026	1.28
0.125	31.6	**6.44**	-32.0	0.0032	1.07
0.151	30.2	**6.15**	-33.0	0.0033	1.03
0.176	29.9	**6.09**	-35.0	0.0035	1.02
0.201	29.5	**6.01**	-38.0	0.0038	1.00
0.227	29.0	**5.91**	-39.0	0.0039	0.98
0.252	28.7	**5.85**	-43.0	0.0043	0.97
0.278	28.5	**5.81**	-43.0	0.0043	0.97
0.303	28.3	**5.77**	-44.0	0.0044	0.96
0.329	28.0	**5.70**	-47.0	0.0047	0.95
0.354	27.9	**5.68**	-50.0	0.0050	0.95
0.380	27.9	**5.68**	-50.0	0.0050	0.95
0.405	28.0	**5.70**	-50.0	0.0050	0.95
0.456	27.5	**5.60**	-50.0	0.0050	0.93
0.481	26.8	**5.46**	-53.0	0.0053	0.91
0.507	28.1	**5.72**	-54.0	0.0054	0.95

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DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-5
Lab ID	00306-01.003	Visual Description	BROWN CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Maximum Shear Stress		Normal Stress
5.13	(1)	**3**
7.18	(2)	**6**
10.25	(3)	**9**

Overall Regression Analysis

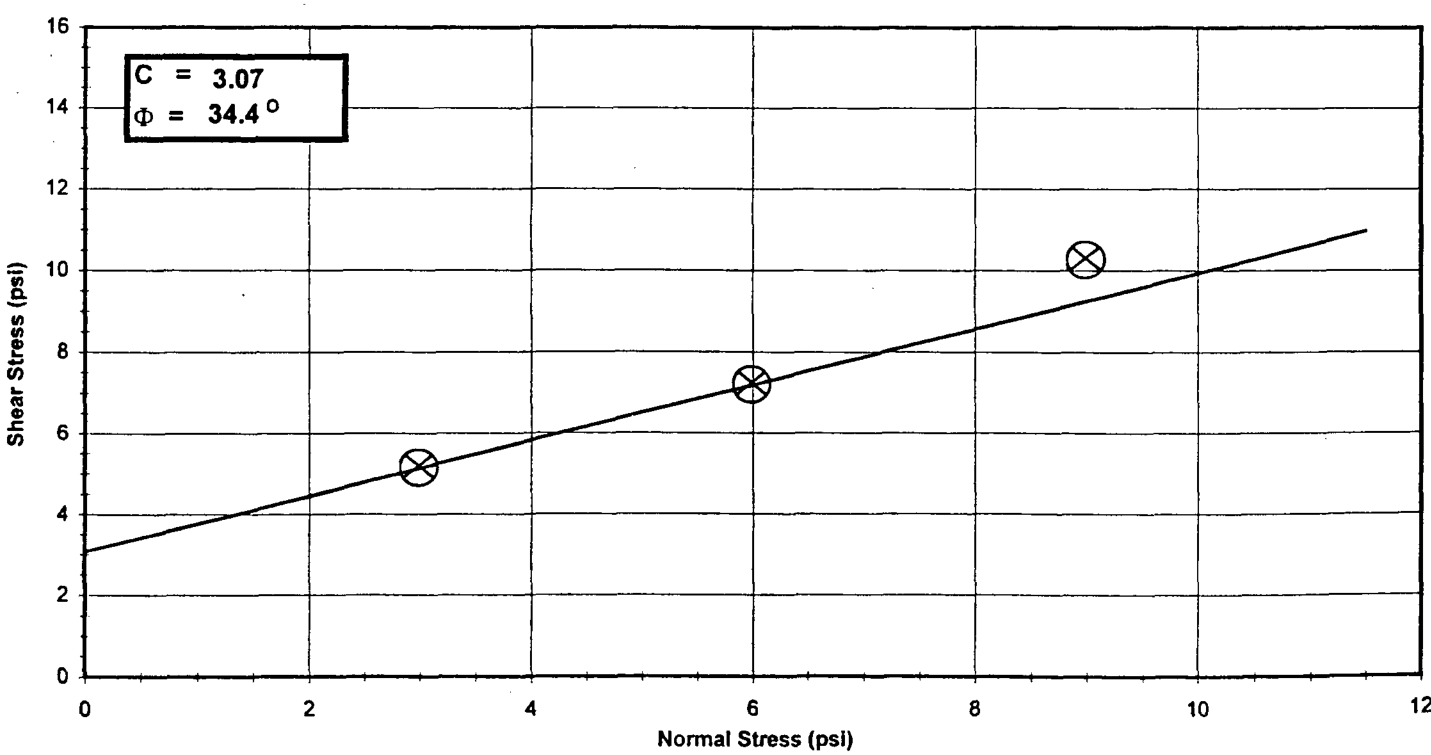
Slope = 0.85
C = 2.40
Φ = 40.5 degrees

Selected Points	Shear Stress	Normal Stress
1	5.13	3
2	7.18	6

Selected Points Regression

Slope = 0.69
C = 3.07
Φ = 34.4 degrees

SHEAR STRESS vs. NORMAL STRESS



Note: Graph not to scale

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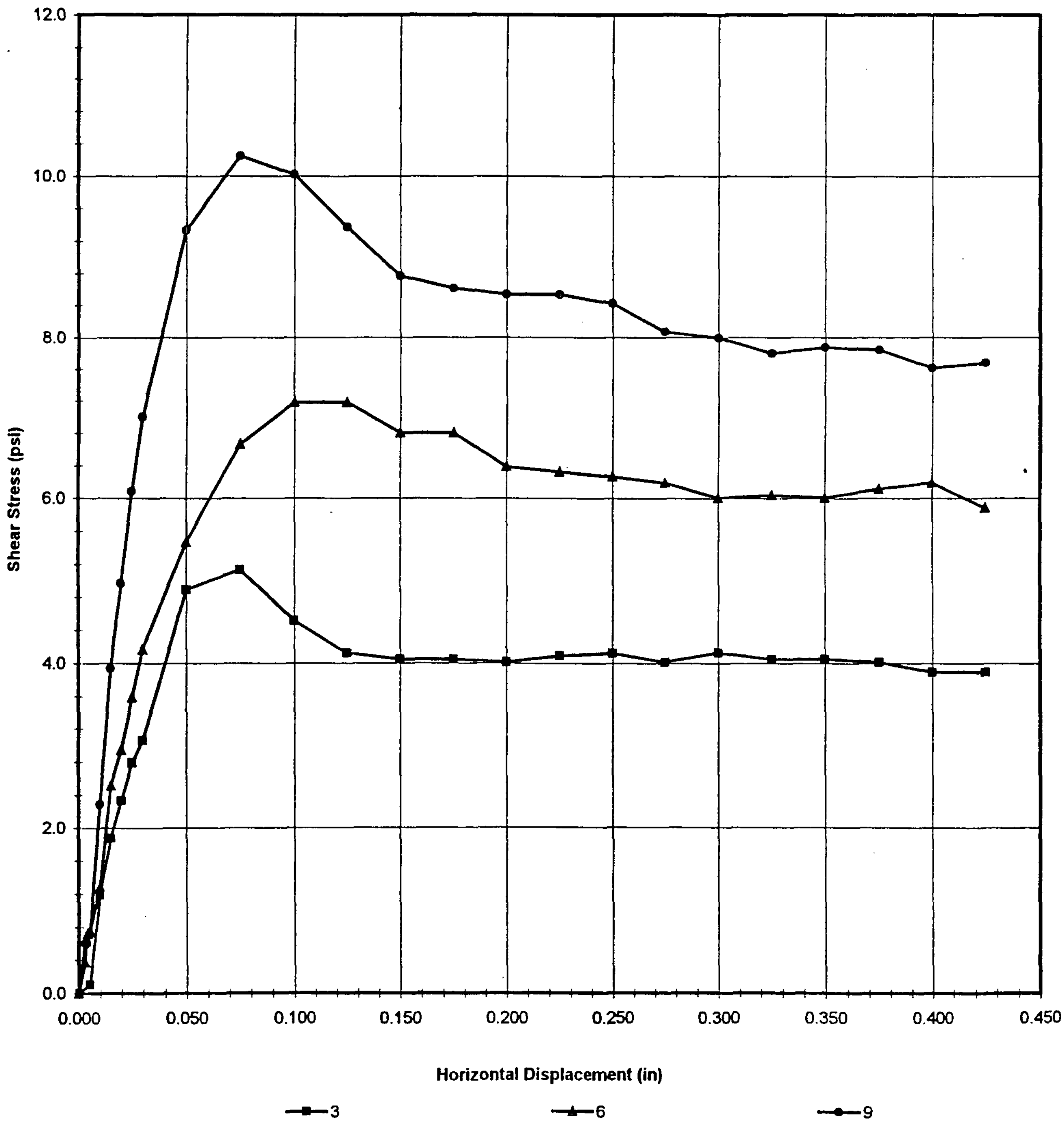
DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-5
Lab ID	00306-01.003	Visual Description	BROWN CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

SHEAR STRESS vs. HORIZONTAL DISPLACEMENT



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DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-5
Lab ID	00306-01.003	Visual Description	BROWN CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

SHEAR BOX DATA

Wt.of Wet Specimen & Ring(gm)	208.58	Specific Gravity (Assumed)	2.70
Weight of Ring (gm)	76.67	Volume of Solids(cc)	43.4
Weight of Wet Specimen (gm)	131.91	Initial Consolidation Reading (in.)	0
Initial Specimen Height(in)	0.75	Final Consolidation Reading (in.)	0.0053
Specimen Diameter(in)	2.5	Corrected Final Cons. Reading	0.0026
Wet Density(pcf)	136.5	Void Ratio Before Consolidation	0.39
Dry Density(pcf)	**121.2**	**Void Ratio After Consolidation**	0.39

Moisture Content	*Before Test*	*After Test*	*Testing Parameters*	
Tare ID	1393	444		
Wt. Wet Soil & Tare (gm)	130.00	234.60	Normal Stress(psi)	3
Wt. Dry Soil & Tare (gm)	121.07	217.55		
Wt. Tare (gm)	50.51	99.85	Strain Rate(in/min)	0.00144
Wt. of Water (gm)	8.93	17.05		
Wt. of Dry Soil (gm)	70.56	117.7	Machine Deflection(in.)	0.0027
Moisture Content (%)	**12.7**	**14.5**		

Horizontal Displacement (in)	Shear Force (lbs)	Shear Stress (psi)	Vertical Reading (inches)	Vertical Displacement (+)incr,(-)decr (in)	Shear To Normal Ratio
0.000	0.0	**0.00**	0.0053	0.0000	0.00
0.005	0.5	**0.10**	0.0134	-0.0081	0.03
0.010	5.8	**1.18**	0.0138	-0.0085	0.39
0.015	9.2	**1.87**	0.0145	-0.0093	0.62
0.020	11.4	**2.33**	0.0151	-0.0098	0.78
0.025	13.7	**2.79**	0.0151	-0.0099	0.93
0.030	15.0	**3.06**	0.0148	-0.0095	1.02
0.050	24.0	**4.89**	0.0130	-0.0078	1.63
0.075	25.2	**5.13**	0.0084	-0.0032	1.71
0.100	22.2	**4.51**	0.0052	0.0001	1.50
0.125	20.2	**4.12**	0.0043	0.0009	1.37
0.150	19.9	**4.04**	0.0032	0.0021	1.35
0.175	19.9	**4.04**	0.0023	0.0030	1.35
0.200	19.7	**4.01**	0.0016	0.0036	1.34
0.225	20.1	**4.09**	0.0007	0.0046	1.36
0.250	20.2	**4.12**	0.0001	0.0052	1.37
0.275	19.7	**4.01**	-0.0006	0.0059	1.34
0.300	20.3	**4.13**	-0.0015	0.0068	1.38
0.325	19.9	**4.04**	-0.0022	0.0075	1.35
0.350	19.9	**4.05**	-0.0029	0.0082	1.35
0.375	19.7	**4.01**	-0.0033	0.0086	1.34
0.400	19.1	**3.89**	-0.0036	0.0088	1.30
0.425	19.1	**3.89**	-0.0037	0.0090	1.30

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DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-5
Lab ID	00306-01.003	Visual Description	BROWN CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

SHEAR BOX DATA

Wt.of Wet Specimen & Ring(gm)	209.45	Specific Gravity (Assumed)	2.70
Weight of Ring (gm)	76.64	Volume of Solids(cc)	44.8
Weight of Wet Specimen (gm)	132.81	Initial Consolidation Reading (in.)	0
Initial Specimen Height(in)	0.75	Final Consolidation Reading (in.)	0.0174
Specimen Diameter(in)	2.5	Corrected Final Cons. Reading	0.0131
Wet Density(pcf)	137.4	Void Ratio Before Consolidation	0.35
Dry Density(pcf)	**125.0**	**Void Ratio After Consolidation**	0.32

Moisture Content	*Before Test*	*After Test*	*Testing Parameters*	
Tare ID	24	444		
Wt. Wet Soil & Tare (gm)	186.52	235.04	Normal Stress(psi)	**6**
Wt. Dry Soil & Tare (gm)	177.93	219.06		
Wt. Tare (gm)	91.21	99.85	Strain Rate(in/min)	0.00144
Wt. of Water (gm)	8.59	15.98		
Wt. of Dry Soil (gm)	86.72	119.21	Machine Deflection(in.)	0.0043
Moisture Content (%)	**9.9**	**13.4**		

Horizontal Displacement (in)	Shear Force (lbs)	Shear Stress (psi)	Vertical Reading (inches)	Vertical Displacement (+)incr,(-)decr (in)	Shear To Normal Ratio
0.000	0.0	**0.00**	0.0174	0.0000	0.00
0.003	1.8	**0.37**	0.0181	-0.0007	0.06
0.004	3.5	**0.72**	0.0181	-0.0007	0.12
0.005	3.7	**0.75**	0.0182	-0.0008	0.13
0.010	6.3	**1.29**	0.0185	-0.0010	0.21
0.015	12.3	**2.51**	0.0191	-0.0017	0.42
0.020	14.4	**2.94**	0.0192	-0.0018	0.49
0.025	17.6	**3.59**	0.0196	-0.0021	0.60
0.030	20.4	**4.16**	0.0193	-0.0019	0.69
0.050	26.8	**5.47**	0.0177	-0.0002	0.91
0.075	32.7	**6.66**	0.0150	0.0025	1.11
0.100	35.3	**7.18**	0.0130	0.0044	1.20
0.125	35.3	**7.18**	0.0118	0.0056	1.20
0.150	33.4	**6.80**	0.0115	0.0060	1.13
0.175	33.4	**6.80**	0.0115	0.0060	1.13
0.200	31.3	**6.39**	0.0114	0.0060	1.06
0.225	31.0	**6.32**	0.0113	0.0061	1.05
0.250	30.8	**6.27**	0.0113	0.0061	1.04
0.275	30.4	**6.19**	0.0113	0.0061	1.03
0.300	29.5	**6.00**	0.0116	0.0059	1.00
0.325	29.6	**6.04**	0.0117	0.0057	1.01
0.350	29.5	**6.00**	0.0122	0.0053	1.00
0.375	30.0	**6.11**	0.0124	0.0050	1.02
0.400	30.4	**6.19**	0.0127	0.0048	1.03
0.425	28.9	**5.88**	0.0128	0.0046	0.98

Tested By TM Date *11/17/00* *Checked By* GU Date 11-19-00

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DCN: CT-S21
DATE: 07/26/00
REVISION: 3

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DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-5
Lab ID	00306-01.003	Visual Description	BROWN CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

SHEAR BOX DATA

Wt.of Wet Specimen & Ring(gm)	211.25	Specific Gravity (Assumed)	2.70
Weight of Ring (gm)	76.68	Volume of Solids(cc)	44.8
Weight of Wet Specimen (gm)	134.57	Initial Consolidation Reading (in.)	0
Initial Specimen Height(in)	0.75	Final Consolidation Reading (in.)	0.0118
Specimen Diameter(in)	2.5	Corrected Final Cons. Reading	0.0065
Wet Density(pcf)	139.2	Void Ratio Before Consolidation	0.35
Dry Density(pcf)	**125.3**	**Void Ratio After Consolidation**	0.33

Moisture Content	*Before Test*	*After Test*	*Testing Parameters*	
Tare ID	24	11006		
Wt. Wet Soil & Tare (gm)	222.35	226.82	Normal Stress(psi)	**9**
Wt. Dry Soil & Tare (gm)	209.20	211.38		
Wt. Tare (gm)	91.20	90.23	Strain Rate(in/min)	0.00144
Wt. of Water (gm)	13.15	15.44		
Wt. of Dry Soil (gm)	118	121.15	Machine Deflection(in.)	0.0053
Moisture Content (%)	**11.1**	**12.7**		

Horizontal Displacement (in)	Shear Force (lbs)	Shear Stress (psi)	Vertical Reading (inches)	Vertical Displacement (+)incr,(-)decr (in)	Shear To Normal Ratio
0.000	0.0	**0.00**	0.0118	0.0000	0.00
0.003	2.9	**0.60**	0.0125	-0.0007	0.07
0.004	2.9	**0.60**	0.0126	-0.0008	0.07
0.005	3.5	**0.71**	0.0126	-0.0008	0.08
0.010	11.2	**2.28**	0.0135	-0.0017	0.25
0.015	19.3	**3.93**	0.0140	-0.0022	0.44
0.020	24.4	**4.96**	0.0143	-0.0025	0.55
0.025	29.8	**6.08**	0.0140	-0.0022	0.68
0.030	34.4	**7.00**	0.0139	-0.0020	0.78
0.050	45.8	**9.33**	0.0119	-0.0001	1.04
0.075	50.3	**10.25**	0.0090	0.0028	1.14
0.100	49.2	**10.02**	0.0078	0.0040	1.11
0.125	46.0	**9.37**	0.0068	0.0050	1.04
0.150	43.0	**8.76**	0.0065	0.0054	0.97
0.175	42.2	**8.61**	0.0060	0.0058	0.96
0.200	41.9	**8.53**	0.0057	0.0061	0.95
0.225	41.9	**8.53**	0.0054	0.0065	0.95
0.250	41.3	**8.42**	0.0050	0.0068	0.94
0.275	39.6	**8.07**	0.0052	0.0066	0.90
0.300	39.2	**7.99**	0.0053	0.0066	0.89
0.325	38.3	**7.80**	0.0054	0.0064	0.87
0.350	38.6	**7.87**	0.0057	0.0061	0.87
0.375	38.5	**7.84**	0.0057	0.0061	0.87
0.400	37.4	**7.61**	0.0061	0.0057	0.85
0.425	37.7	**7.68**	0.0065	0.0053	0.85

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DATE: 07/20/00
REVISION: 3

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DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-6
Lab ID	00306-01.004	Visual Description	BROWN SILTY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Maximum Shear Stress		Normal Stress
3.48	(1)	**3**
5.46	(2)	**6**
7.74	(3)	**9**

Overall Regression Analysis

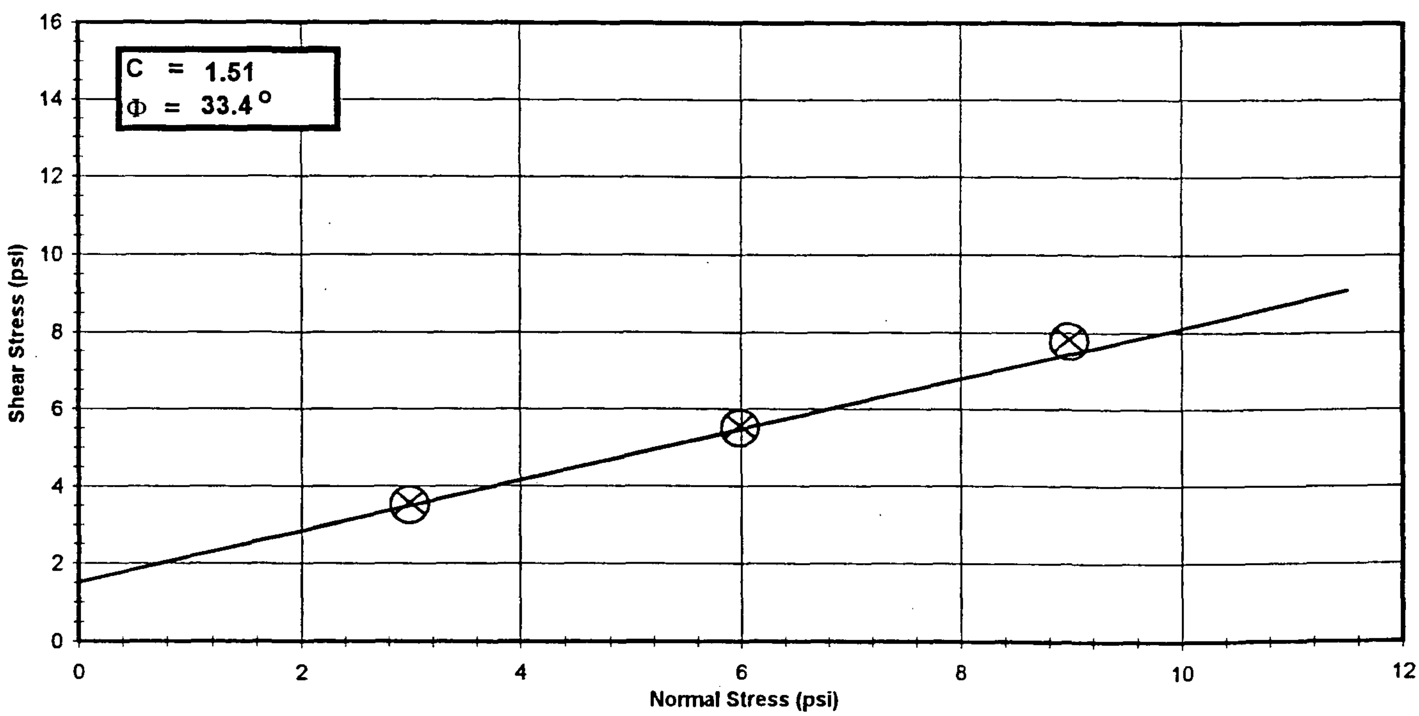
Slope = 0.71
C = 1.30
Φ = 35.4 degrees

Selected Points	Shear Stress	Normal Stress
1	3.48	3
2	5.46	6

Selected Points Regression

Slope = 0.66
C = 1.51
Φ = 33.4 degrees

SHEAR STRESS vs. NORMAL STRESS



Note: Graph not to scale

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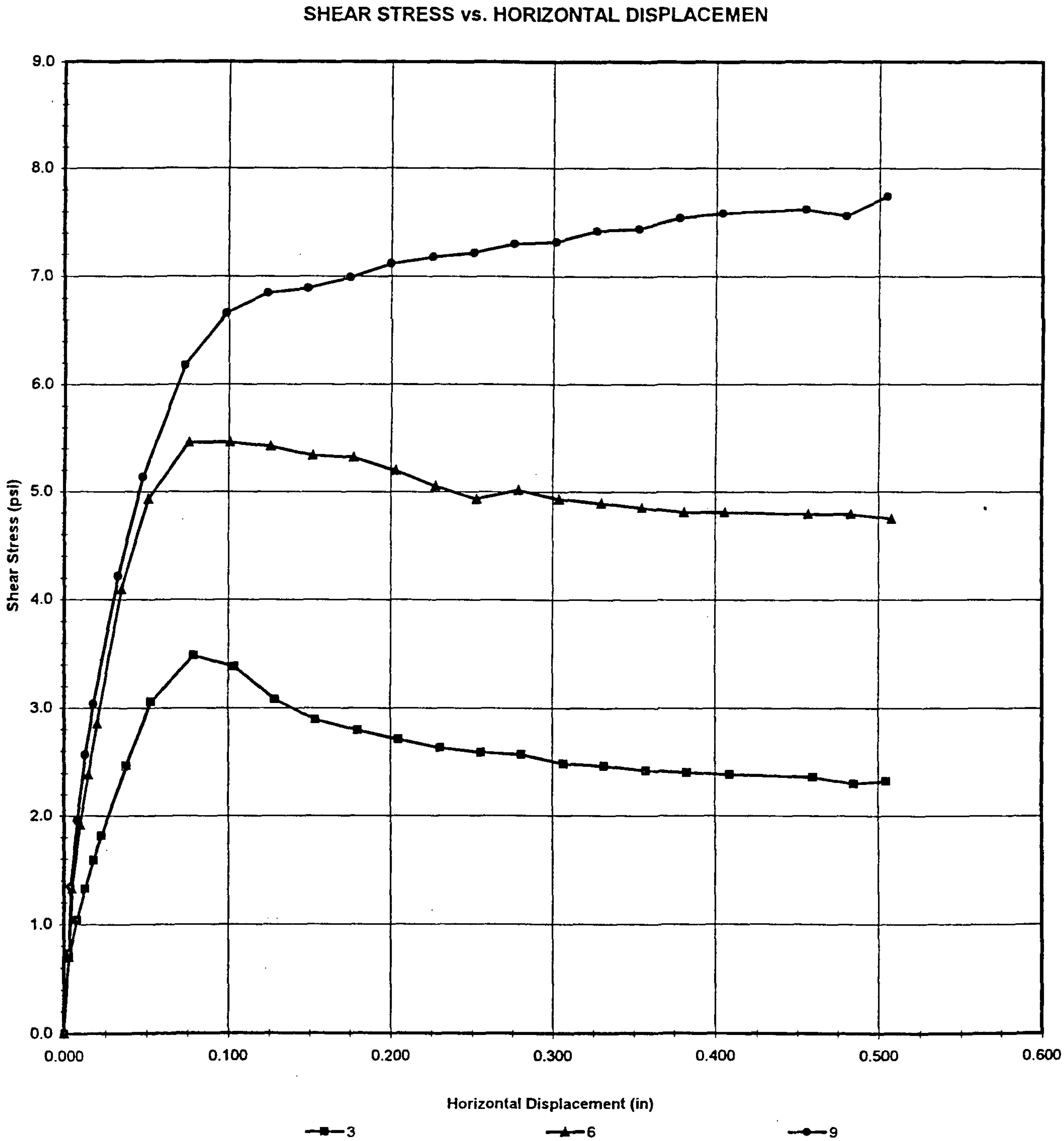
DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-6
Lab ID	00306-01.004	Visual Description	BROWN SILTY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



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DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-6
Lab ID	00306-01.004	Visual Description	BROWN SILTY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

SHEAR BOX DATA

Wt.of Wet Specimen & Ring(gm)	382.77	Specific Gravity (Assumed)	2.70
Weight of Ring (gm)	214.29	Volume of Solids(cc)	52.6
Weight of Wet Specimen (gm)	168.48	Initial Consolidation Dial Reading	0.0
Initial Specimen Height(in)	1	Final Consolidation Dial Reading	82.0
Specimen Diameter(in)	2.5	Corrected Final Cons. Reading	67.8
Wet Density(pcf)	130.8	Void Ratio Before Consolidation	0.53
Dry Density(pcf)	**110.1**	**Void Ratio After Consolidation**	0.52

Moisture Content	*Before Test*	*After Test*	*Testing Parameters*	
Tare ID	444	11170		
Wt. Wet Soil & Tare (gm)	175.09	246.30	Normal Stress(psi)	3
Wt. Dry Soil & Tare (gm)	163.23	222.30		
Wt. Tare (gm)	99.87	94.04	Strain Rate(in/min)	0.00144
Wt. of Water (gm)	11.86	24		
Wt. of Dry Soil (gm)	63.36	128.26	Machine Deflection(div)	14
Moisture Content (%)	**18.7**	**18.7**		

Horizontal Displacement (in)	Shear Force (lbs)	Shear Stress (psi)	Vertical Dial Reading 1 div= 0.0001"	Vertical Displacement (+)incr,(-)decr (in)	Shear To Normal Ratio
0.000	0.0	**0.00**	0.0	0.0000	0.00
0.003	3.4	**0.69**	3.0	-0.0003	0.23
0.008	5.1	**1.04**	13.0	-0.0013	0.35
0.013	6.5	**1.32**	19.0	-0.0019	0.44
0.018	7.8	**1.59**	22.0	-0.0022	0.53
0.023	8.9	**1.81**	22.0	-0.0022	0.60
0.038	12.1	**2.46**	22.0	-0.0022	0.82
0.053	15.0	**3.06**	18.0	-0.0018	1.02
0.079	17.1	**3.48**	-9.0	0.0009	1.16
0.104	16.6	**3.38**	-36.0	0.0036	1.13
0.129	15.1	**3.08**	-55.0	0.0055	1.03
0.154	14.2	**2.89**	-61.0	0.0061	0.96
0.180	13.7	**2.79**	-64.0	0.0064	0.93
0.205	13.3	**2.71**	-66.0	0.0066	0.90
0.231	12.9	**2.63**	-67.0	0.0067	0.88
0.256	12.7	**2.59**	-67.0	0.0067	0.86
0.281	12.6	**2.57**	-68.0	0.0068	0.86
0.307	12.2	**2.49**	-68.0	0.0068	0.83
0.332	12.1	**2.46**	-69.0	0.0069	0.82
0.358	11.9	**2.42**	-69.0	0.0069	0.81
0.383	11.8	**2.40**	-73.0	0.0073	0.80
0.409	11.7	**2.38**	-73.0	0.0073	0.79
0.460	11.6	**2.36**	-73.0	0.0073	0.79
0.485	11.3	**2.30**	-73.0	0.0073	0.77
0.505	11.4	**2.32**	-73.0	0.0073	0.77

Tested By *TM* *Date* *12/1/00* *Checked By* GO *Date* 12-4-00

C:\My Documents\DSHEAR\[BENCHMARKST6.xls]FIRST

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

DCN: CT-S21
DATE: 07/20/00
REVISION: 3

eotechnics

DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-6
Lab ID	00306-01.004	Visual Description	BROWN SILTY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

SHEAR BOX DATA

Wt.of Wet Specimen & Ring(gm)	384.68	Specific Gravity (Assumed)	2.70
Weight of Ring (gm)	214.36	Volume of Solids(cc)	53.1
Weight of Wet Specimen (gm)	170.32	Initial Consolidation Dial Reading	0.0
Initial Specimen Height(in)	1	Final Consolidation Dial Reading	110.0
Specimen Diameter(in)	2.5	Corrected Final Cons. Reading	83.2
Wet Density(pcf)	132.2	Void Ratio Before Consolidation	0.51
Dry Density(pcf)	**111.3**	**Void Ratio After Consolidation**	0.50

Moisture Content	*Before Test*	*After Test*	*Testing Parameters*	
Tare ID	1310	1310		
Wt. Wet Soil & Tare (gm)	220.78	270.74	Normal Stress(psi)	**6**
Wt. Dry Soil & Tare (gm)	202.12	244.25		
Wt. Tare (gm)	102.65	102.65	Strain Rate(in/min)	**0.00144**
Wt. of Water (gm)	18.66	26.49		
Wt. of Dry Soil (gm)	99.47	141.6	Machine Deflection(div)	**27**
Moisture Content (%)	**18.8**	**18.7**		

Horizontal Displacement (in)	Shear Force (lbs)	Shear Stress (psi)	Vertical Dial Reading 1 div= 0.0001"	Vertical Displacement (+)incr,(-)decr (in)	Shear To Normal Ratio
0.000	0.0	**0.00**	0.0	0.0000	0.00
0.003	3.4	**0.69**	1.0	-0.0001	0.12
0.005	6.5	**1.32**	4.0	-0.0004	0.22
0.010	9.4	**1.91**	11.0	-0.0011	0.32
0.015	11.7	**2.38**	16.0	-0.0016	0.40
0.020	14.0	**2.85**	17.0	-0.0017	0.48
0.035	20.1	**4.09**	17.0	-0.0017	0.68
0.051	24.2	**4.93**	15.0	-0.0015	0.82
0.076	26.8	**5.46**	-6.0	0.0006	0.91
0.101	26.8	**5.46**	-18.0	0.0018	0.91
0.126	26.6	**5.42**	-22.0	0.0022	0.90
0.152	26.2	**5.34**	-22.0	0.0022	0.89
0.177	26.1	**5.32**	-22.0	0.0022	0.89
0.203	25.5	**5.19**	-23.0	0.0023	0.87
0.228	24.8	**5.05**	-23.0	0.0023	0.84
0.253	24.2	**4.93**	-23.0	0.0023	0.82
0.279	24.6	**5.01**	-23.0	0.0023	0.84
0.304	24.2	**4.93**	-23.0	0.0023	0.82
0.330	24.0	**4.89**	-23.0	0.0023	0.81
0.355	23.8	**4.85**	-23.0	0.0023	0.81
0.381	23.6	**4.81**	-23.0	0.0023	0.80
0.406	23.6	**4.81**	-23.0	0.0023	0.80
0.457	23.5	**4.79**	-18.0	0.0018	0.80
0.483	23.5	**4.79**	-16.0	0.0016	0.80
0.508	23.3	**4.75**	-14.0	0.0014	0.79

Tested By TM *Date* 11/30/00 *Checked By* GU *Date* 12-4-00

C:\My Documents\DSHEAR\[BENCHMARKST6.xls]SECOND

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

DCN: CT-S21
DATE: 07/20/00
REVISION: 3

Geotechnics

DIRECT SHEAR

ASTM D 3080-90 (SOP-S21)

Client	BENCHMARK ENV.	Boring No.	NA
Client Reference	PETER COOPER	Depth (ft)	NA
Project No.	00306-01	Sample No.	ST-6
Lab ID	00306-01.004	Visual Description	BROWN SILTY CLAY WITH GRAVEL

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

SHEAR BOX DATA

Wt.of Wet Specimen & Ring(gm)	383.23	Specific Gravity (Assumed)	2.70
Weight of Ring (gm)	214.34	Volume of Solids(cc)	53.9
Weight of Wet Specimen (gm)	168.89	Initial Consolidation Dial Reading	0.0
Initial Specimen Height(in)	1	Final Consolidation Dial Reading	228.0
Specimen Diameter(in)	2.5	Corrected Final Cons. Reading	191.4
Wet Density(pcf)	131.1	Void Ratio Before Consolidation	0.49
Dry Density(pcf)	**113.0**	**Void Ratio After Consolidation**	0.46

Moisture Content	*Before Test*	*After Test*	Testing Parameters	
Tare ID	11170	444		
Wt. Wet Soil & Tare (gm)	213.65	249.71	Normal Stress(psi)	9
Wt. Dry Soil & Tare (gm)	197.16	228.83		
Wt. Tare (gm)	94.06	99.84	Strain Rate(in/min)	0.00144
Wt. of Water (gm)	16.49	20.88		
Wt. of Dry Soil (gm)	103.1	128.99	Machine Deflection(div)	37
Moisture Content (%)	**16.0**	**16.2**		

Horizontal Displacement (in)	Shear Force (lbs)	Shear Stress (psi)	Vertical Dial Reading 1 div= 0.0001"	Vertical Displacement (+)incr,(-)decr (in)	Shear To Normal Ratio
0.000	0.0	**0.00**	0.0	0.0000	0.00
0.003	3.6	**0.73**	0.0	0.0000	0.08
0.004	6.6	**1.34**	1.0	-0.0001	0.15
0.008	9.6	**1.96**	6.0	-0.0006	0.22
0.013	12.6	**2.57**	11.0	-0.0011	0.29
0.018	14.9	**3.04**	14.0	-0.0014	0.34
0.033	20.7	**4.22**	24.0	-0.0024	0.47
0.048	25.2	**5.13**	28.0	-0.0028	0.57
0.073	30.3	**6.17**	32.0	-0.0032	0.69
0.099	32.7	**6.66**	32.0	-0.0032	0.74
0.124	33.6	**6.84**	33.0	-0.0033	0.76
0.149	33.8	**6.89**	33.0	-0.0033	0.77
0.175	34.3	**6.99**	33.0	-0.0033	0.78
0.200	34.9	**7.11**	33.0	-0.0033	0.79
0.226	35.2	**7.17**	33.0	-0.0033	0.80
0.251	35.4	**7.21**	33.0	-0.0033	0.80
0.276	35.8	**7.29**	33.0	-0.0033	0.81
0.302	35.9	**7.31**	33.0	-0.0033	0.81
0.327	36.4	**7.42**	33.0	-0.0033	0.82
0.353	36.5	**7.44**	33.0	-0.0033	0.83
0.378	37.0	**7.54**	33.0	-0.0033	0.84
0.404	37.2	**7.58**	32.0	-0.0032	0.84
0.455	37.4	**7.62**	32.0	-0.0032	0.85
0.480	37.1	**7.56**	32.0	-0.0032	0.84
0.505	38.0	**7.74**	32.0	-0.0032	0.86

Tested By TM *Date* 11/29/00 *Checked By* GO *Date* 12-4-00

C:\My Documents\DSHEAR\[BENCHMARKST6.xls]THIRD

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

SOIL TESTING SUMMARY

In-Situ Hydraulic Conductivity Testing Using Shelby Tube Samples

Peter Cooper RI/FS

Gowanda, New York

Existing Cover Soil

Sample Number	Dry Density pcf		Water Content %		Hydraulic Conductivity cm/s
	Before	After	Before	After	
ST-1	117.2	115.5	15.9	16.1	1.1 E-5
ST-2	105.6	102.1	20.4	24.5	7.5 E-7
ST-3	112.5	119.2	19.1	15.7	9.0 E-8
ST-4	107.6	114.3	20.5	15.9	1.0 E-6
ST-5	126.2	123.9	11.0	13.1	2.4 E-7
ST-6	103.0	105.1	19.5	20.4	3.6 E-5

Waste Material Below Existing Cover Soil

ST-2	54.2	54.2	40.9	41.0	1.7 E-5

3rd Rock, LLC
580 Olean Road
East Aurora, NY 14052
(716)652-9646

SOIL TESTING SUMMARY

Peter Cooper RI/FS
Gowanda, New York

Existing Cover Soil

Sample Number	Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plasticity Index %	Maximum Dry Density pcf	Optimum Water Content %	Hydraulic Conductivity cm/s	Compaction % of MDD	Water Content %	USCS
Comp-1, TH-1 through TH-4	6.6	38.3	45.1	10	27.4	7.3	125.7	10.3	1.1 E-6	88.5	12.5	CL-ML
Comp-2, TH-5 through TH-8	4.8	26.2	52.6	16.4	25.4	7.9	125.9	10.4	3.9 E-7	89.4	11.3	CL-ML
Comp-3, TH-9 through TH-12	4.1	28.1	45.7	22.1	26.5	9.1	128.0	10.4	9.0 E-7	88.3	12.1	CL
Comp-4, TH-13 through TH-16	2.7	26.8	50.5	20.0	23.0	6.0	130.1	9.0	1.8 E-6	86.5	12.4	CL-ML
Comp-5, TH-17 through TH-20	5.3	36.7	40.8	17.2	23.9	4.7	124.7	11.4	3.2 E-6	85.9	11.6	CL-ML
Comp-6, TH-21 through TH-24	5.4	27.5	45.7	21.4	22.9	6.9	130.3	9.2	3.8 E-7	87.3	10.9	CL-ML

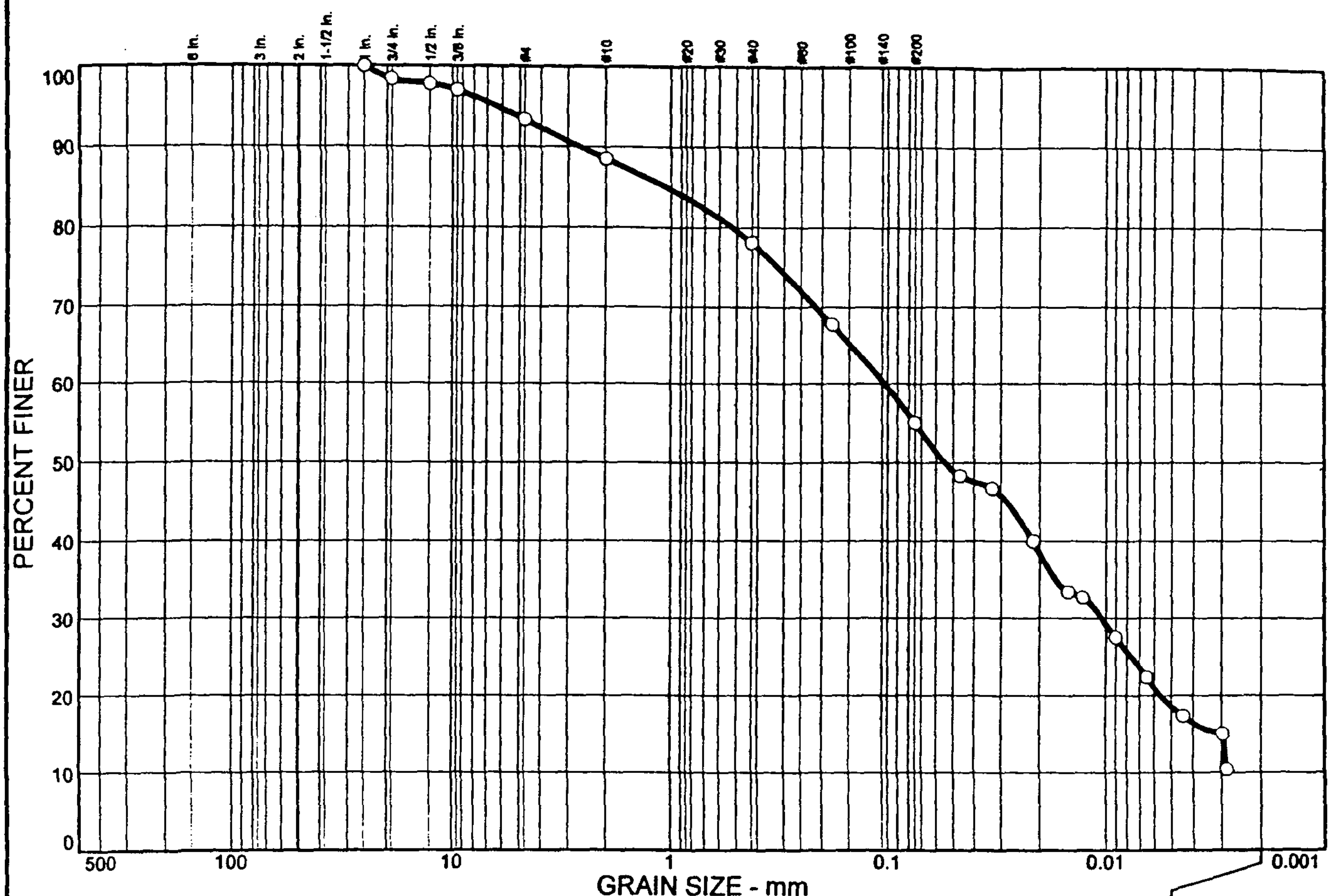
Waste Evaluation

#1	27.5	33.2	31.3	8	62.1	17.5

3rd Rock, LLC
580 Olean Road
East Aurora, NY 14052
(716)652-9646

1/08/01

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	1.6	5.0	4.9	10.4	23.0	55.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	98.4		
.5 in.	97.8		
.375 in.	97.0		
#4	93.4		
#10	88.5		
#40	78.1		
#80	67.8		
#200	55.1		

* (no specification provided)

Soil Description

ID#00-188

Atterberg Limits

PL= 20.1 LL= 27.4 PI= 7.3

Coefficients

D_{85}= 1.06 D_{60}= 0.102 D_{50}= 0.0544
D_{30}= 0.0104 D_{15}= 0.0030 D_{10}=
C_u= C_c=

Classification

USCS= CL-ML AASHTO=

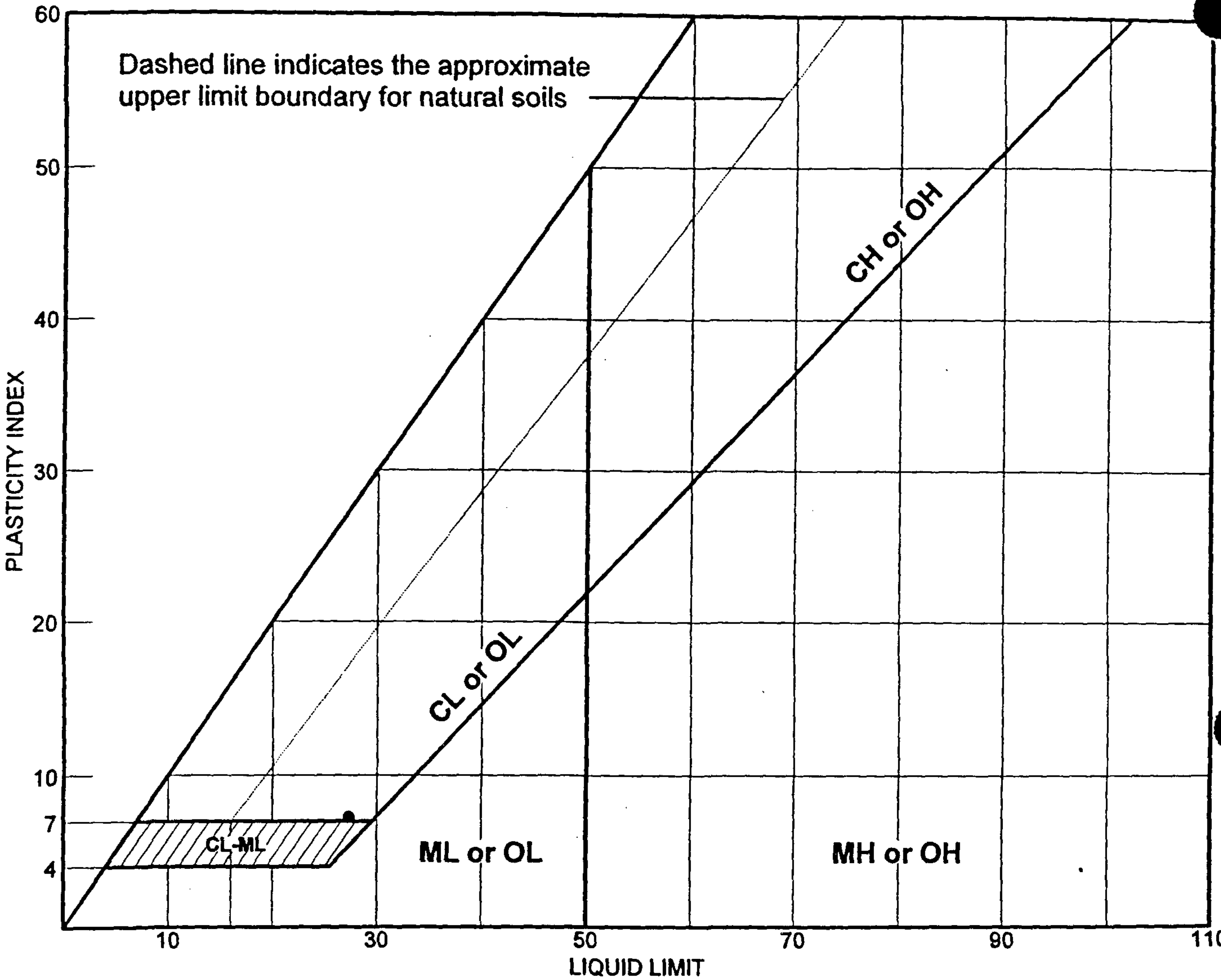
Remarks

Sample No.: Comp 1 Source of Sample: Cap Evaluation Date: 12/17/00
Location: Elev./Depth:

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 Plate

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Cap	Comp 1			20.1	27.4	7.3	CL-ML

LIQUID AND PLASTIC LIMITS TEST REPORT **3rd Rock, LLC**	**Client:** Benchmark Environmental **Project:** Peter Cooper RI/FS **Project No.:** 00-005 **Plate**

COMPACTION TEST REPORT

Test specification: ASTM D 1557-91 Procedure A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 125.7 pcf Optimum moisture = 10.3 %	ID#00-188

Project No. 00-005 **Client:** Benchmark Environmental

Project: Peter Cooper RI/FS

Source: Cap Evaluation **Sample No.:** Comp 1

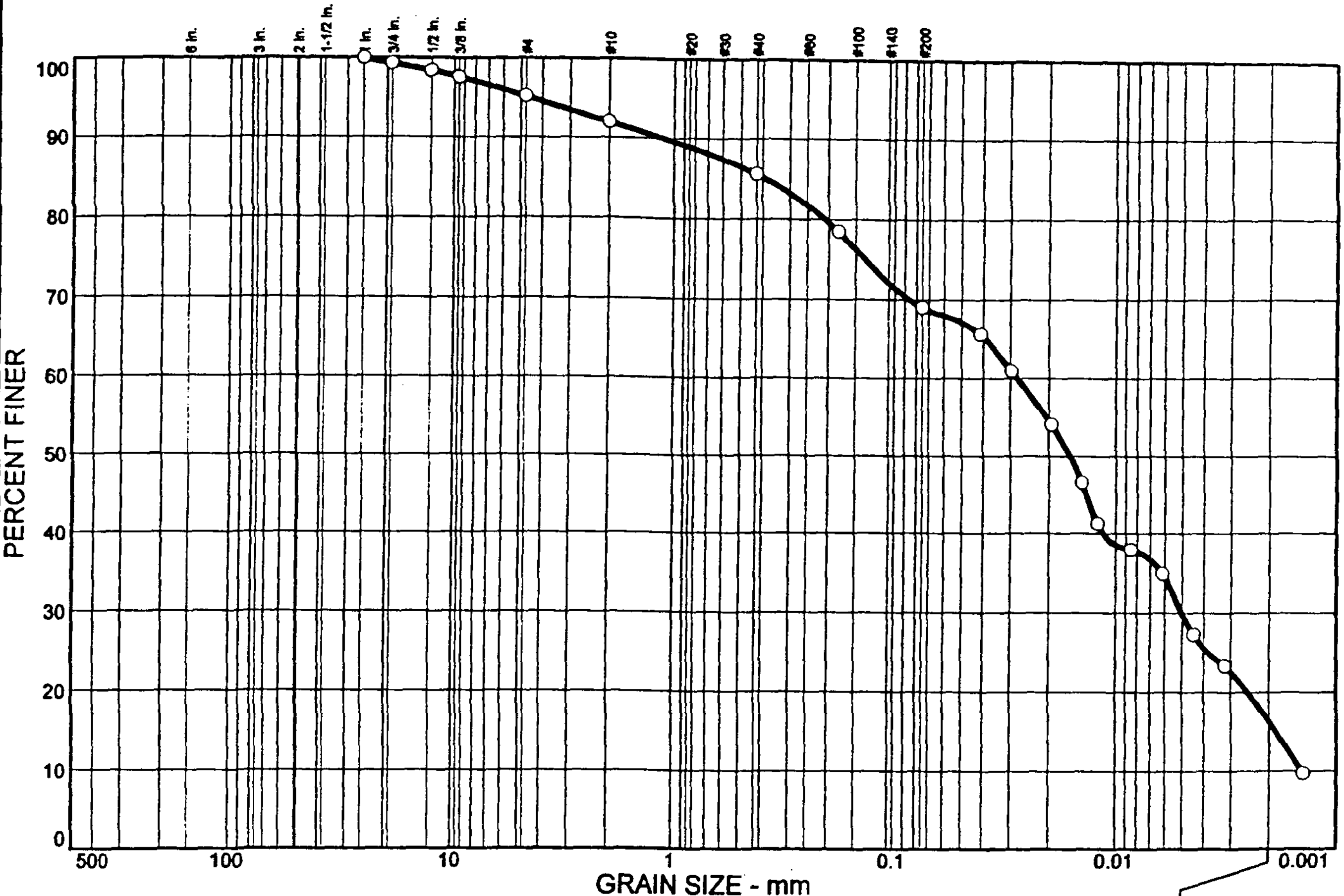
Remarks:

COMPACTION TEST REPORT

3rd Rock, LLC

Plate

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.7	4.1	3.2	6.4	16.6	52.6	16.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	99.3		
.5 in.	98.4		
.375 in.	97.6		
#4	95.2		
#10	92.0		
#40	85.6		
#80	78.5		
#200	69.0		

* (no specification provided)

Soil Description

ID#00-189

Atterberg Limits

PL= 17.5 LL= 25.4 PI= 7.9

Coefficients

D_{85}= 0.385 D_{60}= 0.0279 D_{50}= 0.0160
D_{30}= 0.0050 D_{15}= 0.0019 D_{10}= 0.0014
C_u= 19.53 C_c= 0.63

Classification

USCS= CL-ML AASHTO=

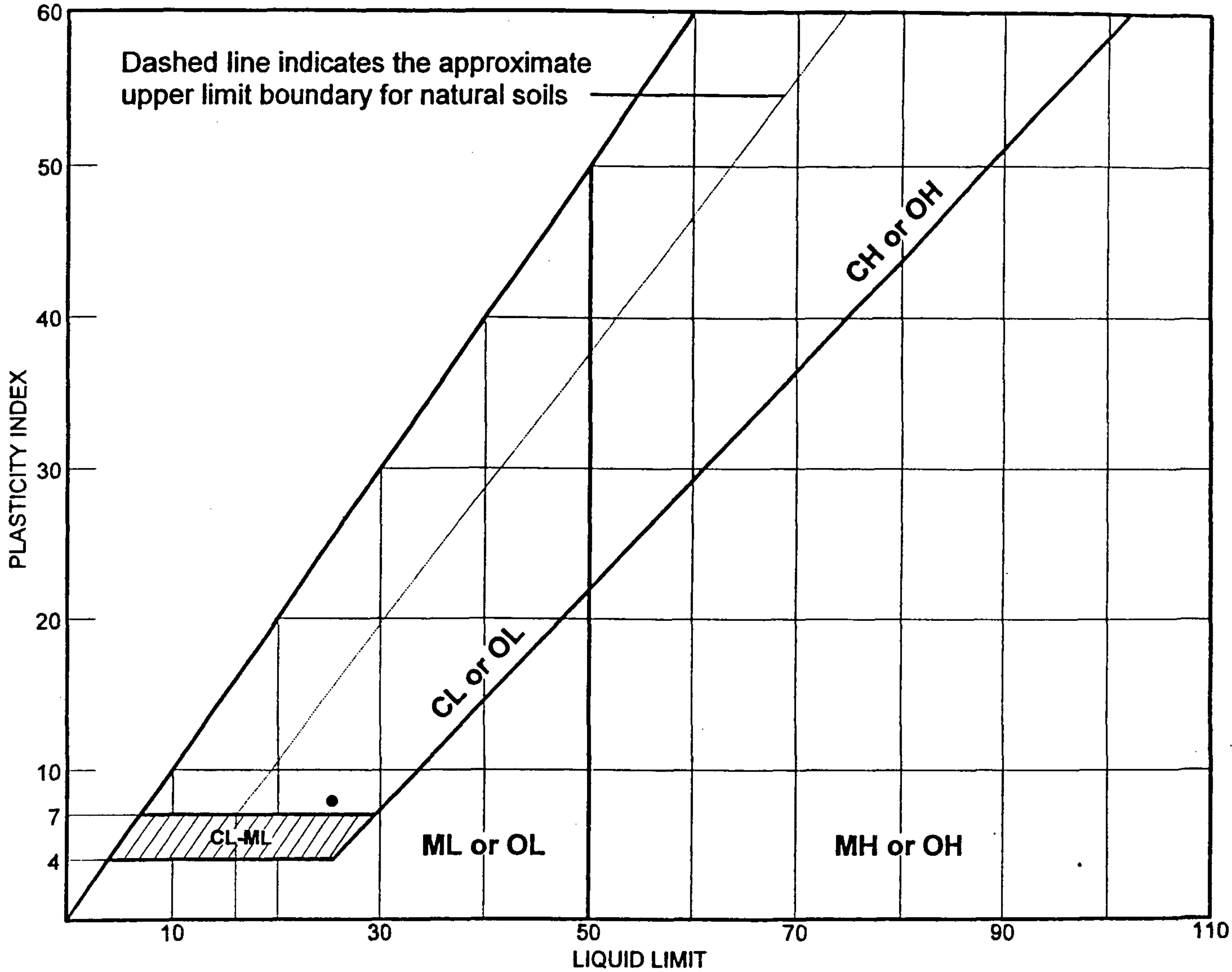
Remarks

Sample No.: Comp 2 **Source of Sample:** Cap Evaluation **Date:** 12/20/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

LIQUID AND PLASTIC LIMITS TEST REPORT

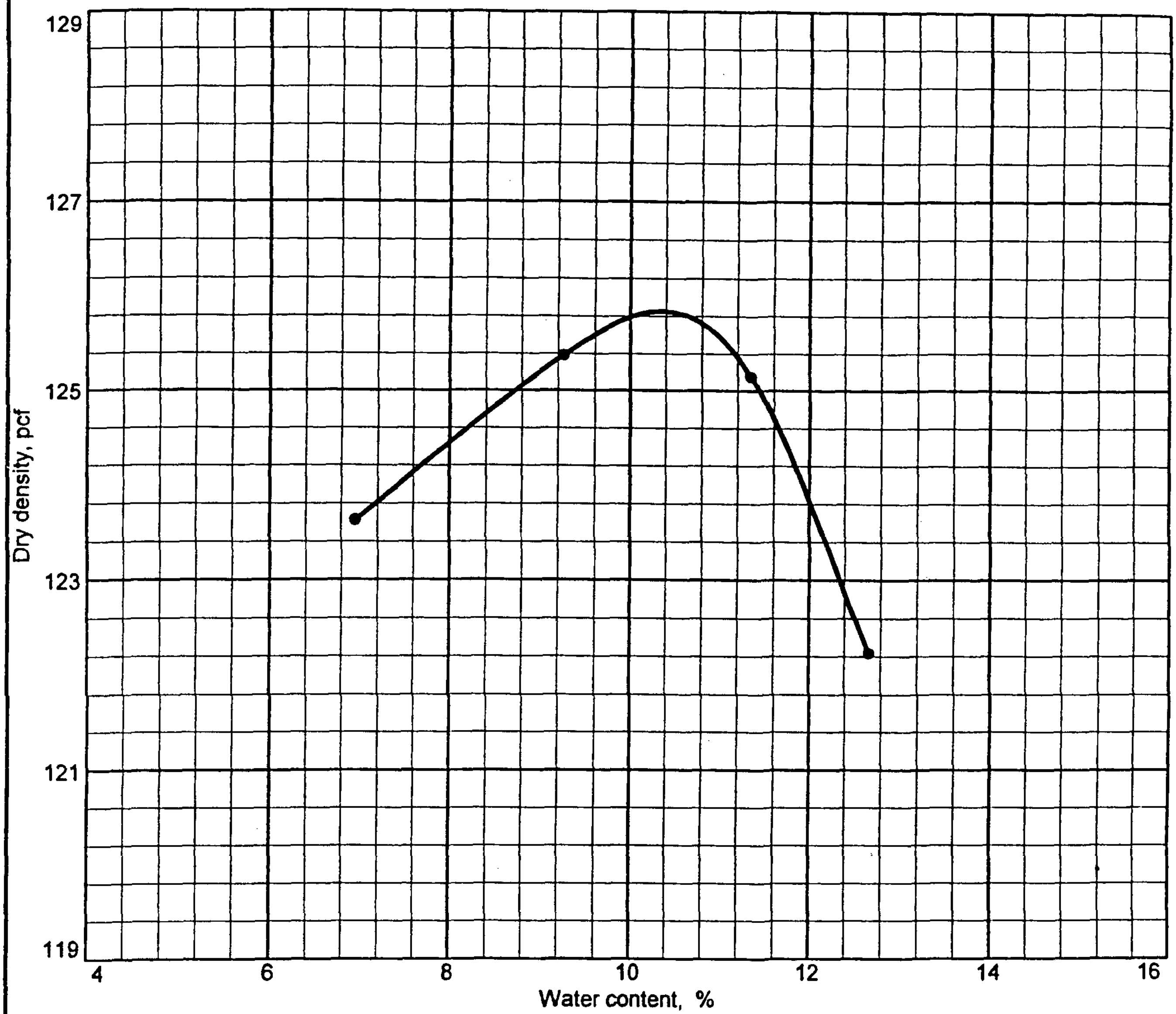


SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Cap	Comp 2			17.5	25.4	7.9	CL-ML

LIQUID AND PLASTIC LIMITS TEST REPORT	Client: Benchmark Environmental
3rd Rock, LLC	Project: Peter Cooper RI/FS
	Project No.: 00-005 Plate

COMPACTION TEST REPORT



Test specification: ASTM D 1557-91 Procedure A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 125.9 pcf Optimum moisture = 10.4 %	ID#00-189

Project No. 00-005 **Client:** Benchmark Environmental

Project: Peter Cooper RI/FS

● **Source:** Cap Evaluation **Sample No.:** Comp 2

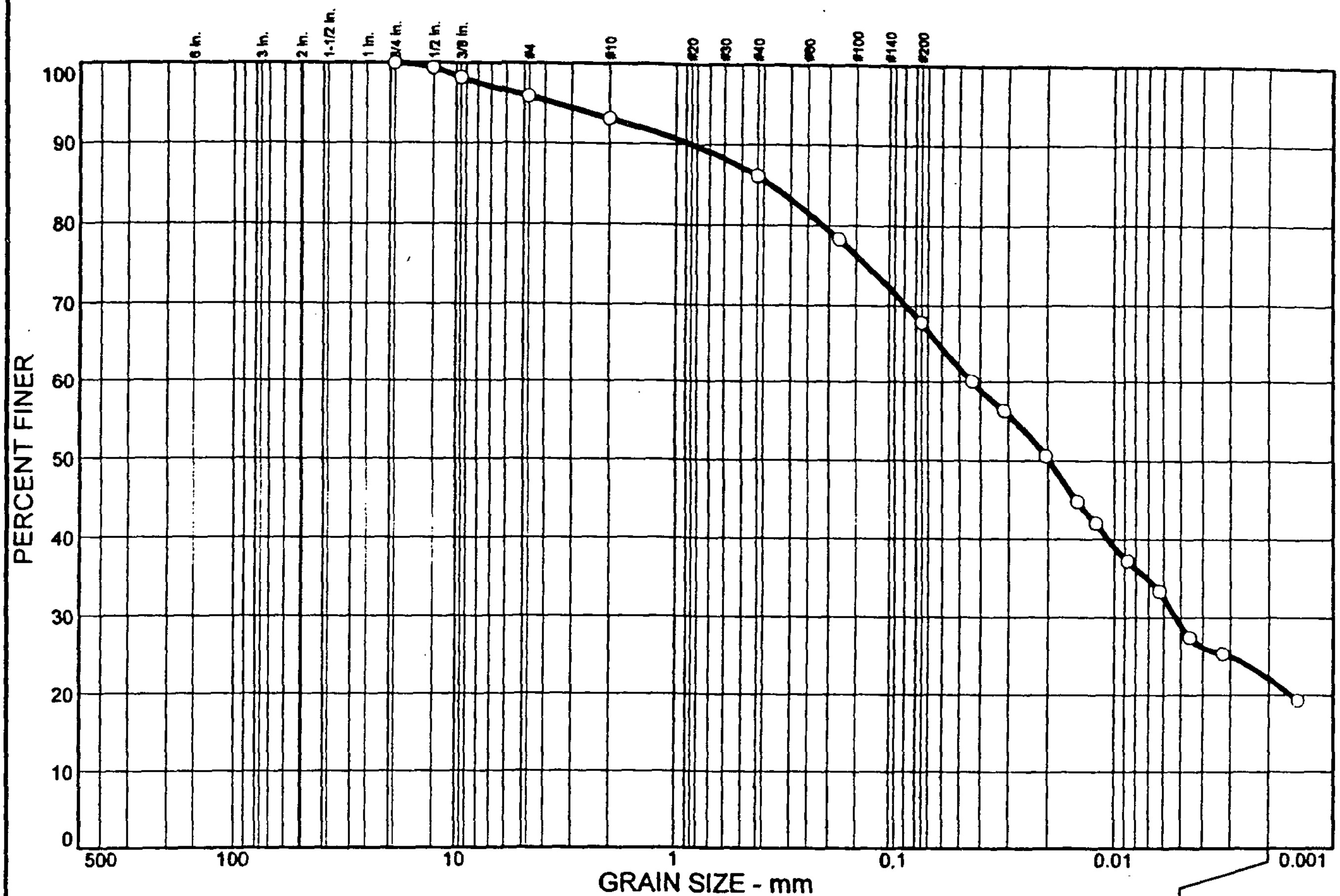
COMPACTION TEST REPORT

3rd Rock, LLC

Remarks:

Plate

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	4.1	2.8	7.0	18.3	45.7	22.1

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	99.4		
.375 in.	98.2		
#4	95.9		
#10	93.1		
#40	86.1		
#80	78.3		
#200	67.8		

* (no specification provided)

Soil Description

ID#00-190

Atterberg Limits

PL= 17.4 LL= 26.5 PI= 9.1

Coefficients

D_{85}= 0.368 D_{60}= 0.0433 D_{50}= 0.0196
D_{30}= 0.0053 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

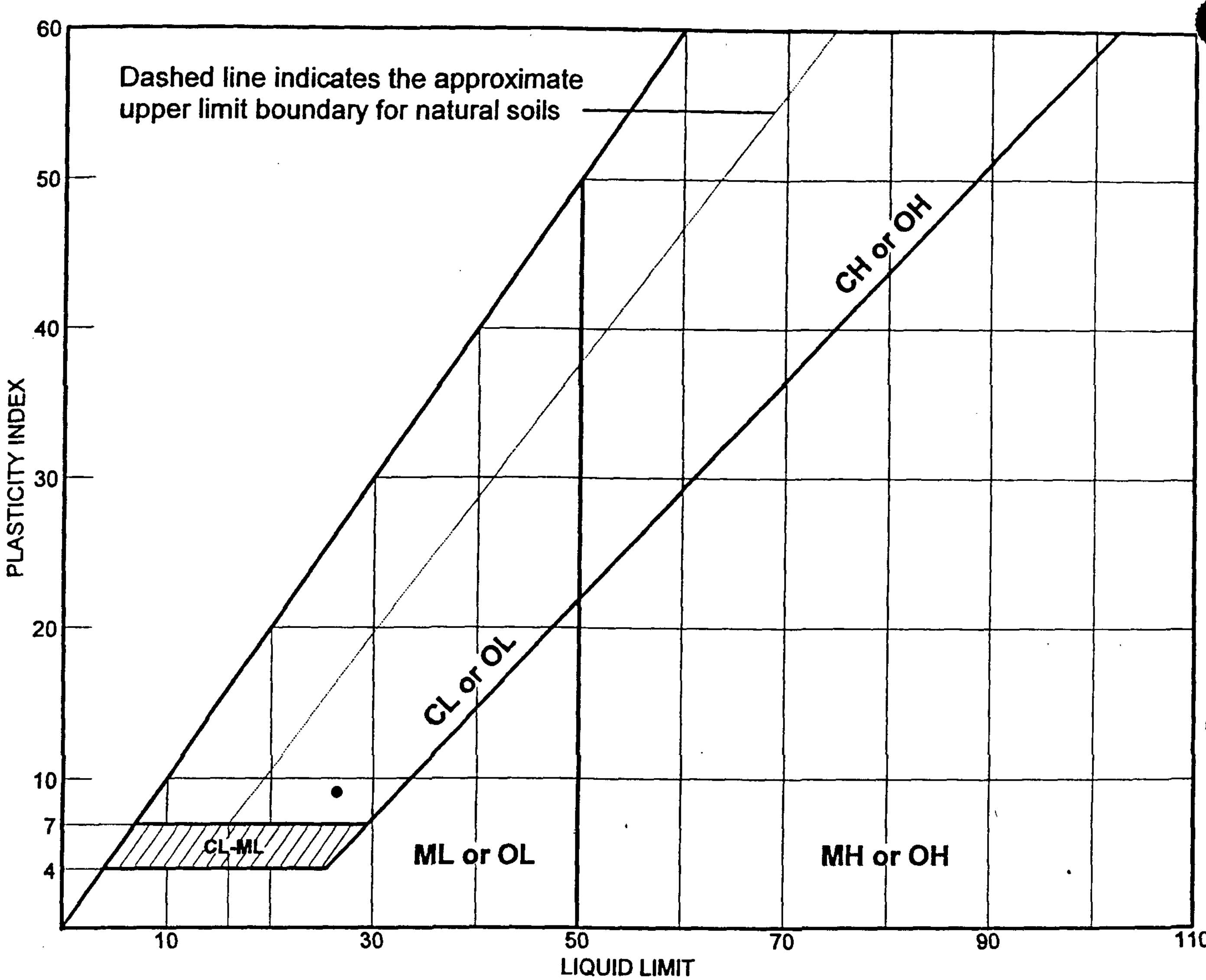
Remarks

Sample No.: Comp 3 Source of Sample: Cap Evaluation Date: 12/20/00
Location: Elev./Depth:

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 Plate

LIQUID AND PLASTIC LIMITS TEST REPORT

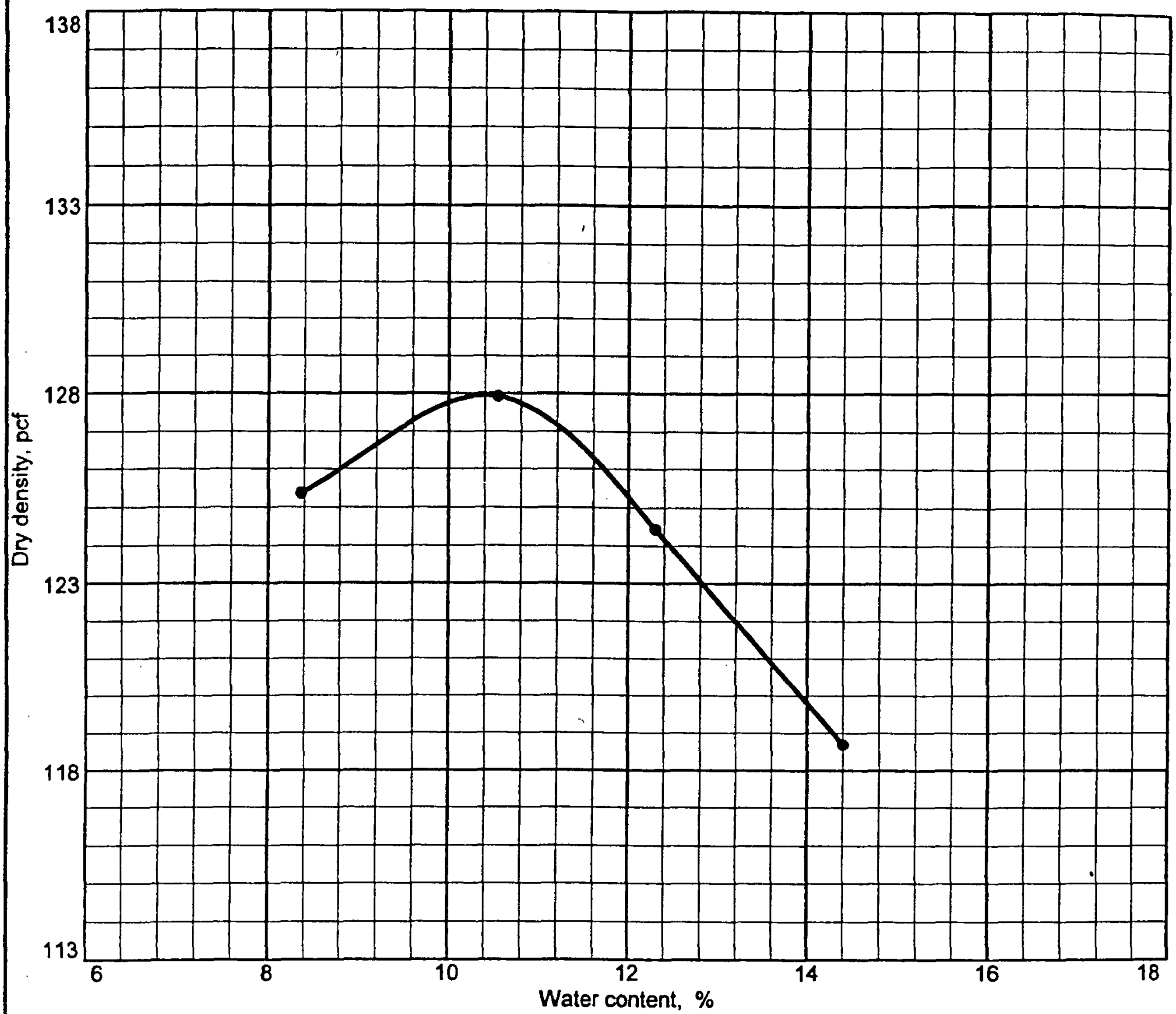


SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Cap	Comp 3			17.4	26.5	9.1	CL

LIQUID AND PLASTIC LIMITS TEST REPORT **3rd Rock, LLC**	**Client:** Benchmark Environmental **Project:** Peter Cooper RI/FS **Project No.:** 00-005 **Plate**

COMPACTION TEST REPORT



Test specification: ASTM D 1557-91 Procedure A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 128.0 pcf Optimum moisture = 10.4 %	ID#00-190

Project No. 00-005 **Client:** Benchmark Environmental

Project: Peter Cooper RI/FS

● **Source:** Cap Evaluation **Sample No.:** Comp 3

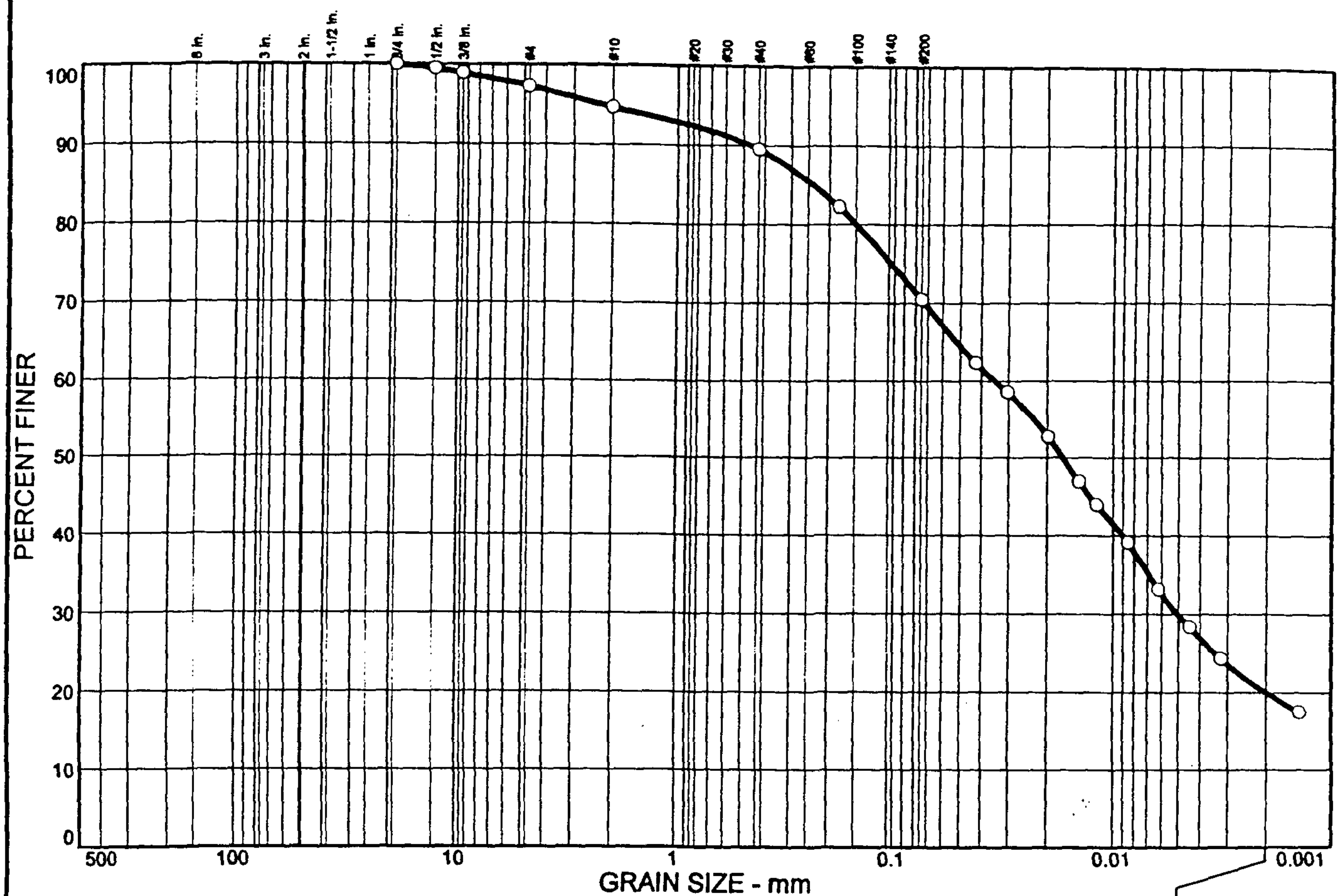
COMPACTION TEST REPORT

3rd Rock, LLC

Remarks:

Plate

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	2.7	2.6	5.2	19.0	50.5	20.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	99.5		
.375 in.	98.9		
#4	97.3		
#10	94.7		
#40	89.5		
#80	82.2		
#200	70.5		

* (no specification provided)

Soil Description

ID#00-191

Atterberg Limits

PL= 17.0 LL= 23.0 PI= 6.0

Coefficients

D_{85}= 0.236 D_{60}= 0.0345 D_{50}= 0.0169
D_{30}= 0.0050 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL-ML AASHTO=

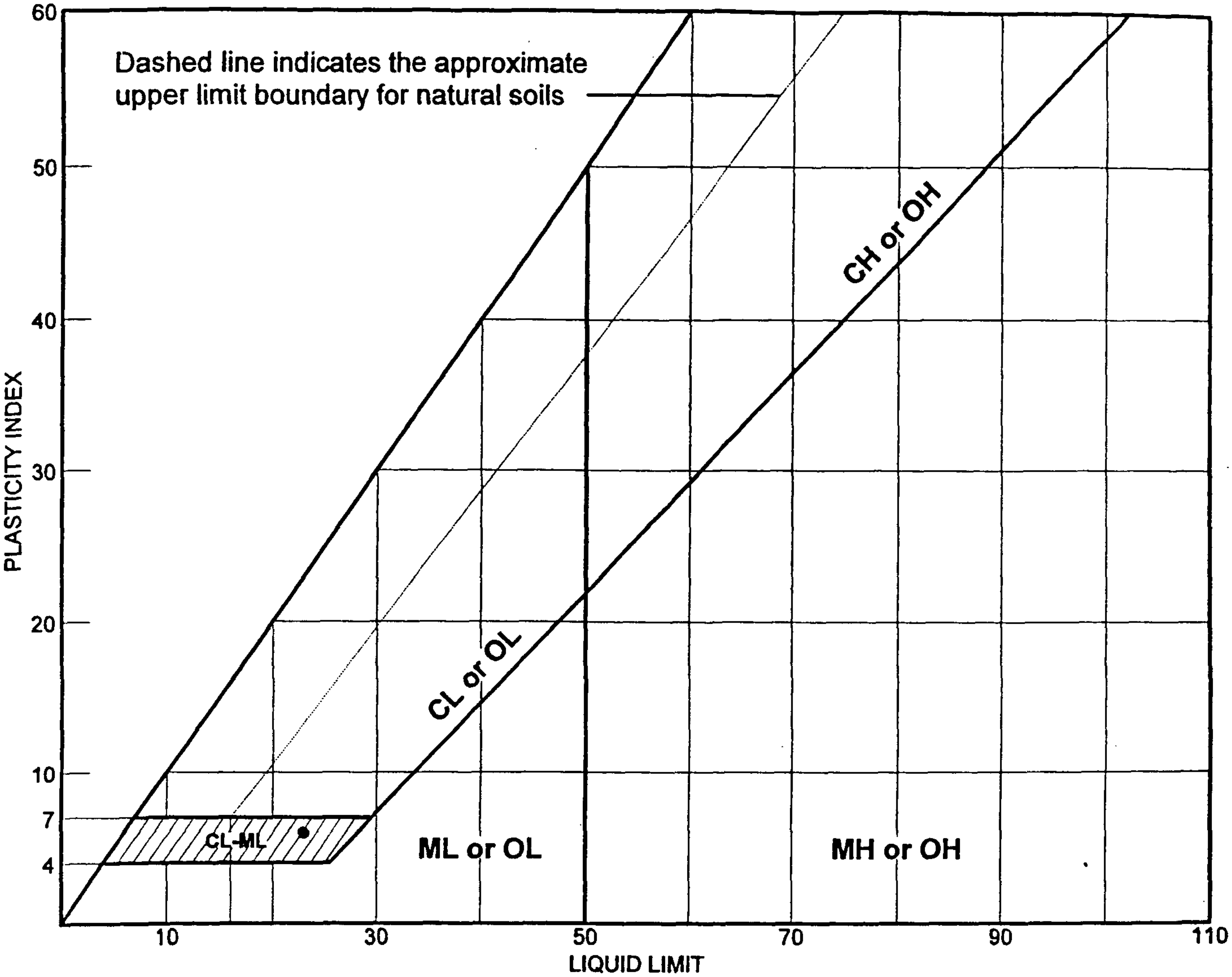
Remarks

Sample No.: Comp 4 **Source of Sample:** Cap Evaluation **Date:** 12/20/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

LIQUID AND PLASTIC LIMITS TEST REPORT



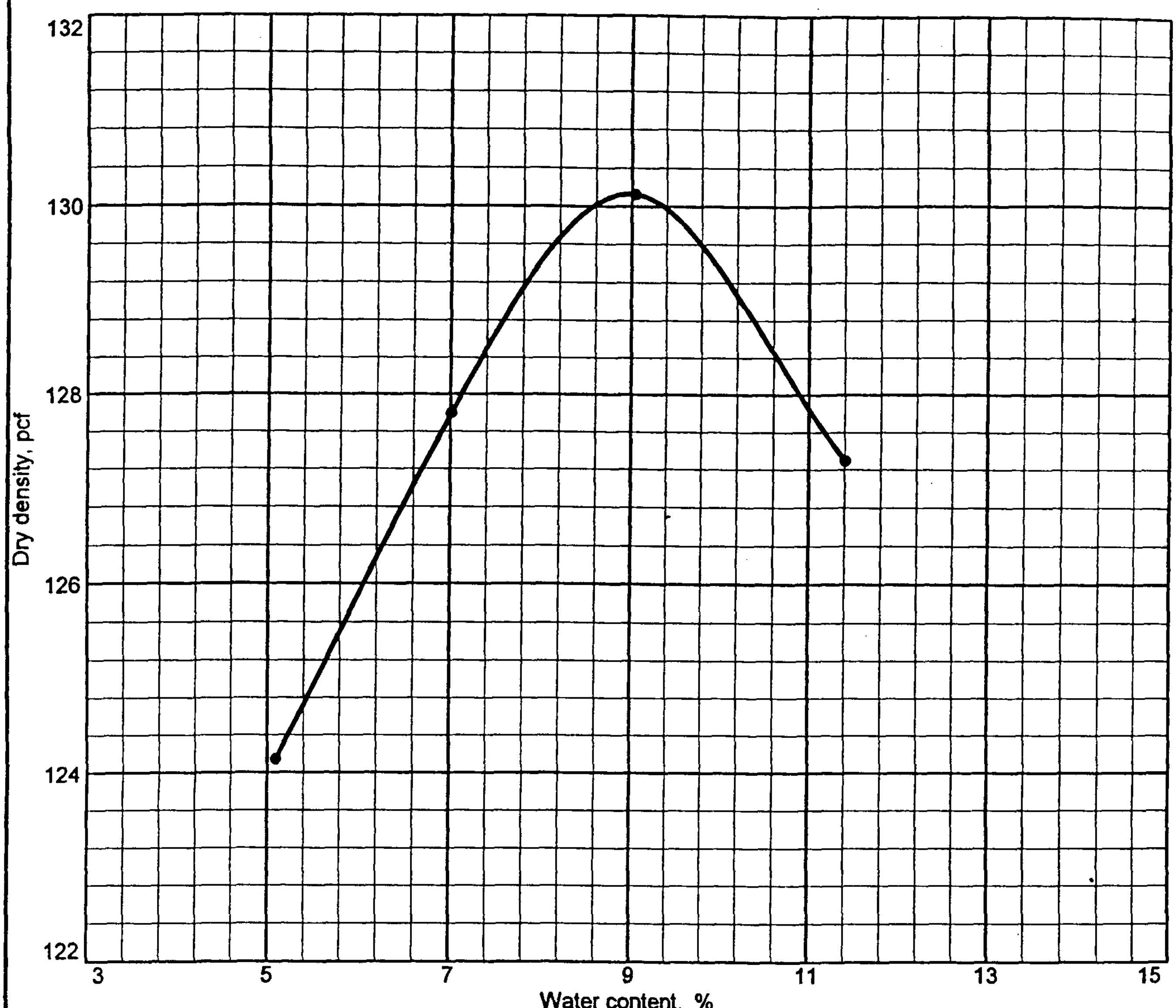
SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Cap	Comp 4			17.0	23.0	6.0	CL-ML

LIQUID AND PLASTIC LIMITS TEST REPORT

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No.: 00-005
Plate

COMPACTION TEST REPORT



Test specification: ASTM D 1557-91 Procedure A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 130.1 pcf Optimum moisture = 9.0 %	ID#00-191

Project No. 00-005 **Client:** Benchmark Environmental
Project: Peter Cooper RI/FS

• **Source:** Cap Evaluation **Sample No.:** Comp 4

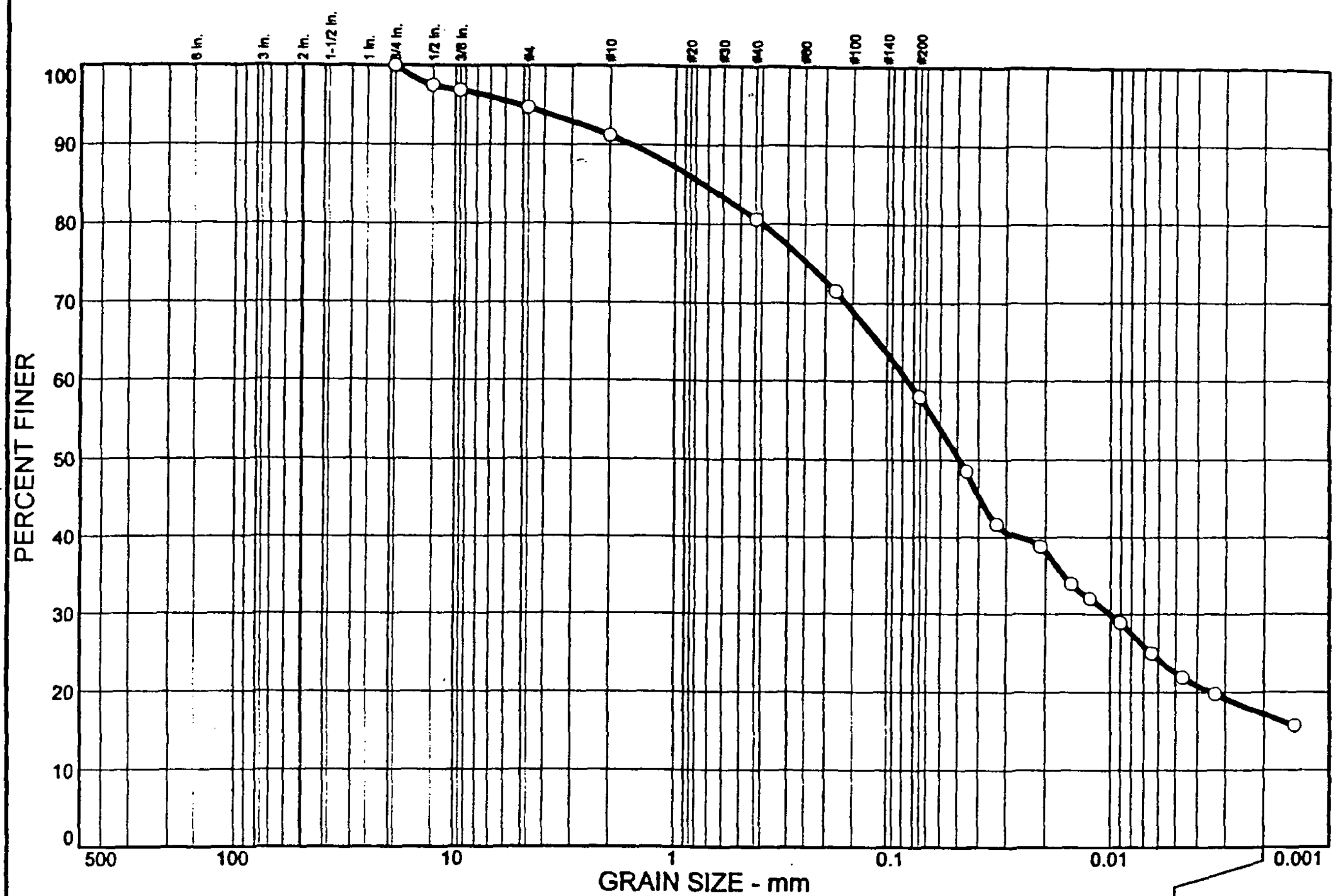
COMPACTION TEST REPORT

3rd Rock, LLC

Remarks:

Plate

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	5.3	3.5	10.6	22.6	40.8	17.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	97.5		
.375 in.	96.9		
#4	94.7		
#10	91.2		
#40	80.6		
#80	71.5		
#200	58.0		

* (no specification provided)

Soil Description

ID#00-192

Atterberg Limits

PL= 19.2 LL= 23.9 PI= 4.7

Coefficients

D_{85}= 0.729 D_{60}= 0.0845 D_{50}= 0.0488
D_{30}= 0.0100 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL-ML AASHTO=

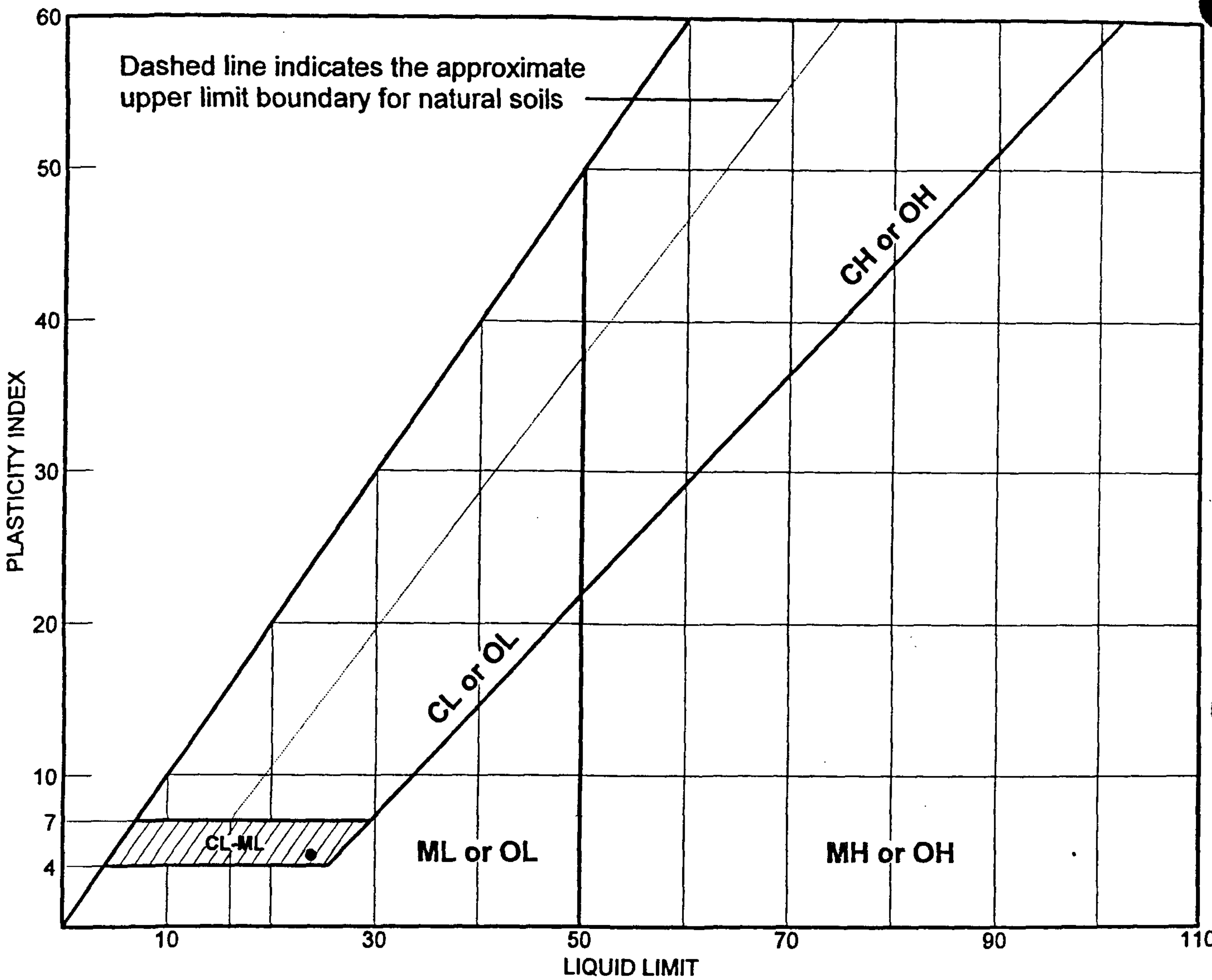
Remarks

Sample No.: Comp 5 **Source of Sample:** Cap Evaluation **Date:** 12/20/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Cap	Comp 5			19.2	23.9	4.7	CL-ML

LIQUID AND PLASTIC LIMITS TEST REPORT

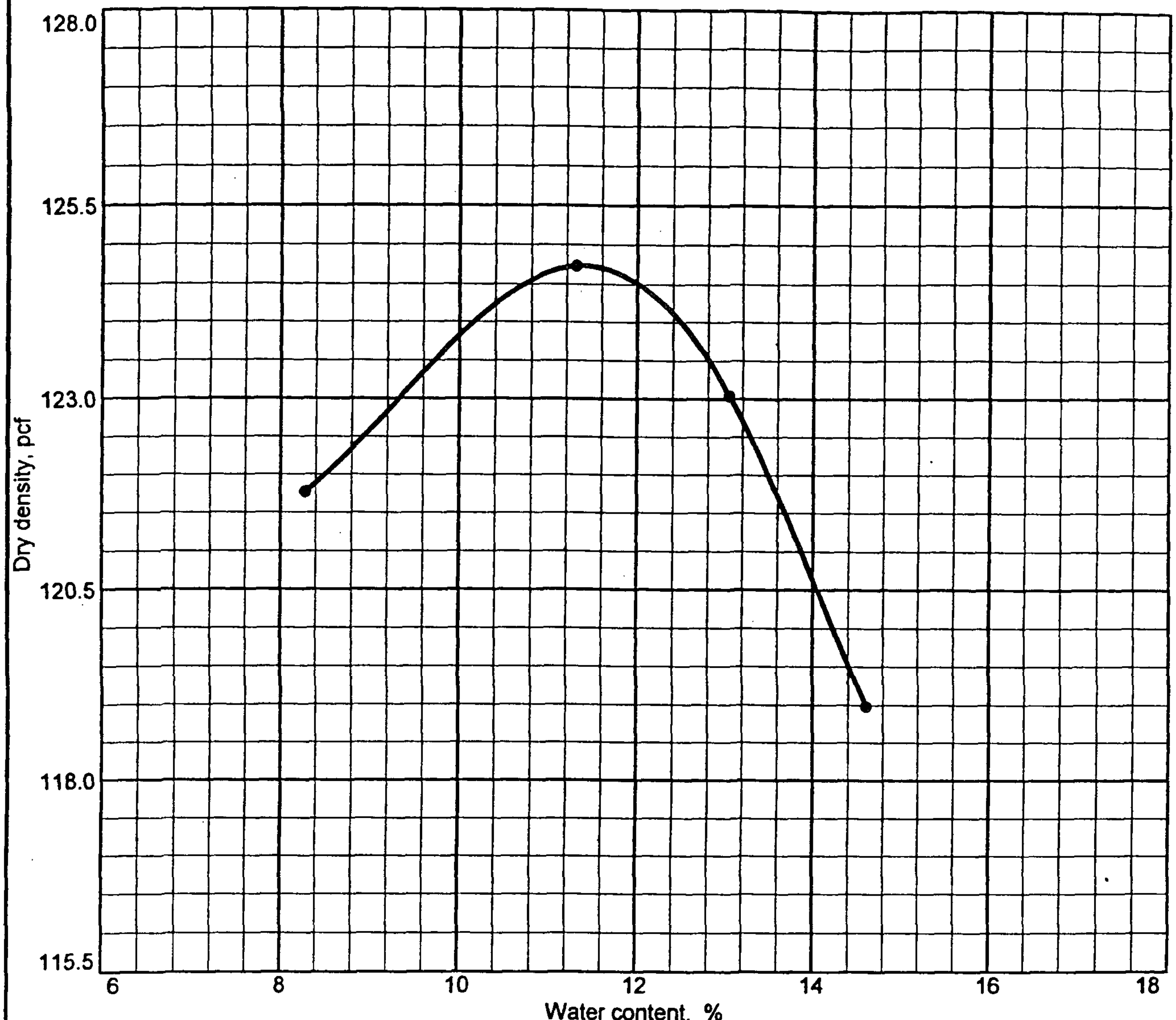
3rd Rock, LLC

Client: Benchmark Environmental

Project: Peter Cooper RI/FS

Project No.: 00-005 **Plate**

COMPACTION TEST REPORT



Test specification: ASTM D 1557-91 Procedure A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 124.7 pcf Optimum moisture = 11.4 %	ID#00-192

Project No. 00-005 **Client:** Benchmark Environmental

Project: Peter Cooper RI/FS

● **Source:** Cap Evaluation **Sample No.:** Comp 5

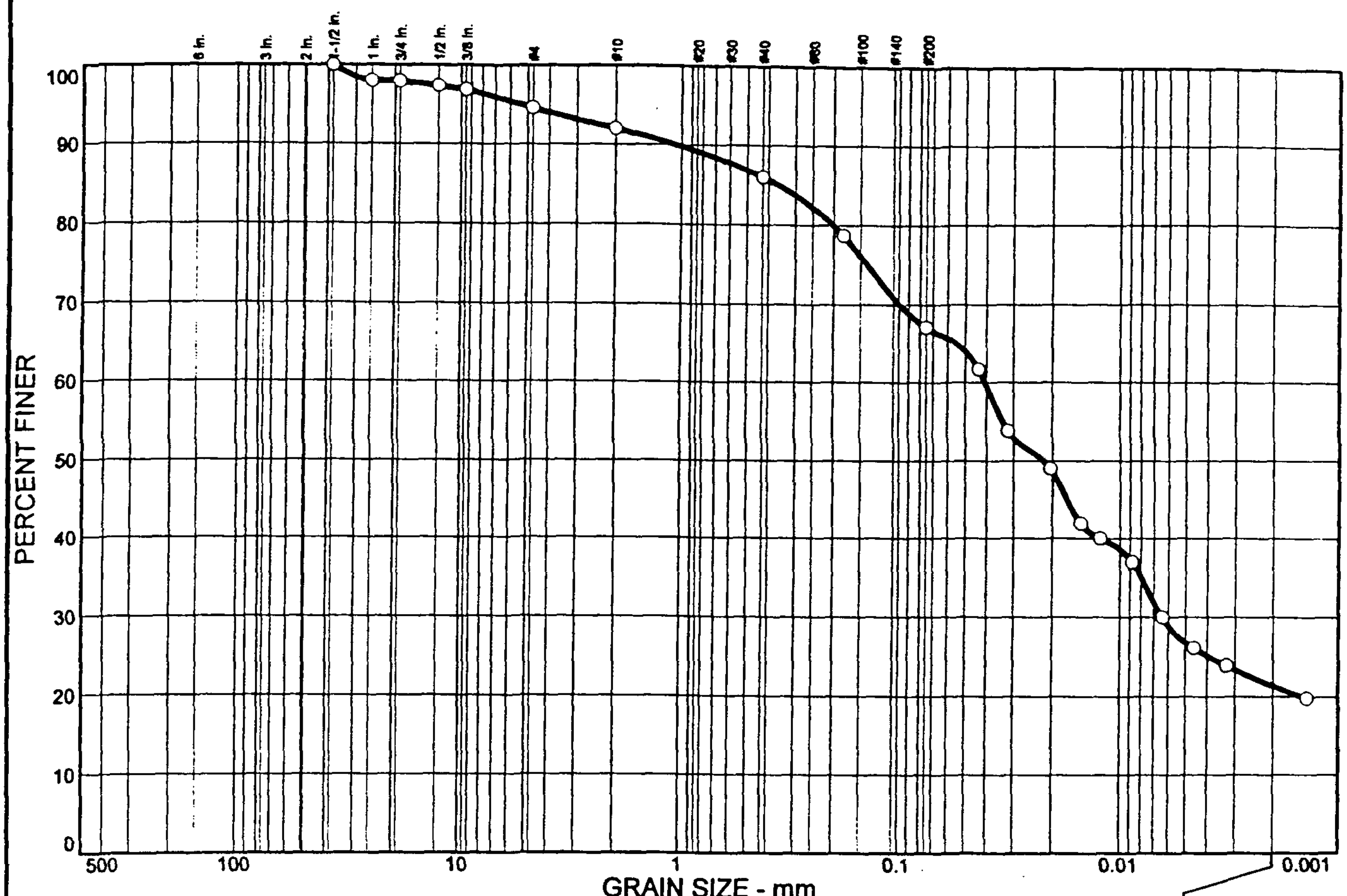
Remarks:

COMPACTION TEST REPORT

3rd Rock, LLC

Plate

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	2.0	3.4	2.6	6.0	18.9	45.7	21.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
1 in.	98.0		
.75 in.	98.0		
.5 in.	97.4		
.375 in.	96.9		
#4	94.6		
#10	92.0		
#40	86.0		
#80	78.7		
#200	67.1		

* (no specification provided)

Soil Description

ID#00-193

Atterberg Limits

PL= 16.0 LL= 22.9 PI= 6.9

Coefficients

D_{85}= 0.359 D_{60}= 0.0404 D_{50}= 0.0218
D_{30}= 0.0064 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL-ML AASHTO=

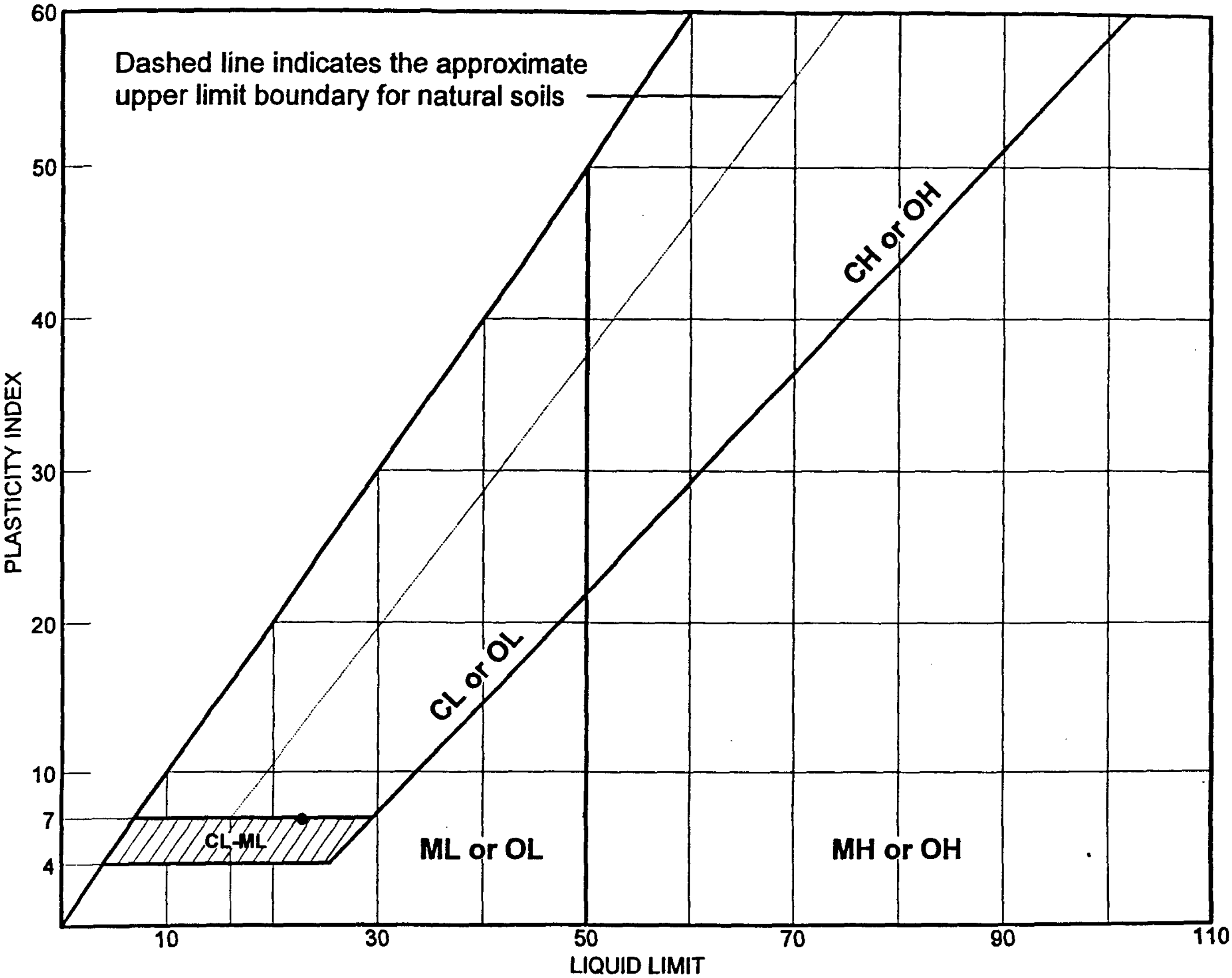
Remarks

Sample No.: Comp 6 **Source of Sample:** Cap Evaluation **Date:** 12/20/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

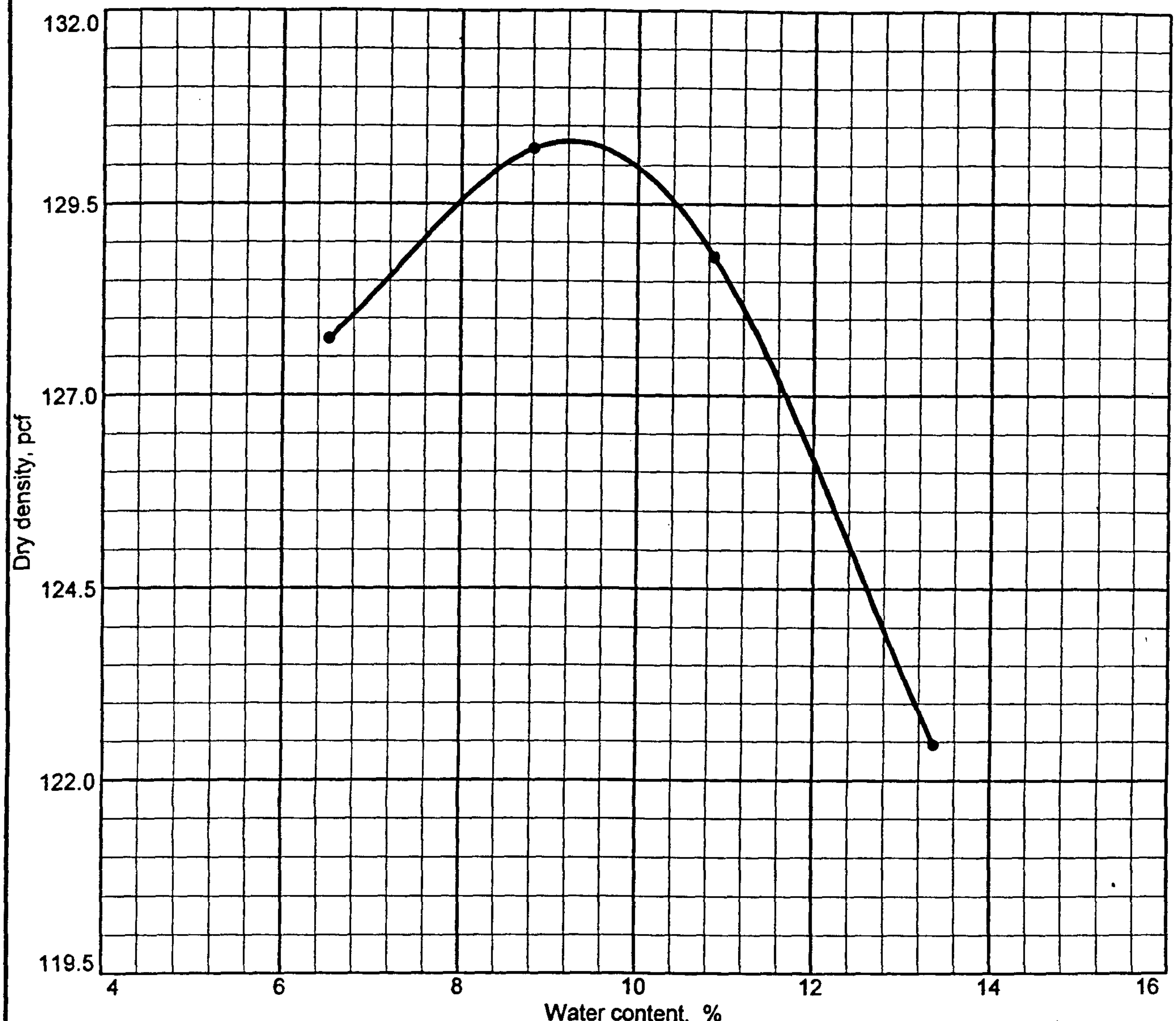
LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Cap	Comp 6			16.0	22.9	6.9	CL-ML

LIQUID AND PLASTIC LIMITS TEST REPORT **3rd Rock, LLC**	**Client:** Benchmark Environmental **Project:** Peter Cooper RI/FS **Project No.:** 00-005 **Plate**

COMPACTION TEST REPORT



Test specification: ASTM D 1557-91 Procedure A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 130.3 pcf Optimum moisture = 9.2 %	ID#00-193

Project No. 00-005 Client: Benchmark Environmental

Project: Peter Cooper RI/FS

• Source: Cap Evaluation Sample No.: Comp 6

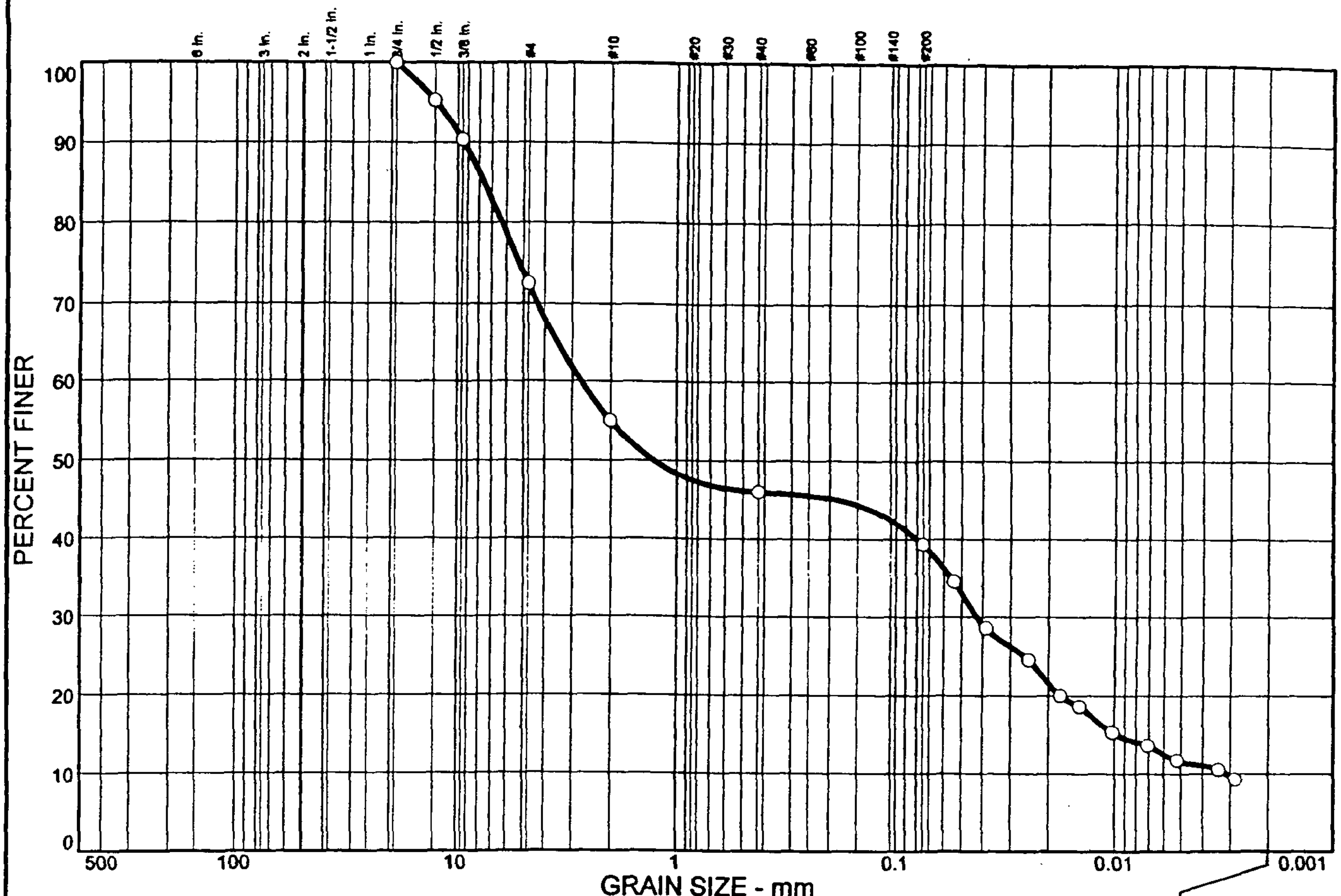
Remarks:

COMPACTION TEST REPORT

3rd Rock, LLC

Plate

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	27.5	17.5	9.0	6.7	39.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	95.3		
.375 in.	90.4		
#4	72.5		
#10	55.0		
#40	46.0		
#200	39.3		

* (no specification provided)

Soil Description

ID#00-184

Atterberg Limits

PL= 44.6 LL= 62.1 PI= 17.5

Coefficients

D_{85}= 7.56 D_{60}= 2.72 D_{50}= 1.27
D_{30}= 0.0424 D_{15}= 0.0098 D_{10}= 0.0031
C_u= 870.23 C_c= 0.21

Classification

USCS= AASHTO=

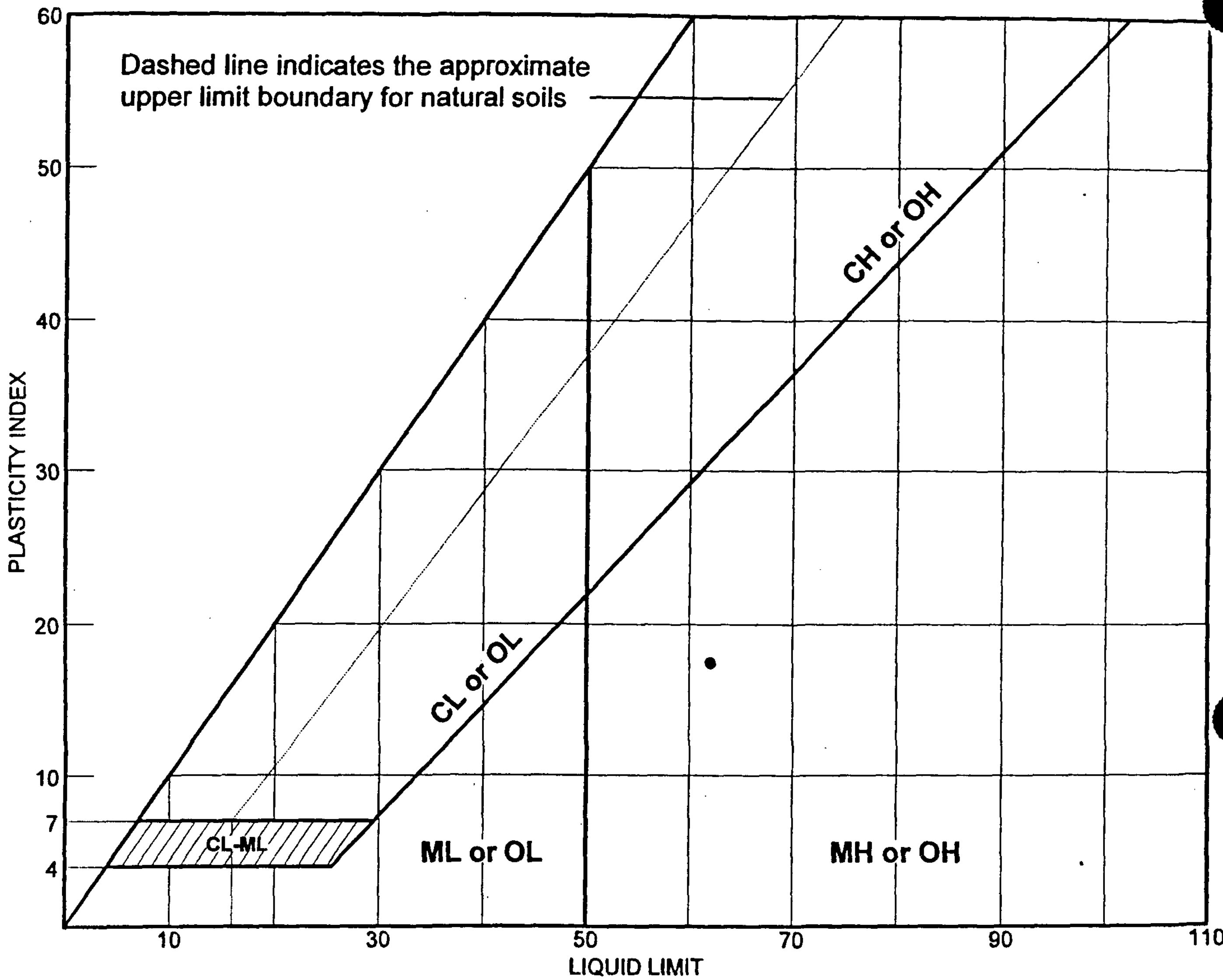
Remarks

Sample No.: #1 Source of Sample: Waste Evaluation Date: 10/13/0
Location: Elev./Depth:

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 Plate

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	Waste	#1			44.6	62.1	17.5	

LIQUID AND PLASTIC LIMITS TEST REPORT	**Client:** Benchmark Environmental
3rd Rock, LLC	**Project:** Peter Cooper RI/FS
	Project No.: 00-005 Plate

301691

SOIL TESTING SUMMARY

Peter Cooper RI/FS
Gowanda, New York

Wetland Sediment

Sample Number	Gravel %	Sand %	Silt %	Clay %
Wetland Sediment #1	0.2	45.8	47.5	6.5
Wetland Sediment #2	0.7	35.8	55.9	7.6
Wetland Sediment #3	0.3	42.1	44.2	13.4

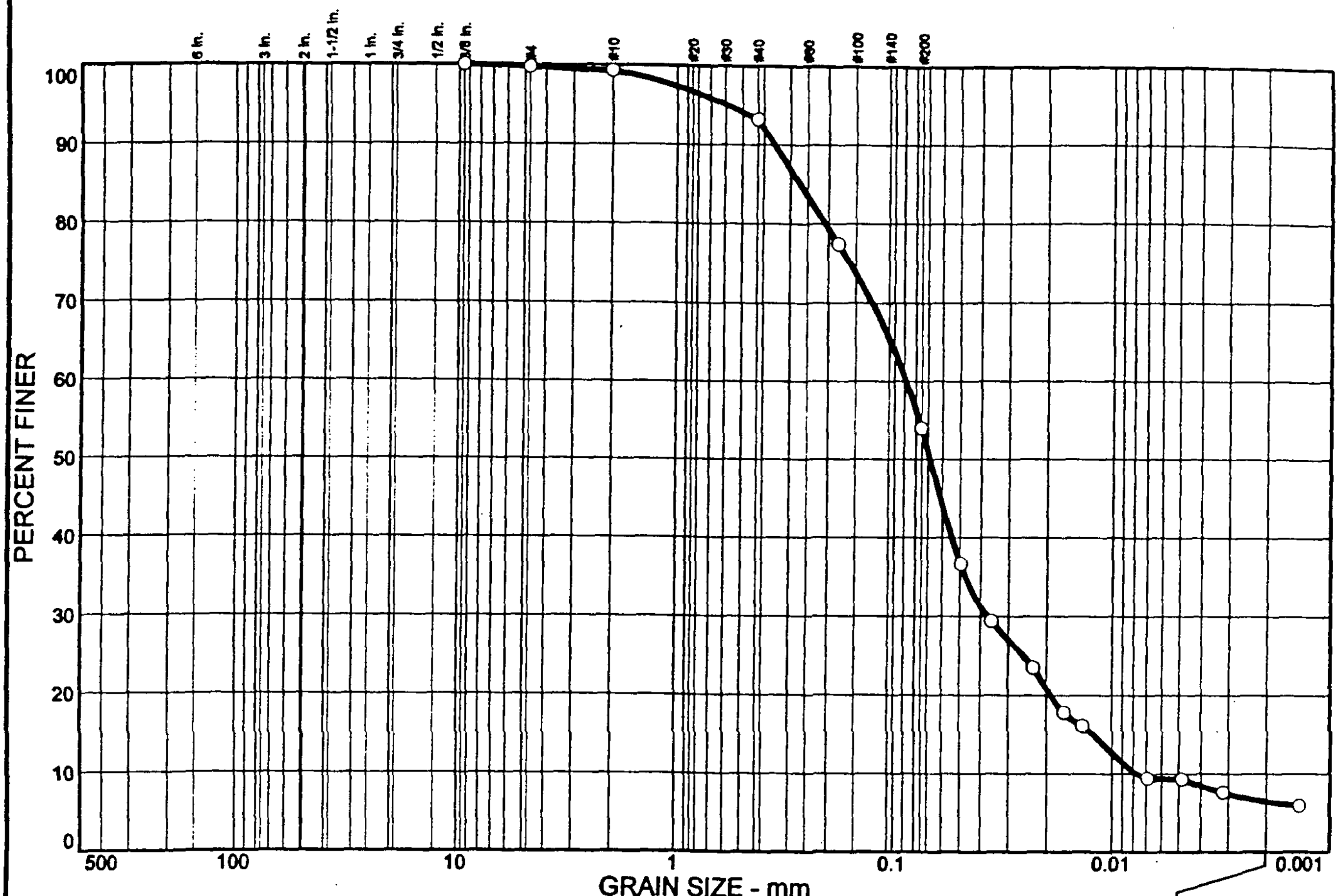
Creek Sediment

Sample Number	Gravel %	Sand %	Silt & Clay %
Creek Sediment #1	16.0	82.3	1.7
Creek Sediment #2	20.1	78.9	1.0
Creek Sediment #3	3.9	94.5	1.6
Creek Sediment #4	0.3	95.4	4.3

3rd Rock, LLC
580 Olean Road
East Aurora, NY 14052
(716)652-9646

1/08/01

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.2	0.5	6.1	39.2	47.5	6.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	99.8		
#10	99.3		
#40	93.2		
#80	77.4		
#200	54.0		

* (no specification provided)

Soil Description

ID#00-185

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.269 D_{60}= 0.0881 D_{50}= 0.0683
D_{30}= 0.0372 D_{15}= 0.0121 D_{10}= 0.0077
C_u= 11.47 C_c= 2.04

Classification

USCS= AASHTO=

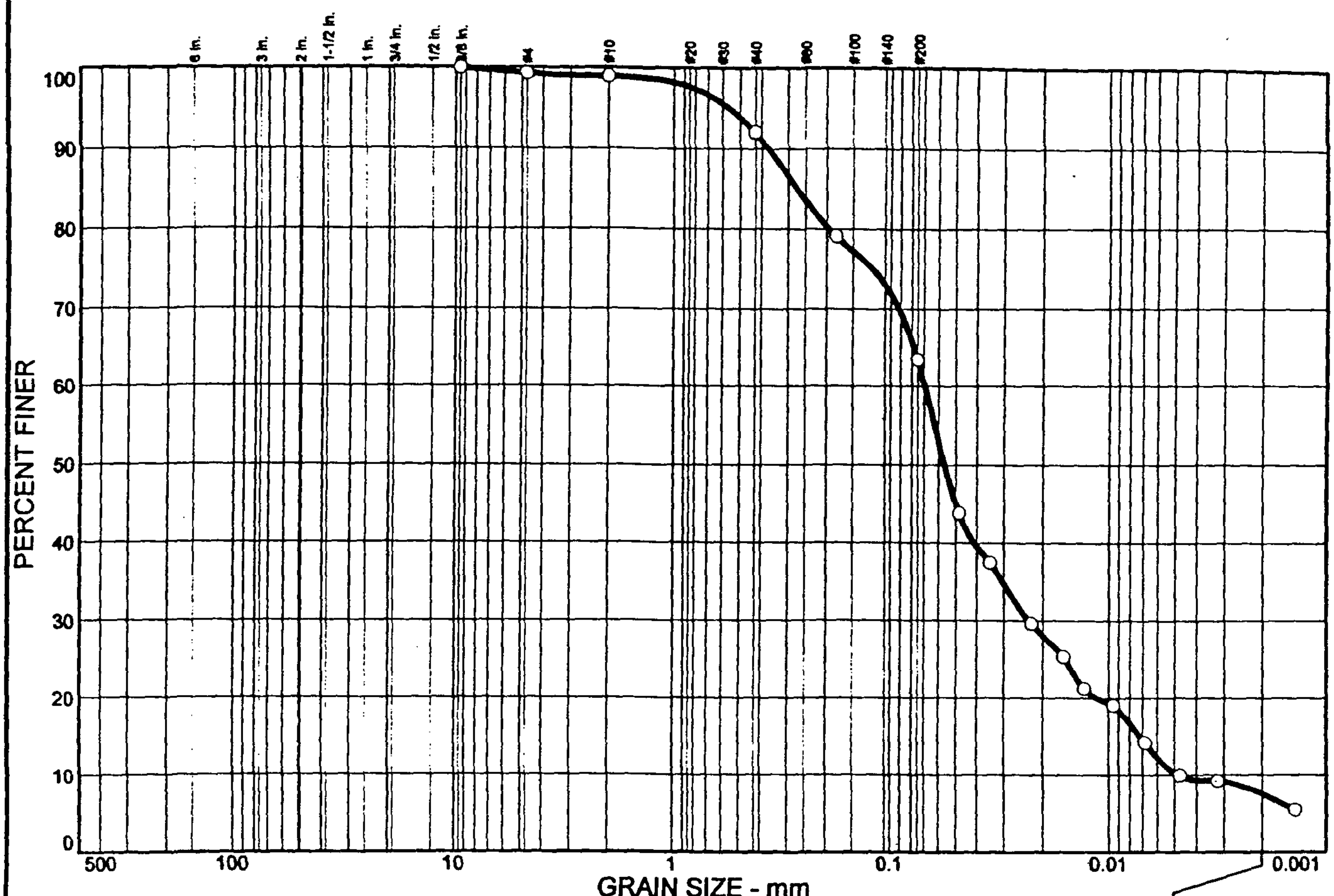
Remarks

Sample No.: Wetland Sed. #1 **Source of Sample:** Other Materials **Date:** 10/18/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.7	0.4	6.9	28.5	55.9	7.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	99.3		
#10	98.9		
#40	92.0		
#80	79.1		
#200	63.5		

* (no specification provided)

Soil Description

ID#00-186

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.271 D_{60}= 0.0693 D_{50}= 0.0562
D_{30}= 0.0232 D_{15}= 0.0072 D_{10}= 0.0048
C_u= 14.40 C_c= 1.61

Classification

USCS= AASHTO=

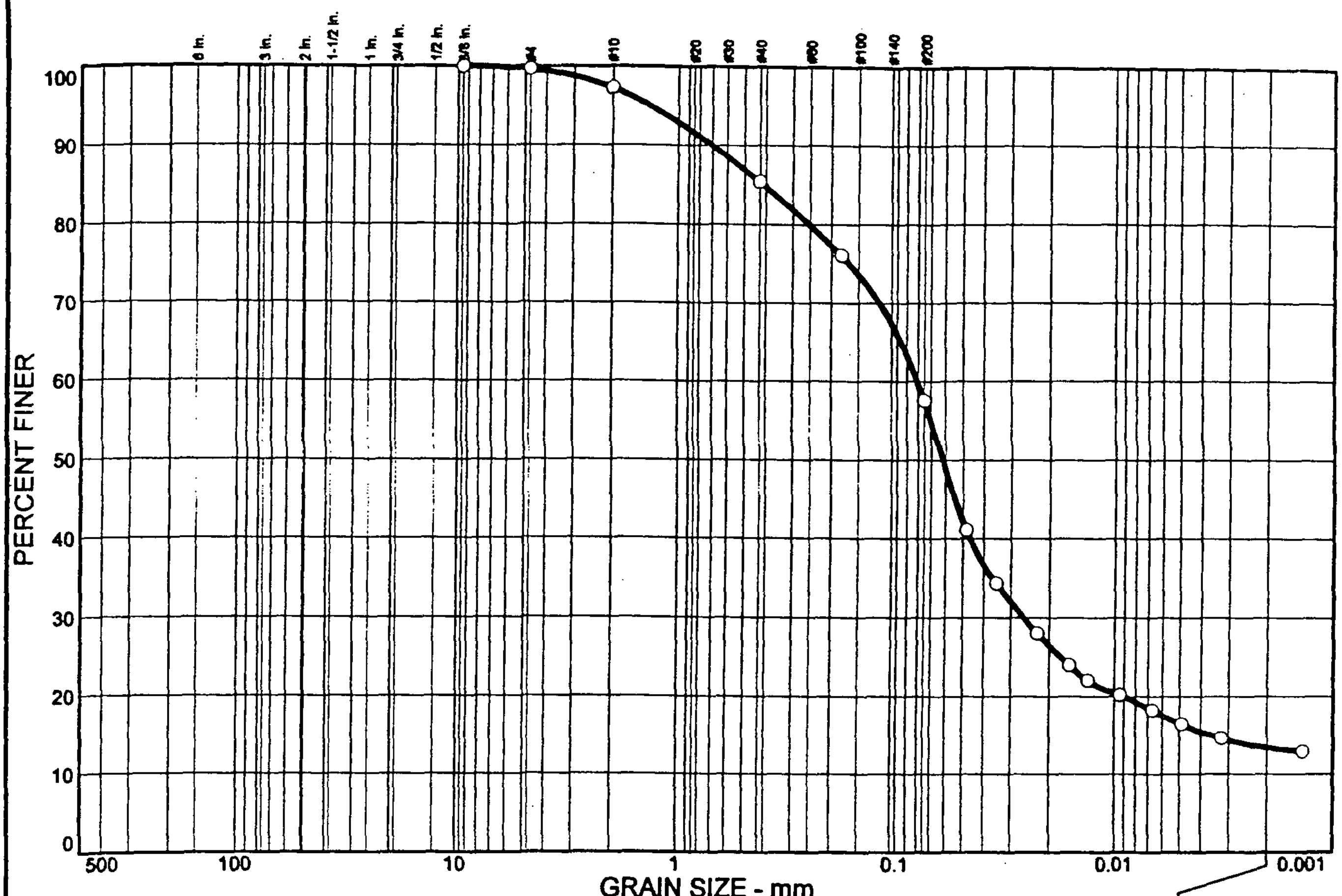
Remarks

Sample No.: Wetland Sed. #2 **Source of Sample:** Other Materials **Date:** 10/18/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.3	2.4	11.9	27.8	44.2	13.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	99.7		
#10	97.3		
#40	85.4		
#80	76.1		
#200	57.6		

* (no specification provided)

Soil Description

ID#00-187

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.408 D_{60}= 0.0805 D_{50}= 0.0616
D_{30}= 0.0261 D_{15}= 0.0036 D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

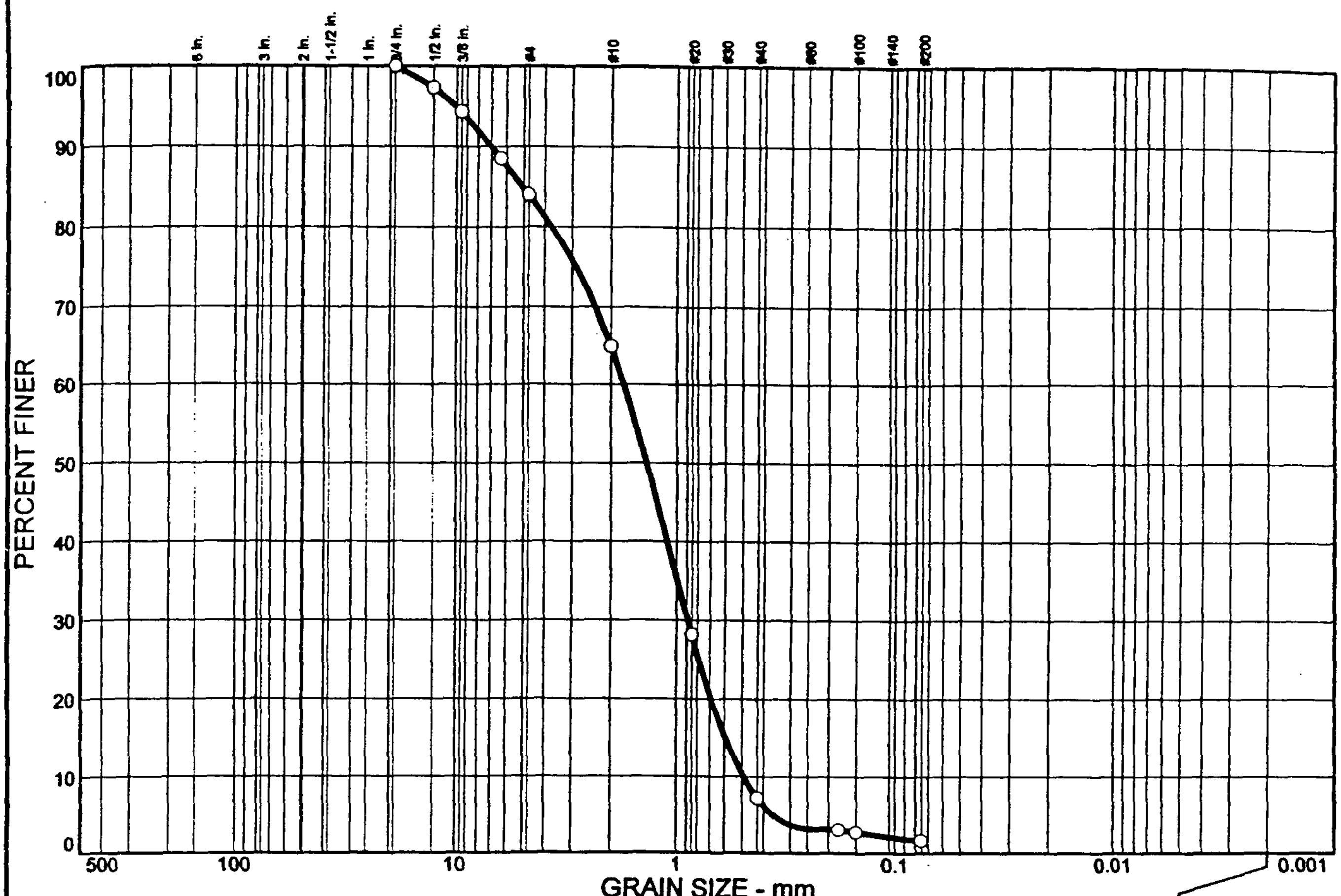
Remarks

Sample No.: Wetland Sed. #3 **Source of Sample:** Other Materials **Date:** 10/18/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	16.0	19.0	57.8	5.5	1.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	97.3		
.375 in.	94.4		
.25 in.	88.5		
#4	84.0		
#10	65.0		
#20	28.2		
#40	7.2		
#80	3.1		
#100	2.8		
#200	1.7		

* (no specification provided)

Soil Description

ID#00-219

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 5.07 D_{60}= 1.75 D_{50}= 1.38
D_{30}= 0.887 D_{15}= 0.591 D_{10}= 0.490
C_u= 3.57 C_c= 0.92

Classification

USCS= SP AASHTO=

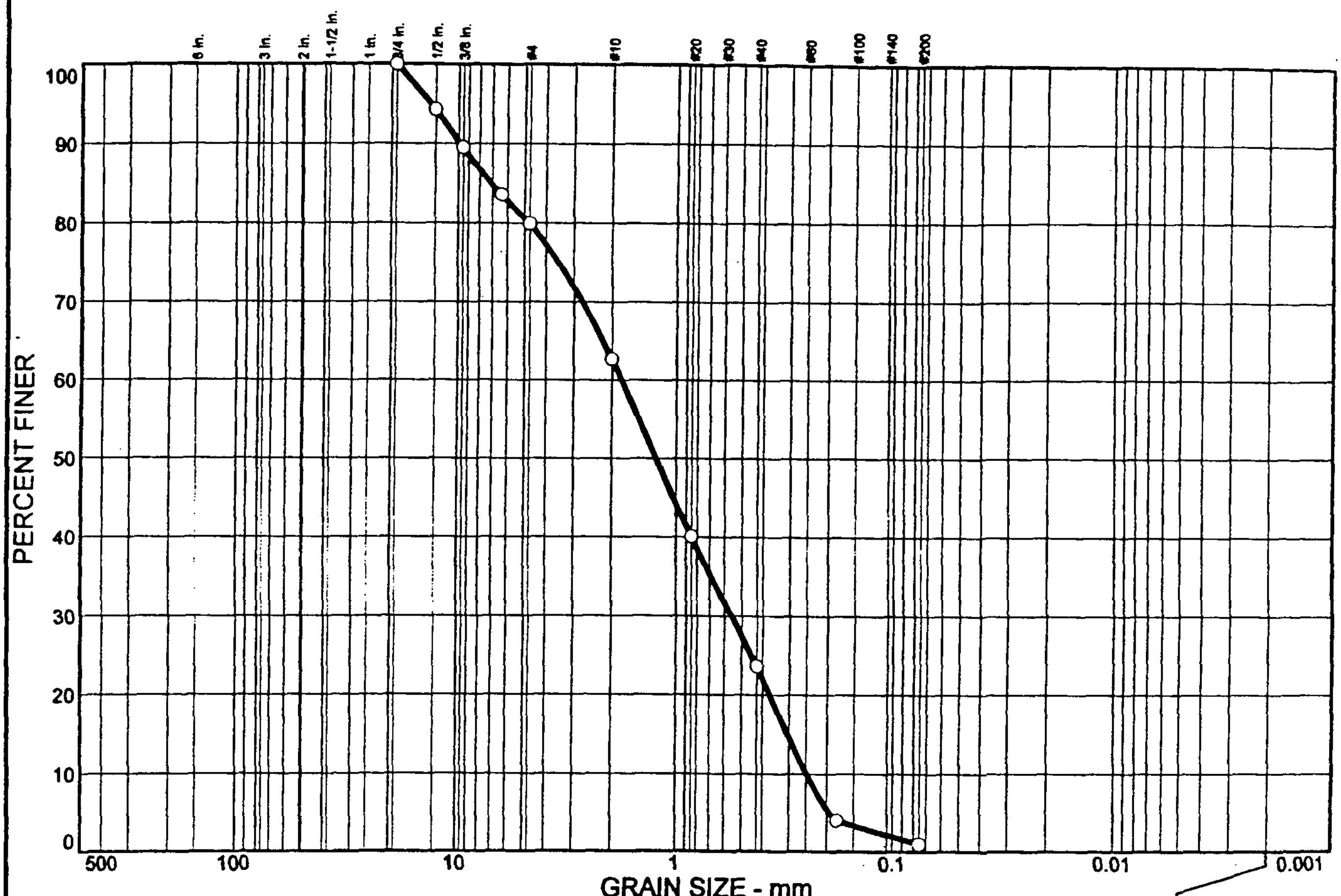
Remarks

Sample No.: Creek Sediment 1 **Source of Sample:** Other Materials **Date:** 12/21/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	20.1	17.2	39.1	22.6	1.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	94.3		
.375 in.	89.5		
.25 in.	83.6		
#4	79.9		
#10	62.7		
#20	40.1		
#40	23.6		
#80	4.0		
#200	1.0		

* (no specification provided)

Soil Description

ID#00-220

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 7.06 D_{60}= 1.80 D_{50}= 1.24
D_{30}= 0.555 D_{15}= 0.304 D_{10}= 0.248
C_u= 7.26 C_c= 0.69

Classification

USCS= SP AASHTO=

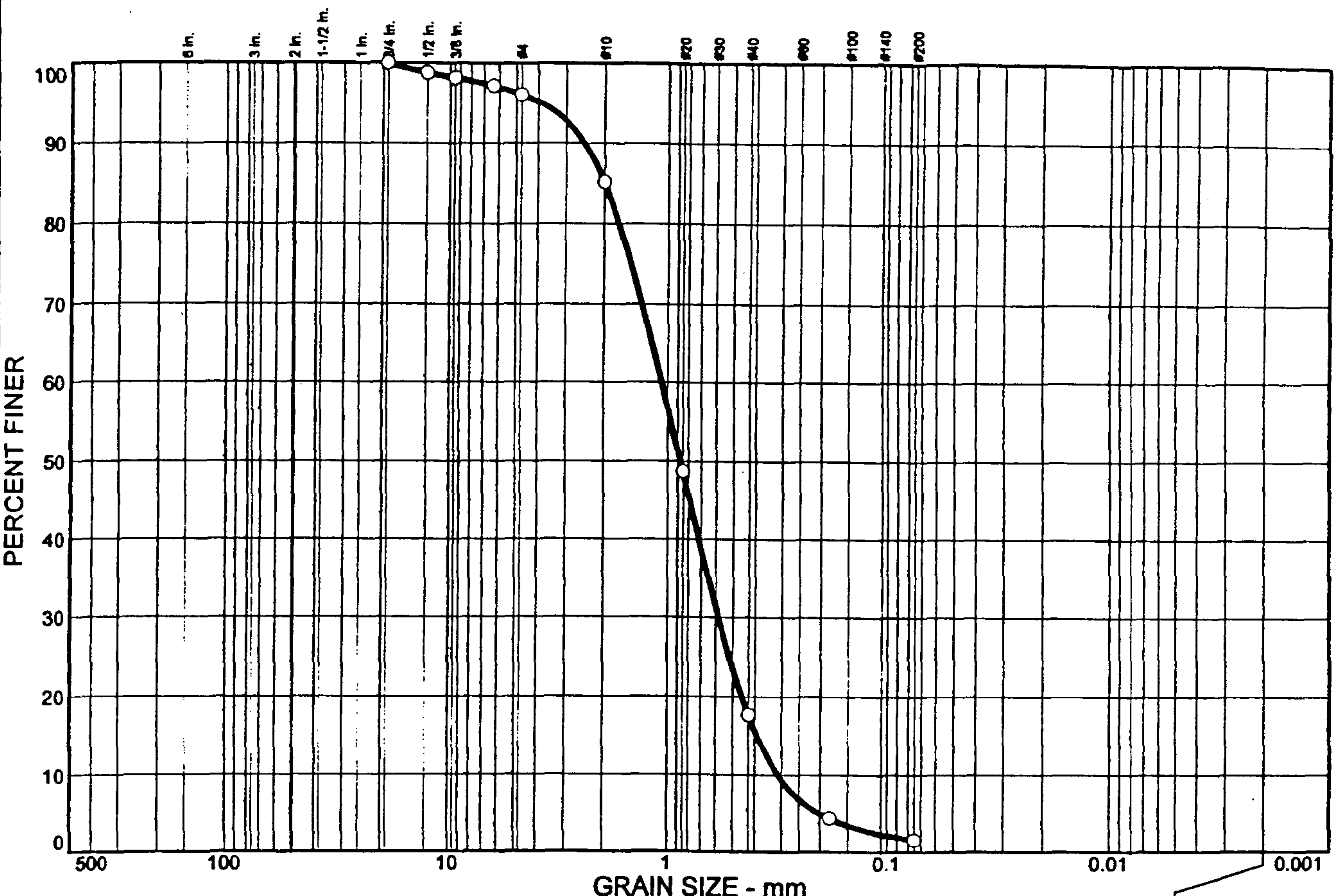
Remarks

Sample No.: Creek Sediment 2 **Source of Sample:** Other Materials **Date:** 12/21/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	3.9	10.9	67.5	16.1	1.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	98.8		
.375 in.	98.2		
.25 in.	97.2		
#4	96.1		
#10	85.2		
#20	48.7		
#40	17.7		
#80	4.4		
#200	1.6		

* (no specification provided)

Soil Description

ID#00-221

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 1.99 D_{60}= 1.07 D_{50}= 0.872
D_{30}= 0.580 D_{15}= 0.388 D_{10}= 0.311
C_u= 3.43 C_c= 1.02

Classification

USCS= SP AASHTO=

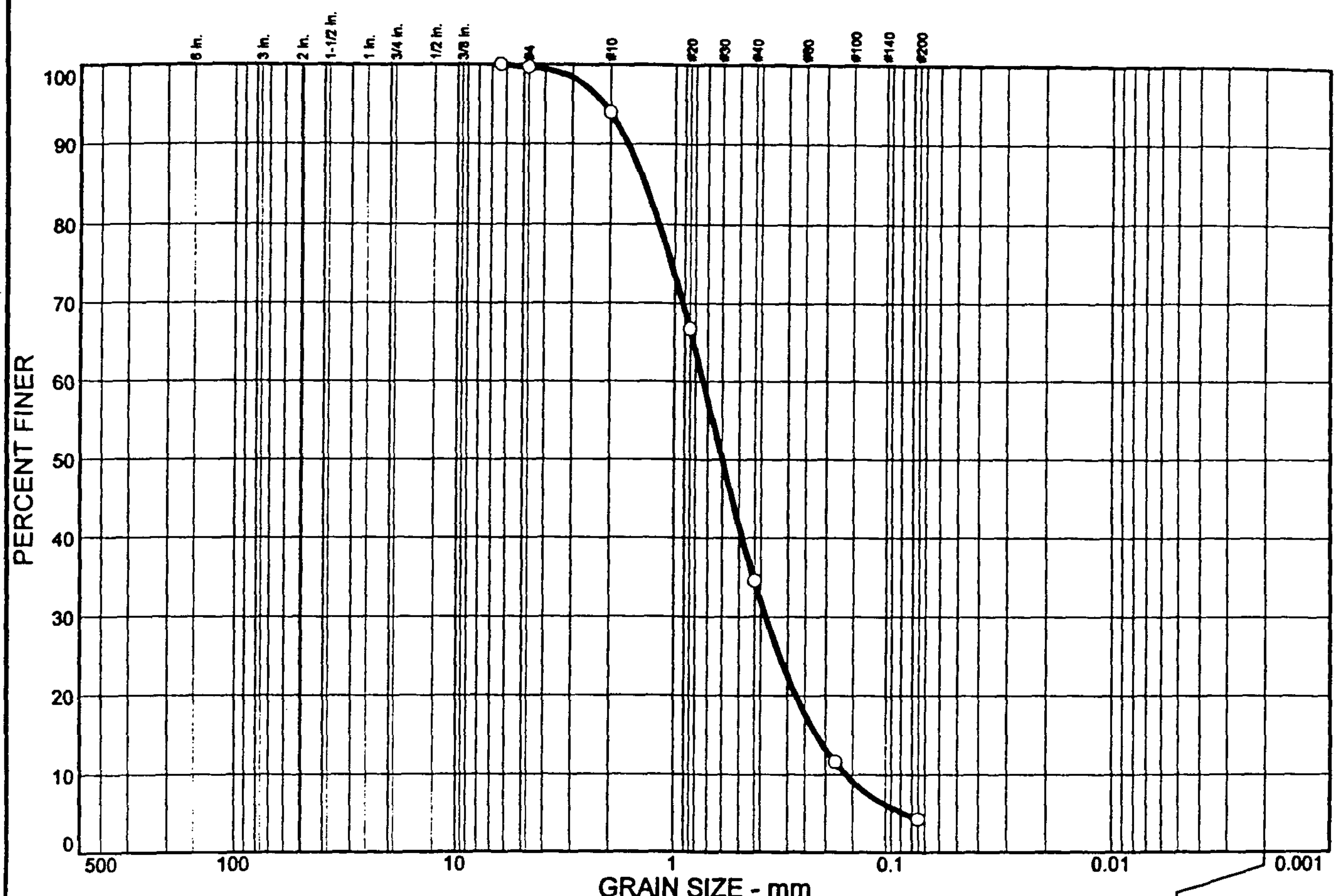
Remarks

Sample No.: Creek Sediment 3 **Source of Sample:** Other Materials **Date:** 12/21/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.3	5.7	59.4	30.3	4.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.25 in.	100.0		
#4	99.7		
#10	94.0		
#20	66.8		
#40	34.6		
#80	11.6		
#200	4.3		

* (no specification provided)

Soil Description

ID#00-222

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 1.38 D_{60}= 0.734 D_{50}= 0.597
D_{30}= 0.377 D_{15}= 0.219 D_{10}= 0.160
C_u= 4.58 C_c= 1.21

Classification

USCS= SP AASHTO=

Remarks

Sample No.: Creek Sediment 4 **Source of Sample:** Other Materials **Date:** 12/21/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

SOIL TESTING SUMMARY

Peter Cooper RI/FS
Gowanda, New York

Former Plant Site Soil/Fill

Sample Number	Gravel %	Sand %	Fines: Silt %	Fines: Clay %
SB-1, Surface	23.9	57.4	14.8	3.9
SB-1, 5-7'	27.0	61.1	11.9*	
SB-2, Surface	49.3	43.1	7.6*	
SB-2, 6-8'	42.4	43.5	14.1*	
SB-4, Surface	26.3	35.6	24.6	13.5
SB-4, 4-6'	32.5	57.2	10.3*	
SB-5, Surface	18.0	30.4	36.6	15.0
SB-5, 6-8'	17.5	62.1	16.4**	4.0**
SB-3, 3-5'	0.0	42.0	39.3	18.7
SB-6, Surface	10.6	24.2	38.4	26.8
MW-FP-2, 0.5-2.5'	56.3	28.9	14.8*	
MW-FP-2, 5-7'	17.9	69.9	12.2*	
SB-7, Surface	21.4	52.7	15.4	10.5
SB-7, 7-9'	15.0	58.8	16.2**	10.0**
SB-8, Surface	26.8	30.8	28.7	13.7
SB-8, 10-12'	11.8	35.2	39.0	14.0
SB-9, 0.5-2.5'	35.2	29.5	25.0	10.3
SB-9, 7-9'	1.1	58.2	32.7**	8**
SB-10, Surface	29.6	37.7	22.4	10.3
SB-10, 7-9'	0.0	56.6	35.2	8.2
MW-FP-3, 0.5-2.5'	39.5	40.5	16.0	4.0
MW-FP-3, 5-7'	17.1	54.0	23.9	5.0
SB-6, 4-6'	15.9	52.4	22.7	9.0

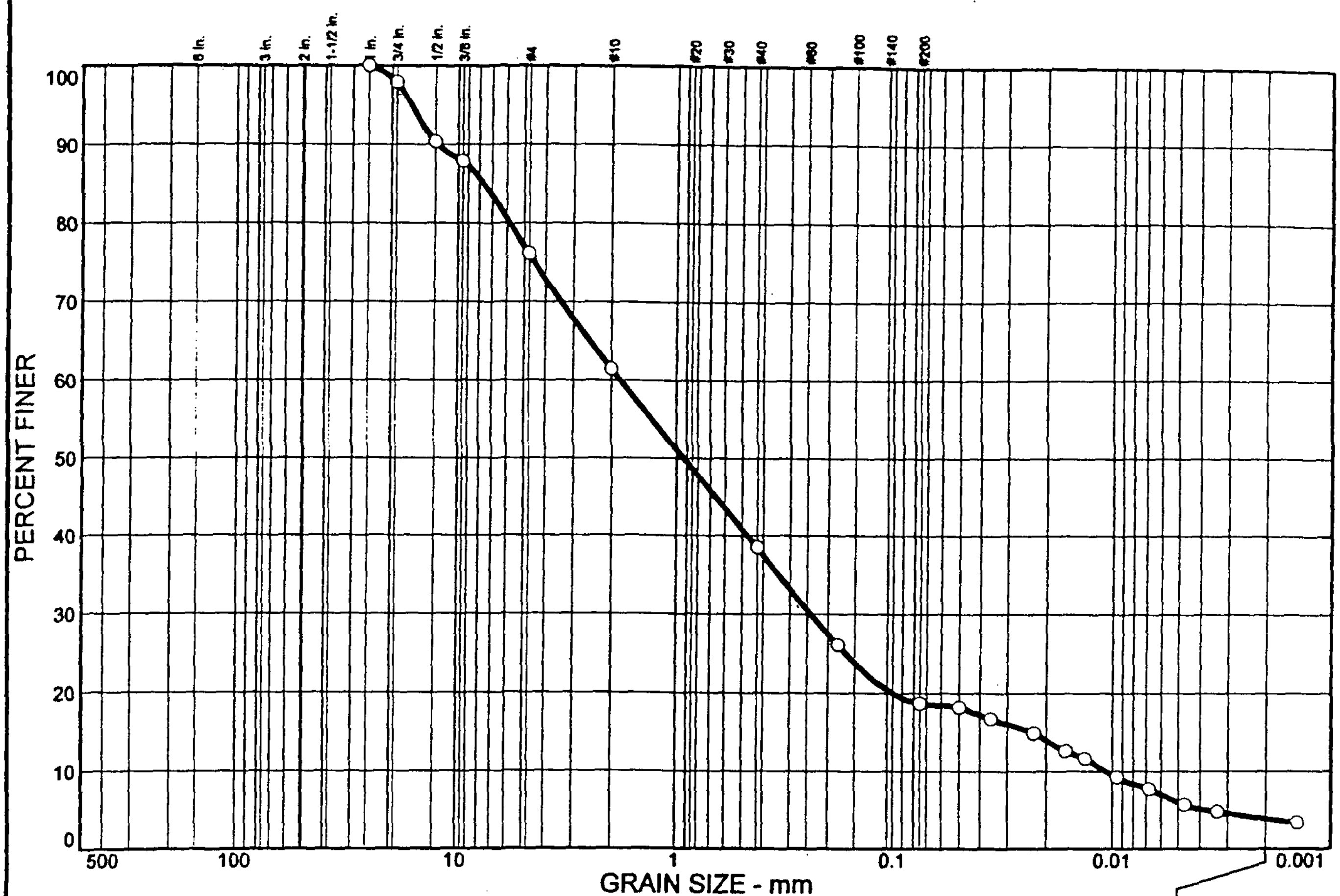
* Predominantly Silt
** Approximate percentages based on shape of curve.

301699

3rd Rock, LLC
580 Olean Road
East Aurora, NY 14052
(716)652-9646

1/08/01

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	2.1	21.8	14.6	23.0	19.8	14.8	3.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	97.9		
.5 in.	90.3		
.375 in.	87.8		
#4	76.1		
#10	61.5		
#40	38.5		
#80	26.1		
#200	18.7		

* (no specification provided)

Soil Description

ID#00-194

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 7.63 D_{60}= 1.81 D_{50}= 0.926
D_{30}= 0.240 D_{15}= 0.0231 D_{10}= 0.0107
C_u= 169.53 C_c= 2.97

Classification

USCS= AASHTO=

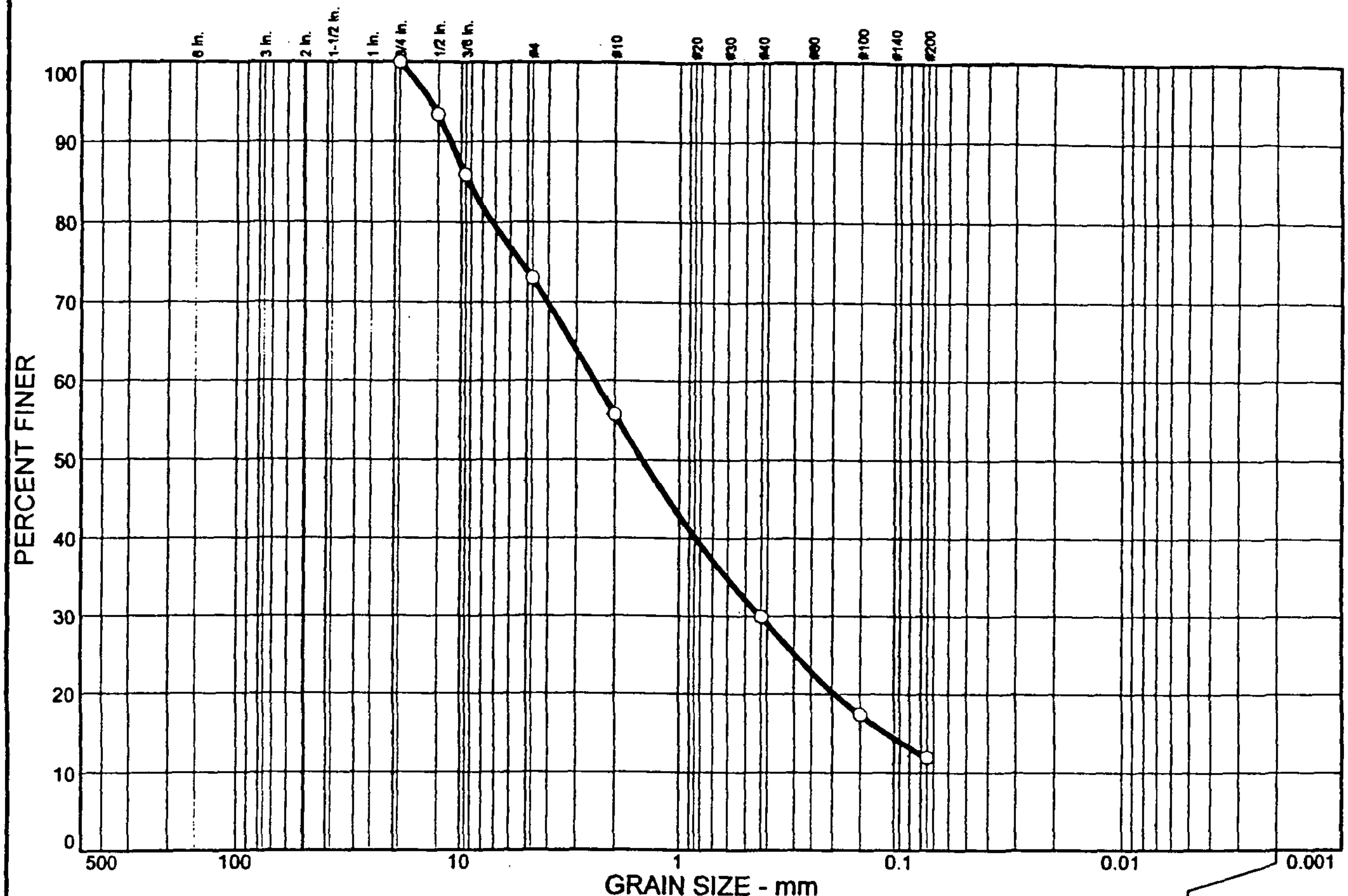
Remarks

Sample No.: SB-1(SS) Source of Sample: Former Plant Site Date: 12/4/00
Location: Elev./Depth: Surface

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 Plate

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	27.0	17.3	25.8	18.0	11.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	93.4		
.375 in.	85.9		
#4	73.0		
#10	55.7		
#40	29.9		
#100	17.4		
#200	11.9		

* (no specification provided)

Soil Description

ID#00-195

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 9.18 D_{60}= 2.46 D_{50}= 1.49
D_{30}= 0.428 D_{15}= 0.114 D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

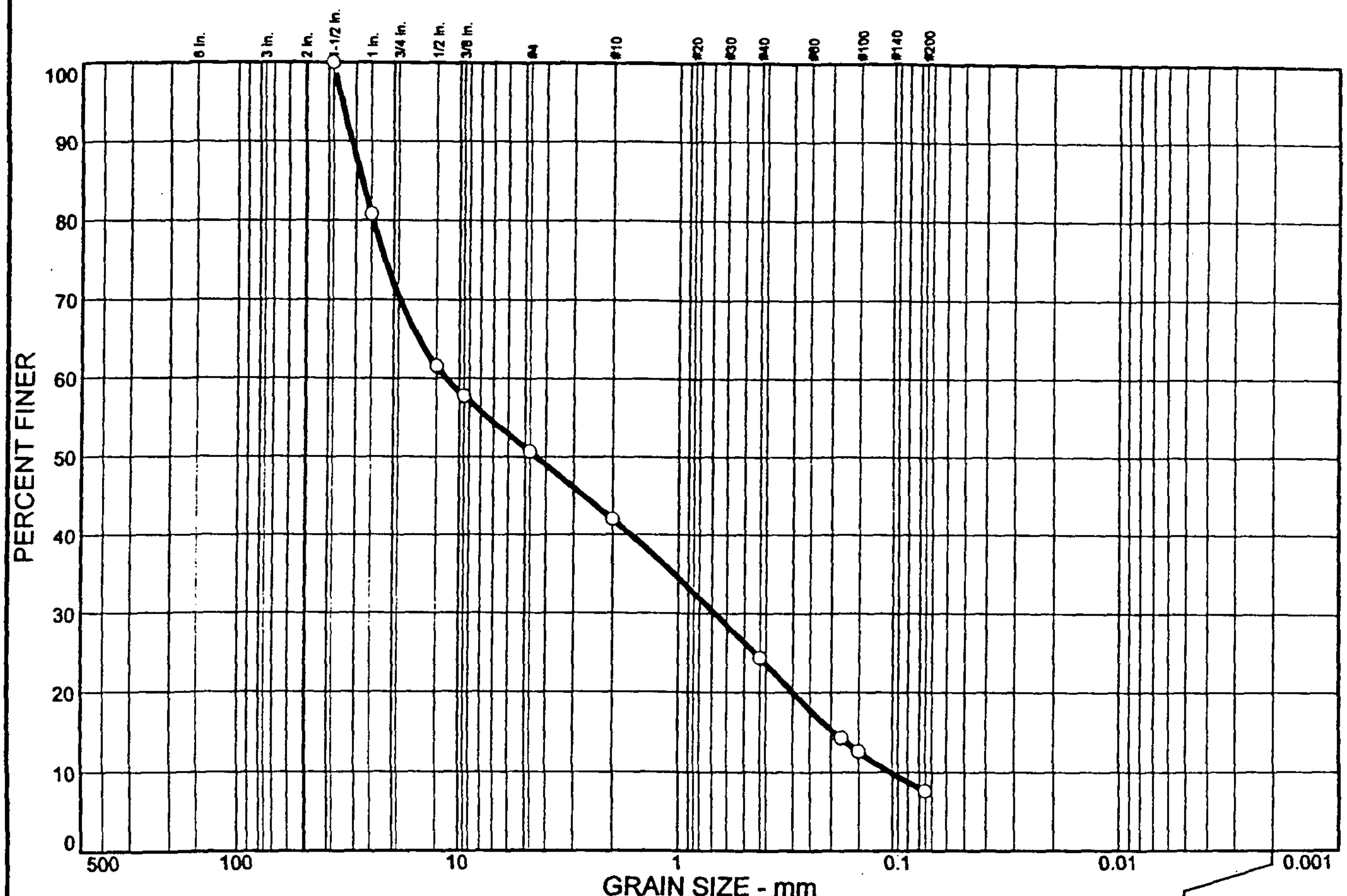
Remarks

Sample No.: SB-1 **Source of Sample:** Former Plant Site **Date:** 11/3/00
Location: **Elev./Depth:** 5-7'

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	29.3	20.0	8.7	17.6	16.8	7.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
1 in.	80.8		
.5 in.	61.6		
.375 in.	57.8		
#4	50.7		
#10	42.0		
#40	24.4		
#80	14.3		
#100	12.6		
#200	7.6		

* (no specification provided)

Soil Description

ID#00-196

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 28.0 D_{60}= 11.4 D_{50}= 4.42
D_{30}= 0.677 D_{15}= 0.193 D_{10}= 0.108
C_u= 106.00 C_c= 0.37

Classification

USCS= AASHTO=

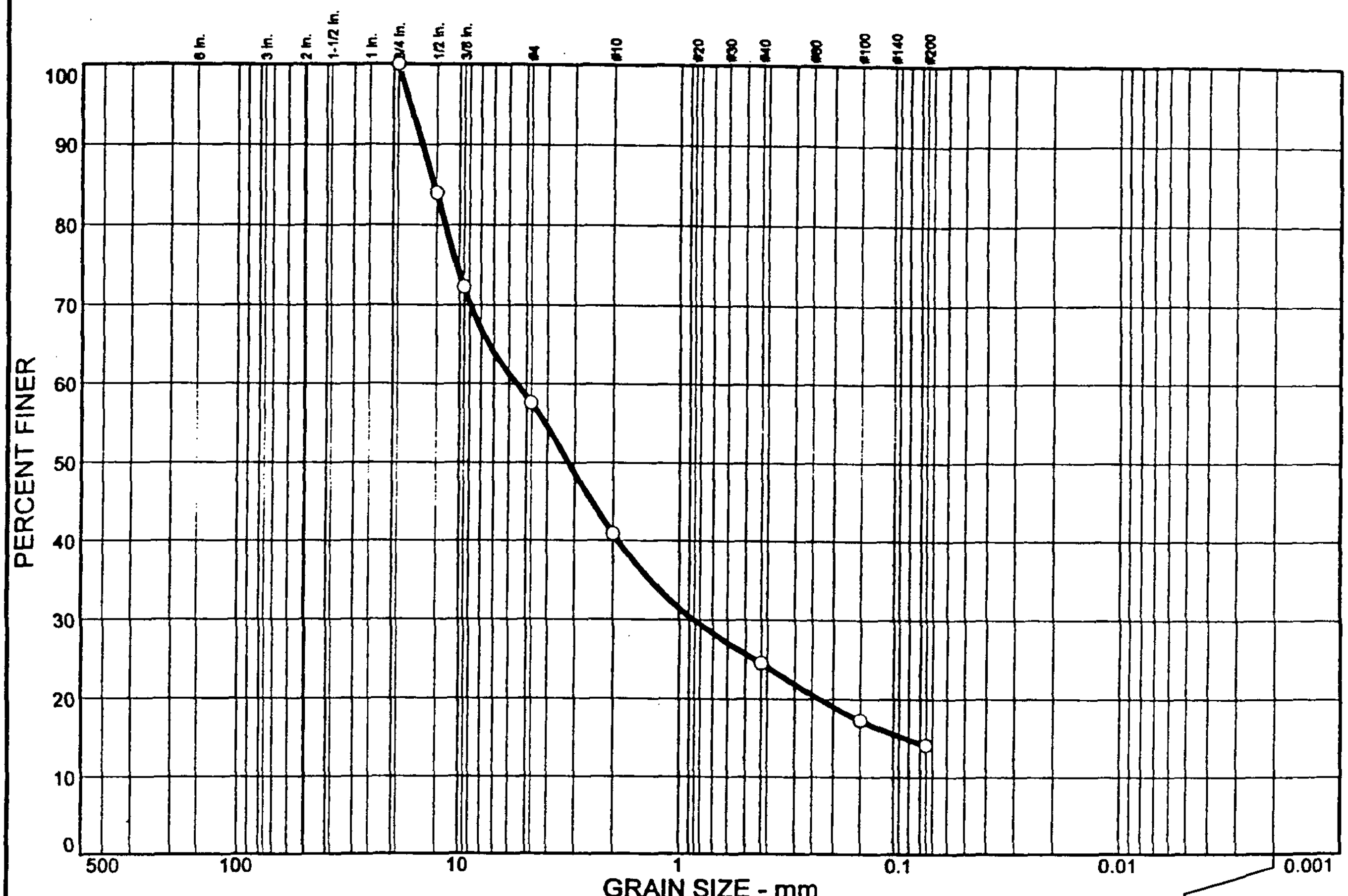
Remarks

Sample No.: SB-2 Surf. **Source of Sample:** Former Plant Site **Date:** 10/30/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	42.4	16.7	16.4	10.4	14.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	84.0		
.375 in.	72.3		
#4	57.6		
#10	40.9		
#40	24.5		
#100	17.3		
#200	14.1		

* (no specification provided)

Soil Description

ID#00-197

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 13.0 D_{60}= 5.51 D_{50}= 3.19
D_{30}= 0.853 D_{15}= 0.0930 D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

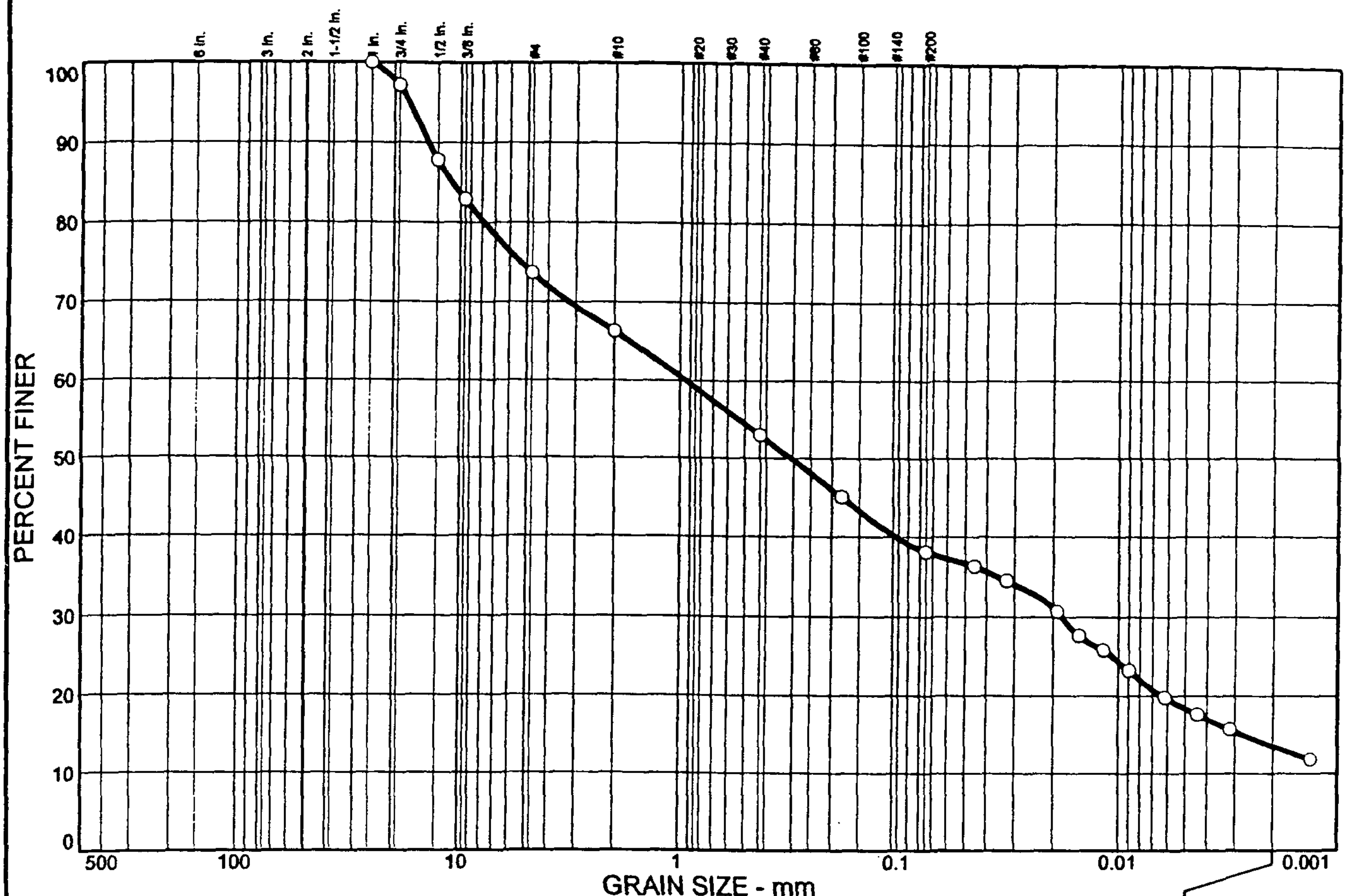
Remarks

Sample No.: SB-2 **Source of Sample:** Former Plant Site **Date:** 10/18/00
Location: **Elev./Depth:** 6-8'

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	2.9	23.4	7.4	13.3	14.9	24.6	13.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	97.1		
.5 in.	87.8		
.375 in.	82.9		
#4	73.7		
#10	66.3		
#40	53.0		
#80	45.1		
#200	38.1		

* (no specification provided)

Soil Description

ID#00-198

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 10.9 D_{60}= 0.932 D_{50}= 0.305
D_{30}= 0.0182 D_{15}= 0.0027 D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

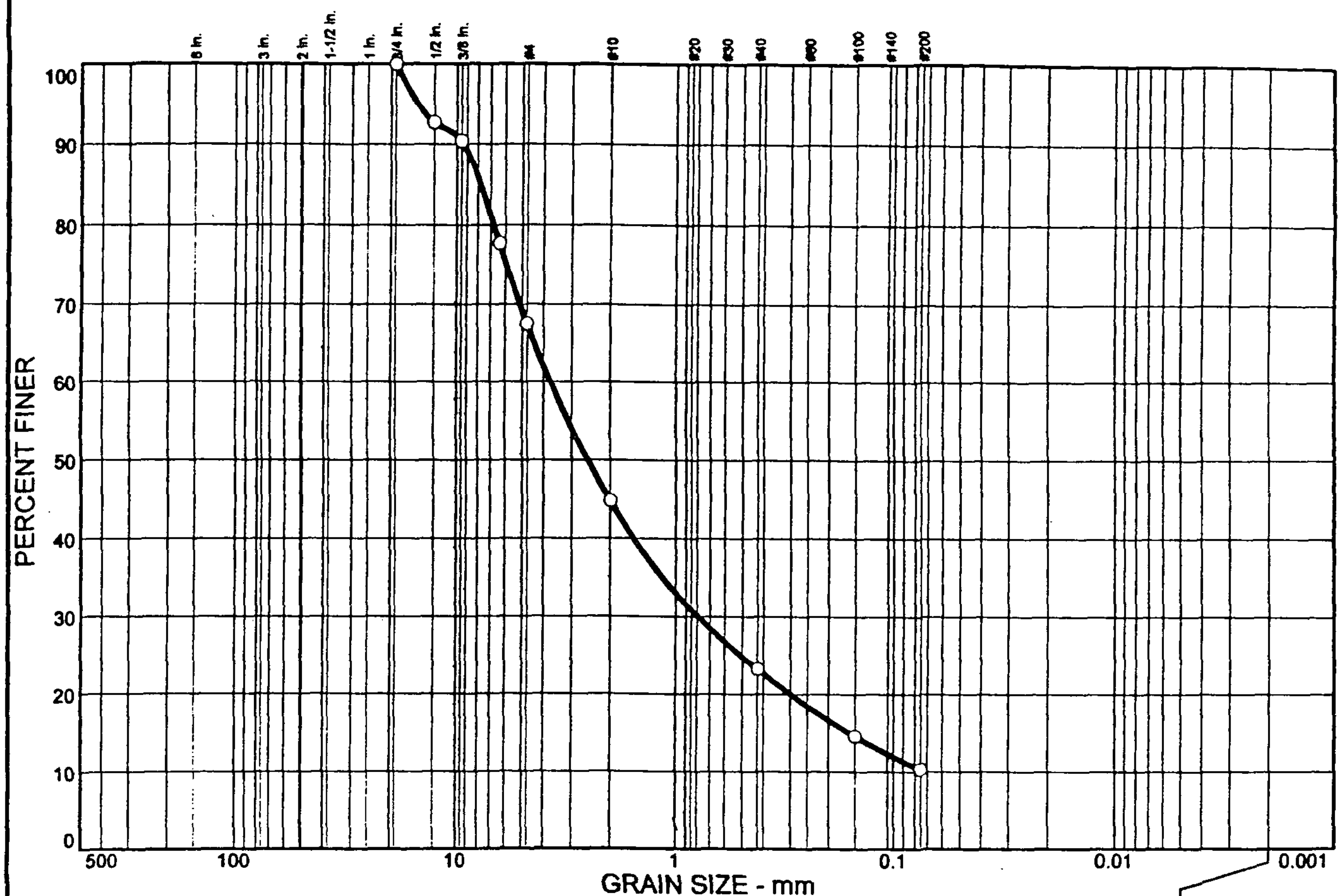
Remarks

Sample No.: SB-4 (Surf) **Source of Sample:** Former Plant Site **Date:** 11/3/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	32.5	22.7	21.5	13.0	10.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	92.7		
.375 in.	90.4		
.25 in.	77.7		
#4	67.5		
#10	44.8		
#40	23.3		
#100	14.6		
#200	10.3		

* (no specification provided)

Soil Description

ID#00-199

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 7.75 D_{60}= 3.72 D_{50}= 2.54
D_{30}= 0.791 D_{15}= 0.159 D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

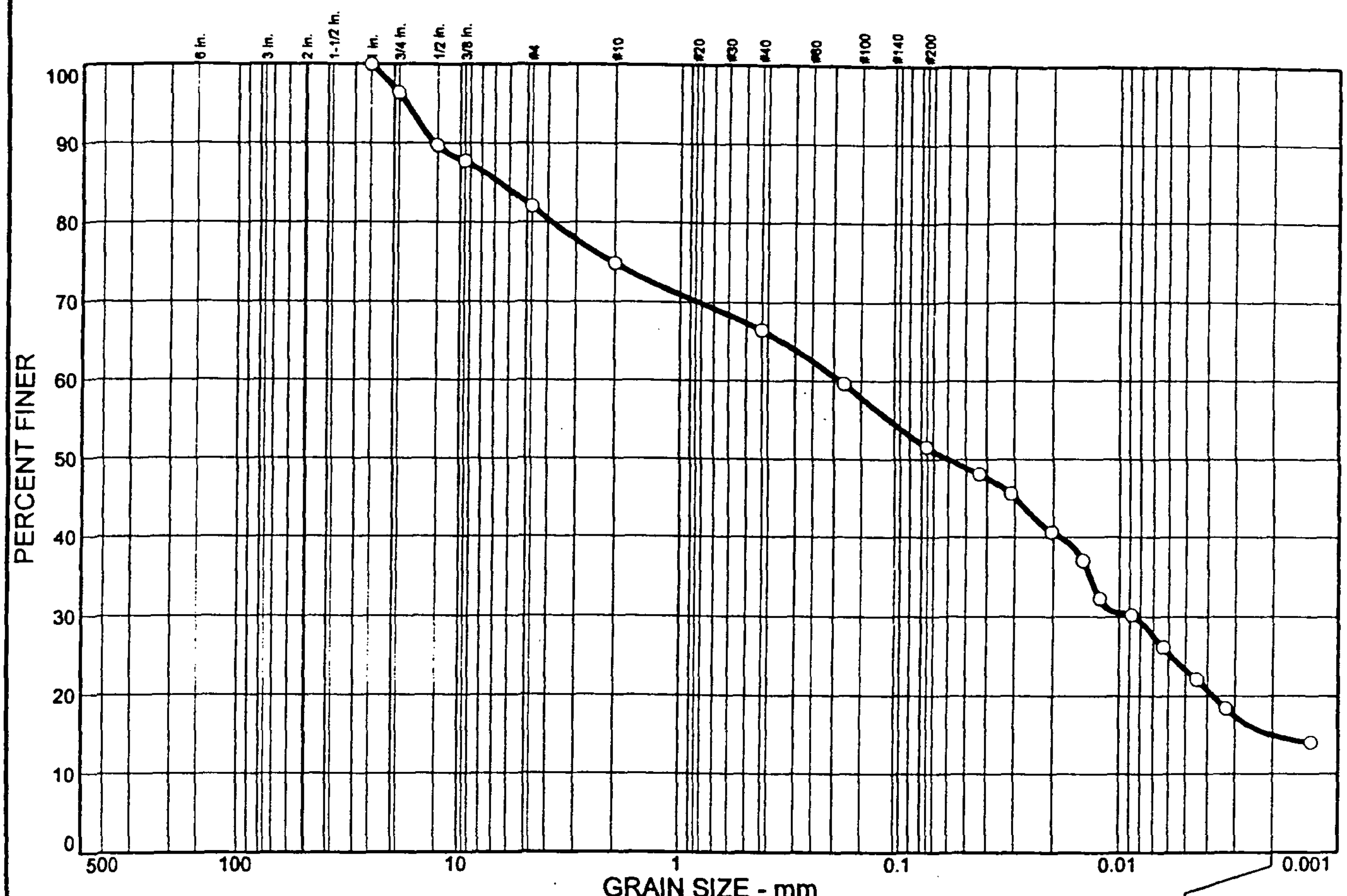
Remarks

Sample No.: SB-4 **Source of Sample:** Former Plant Site **Date:** 10/18/00
Location: **Elev./Depth:** 4-6'

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	3.6	14.4	7.2	8.3	14.9	36.6	15.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	96.4		
.5 in.	89.7		
.375 in.	87.7		
#4	82.0		
#10	74.8		
#40	66.5		
#80	59.7		
#200	51.6		

* (no specification provided)

Soil Description

ID#00-200

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 6.59 D_{60}= 0.186 D_{50}= 0.0595
D_{30}= 0.0085 D_{15}= 0.0020 D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

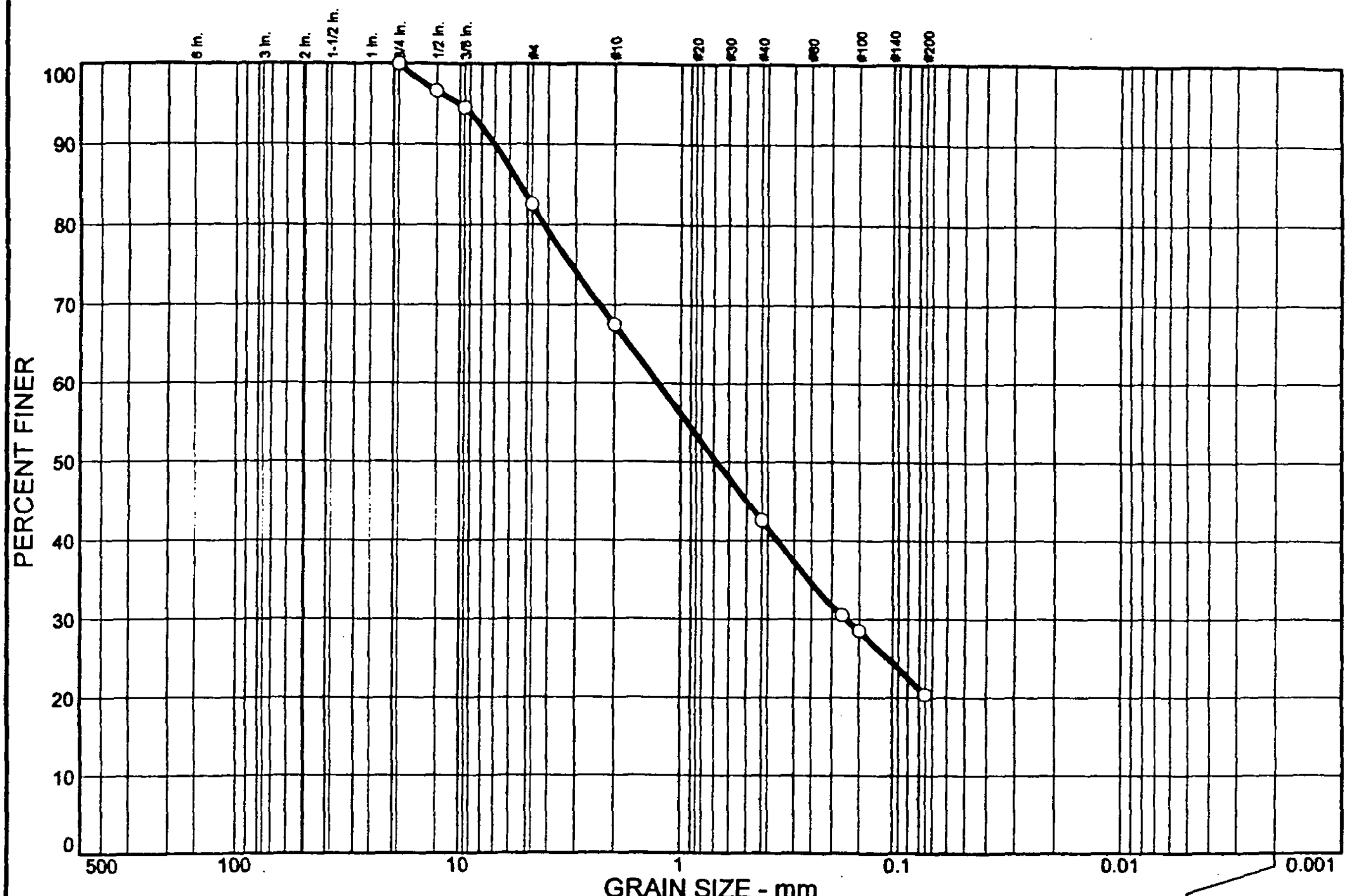
Remarks

Sample No.: SB-5 (Surf) **Source of Sample:** Former Plant Site **Date:** 11/17/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	17.5	15.0	24.9	22.2	20.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	96.6		
.375 in.	94.5		
#4	82.5		
#10	67.5		
#40	42.6		
#80	30.5		
#100	28.5		
#200	20.4		

* (no specification provided)

Soil Description

ID#00-201

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 5.39 D_{60}= 1.26 D_{50}= 0.679
D_{30}= 0.172 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

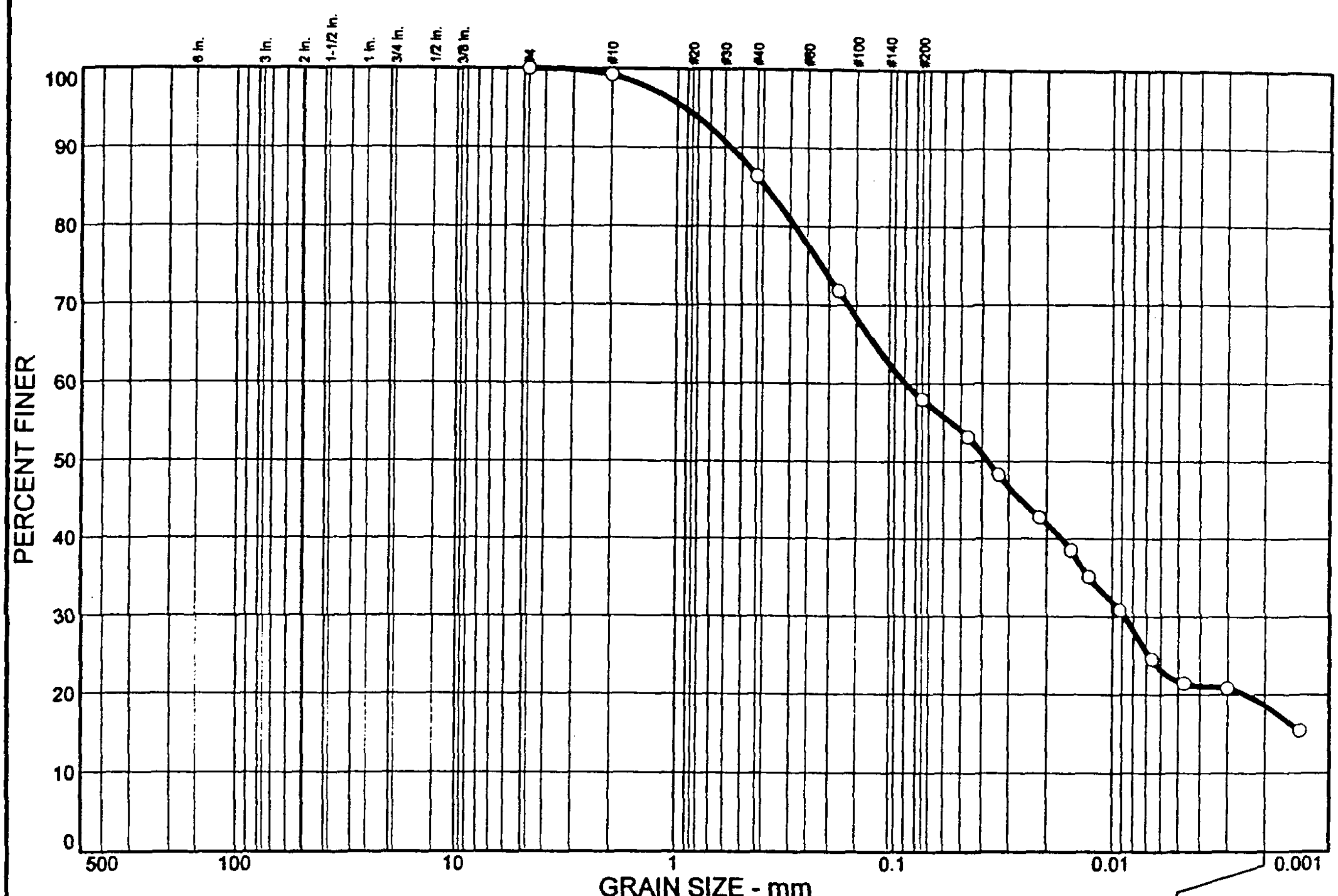
Remarks

Sample No.: SB-5 Source of Sample: Former Plant Site Date: 10/28/00
Location: Elev./Depth: 6-8'

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 Plate

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.8	12.8	28.4	39.3	18.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.2		
#40	86.4		
#80	71.8		
#200	58.0		

* (no specification provided)

Soil Description

ID#00-202

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.387 D_{60}= 0.0885 D_{50}= 0.0374
D_{30}= 0.0087 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

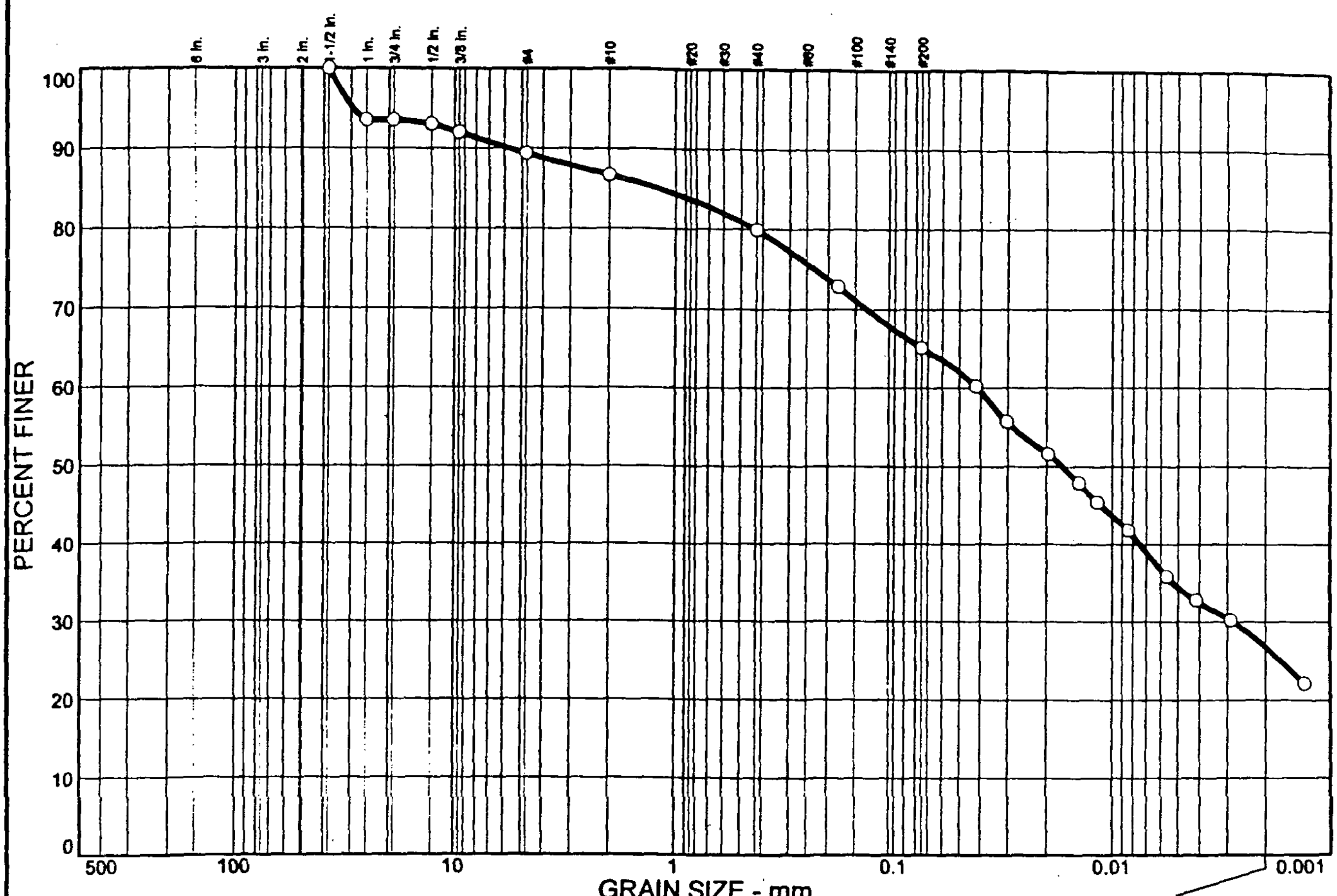
Remarks

Sample No.: SB-3 **Source of Sample:** Former Plant Site **Date:** 11/17/00
Location: **Elev./Depth:** 3-5'

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	6.5	4.1	2.7	6.8	14.7	38.4	26.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
1 in.	93.5		
.75 in.	93.5		
.5 in.	93.0		
.375 in.	92.0		
#4	89.4		
#10	86.7		
#40	79.9		
#80	72.8		
#200	65.2		

* (no specification provided)

Soil Description

ID#00-203

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 1.19 D_{60}= 0.0412 D_{50}= 0.0168
D_{30}= 0.0028 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

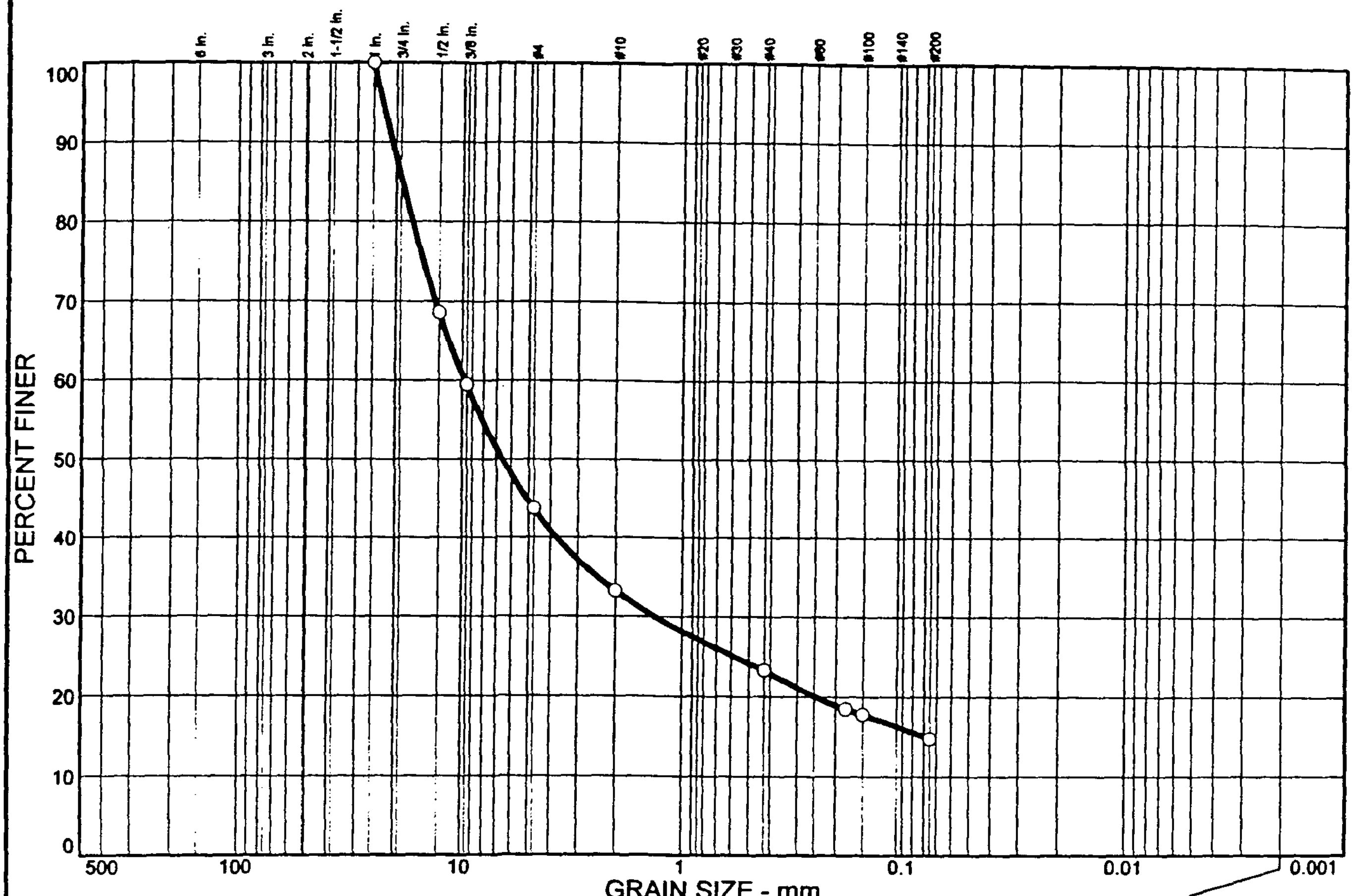
Remarks

Sample No.: SB-6 (Surf) **Source of Sample:** Former Plant Site **Date:** 11/17/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	14.1	42.2	10.5	10.0	8.4	14.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.5 in.	68.6		
.375 in.	59.5		
#4	43.7		
#10	33.2		
#40	23.2		
#80	18.5		
#100	17.8		
#200	14.8		

* (no specification provided)

Soil Description

ID#00-204

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 18.7 D_{60}= 9.69 D_{50}= 6.53
D_{30}= 1.32 D_{15}= 0.0783 D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

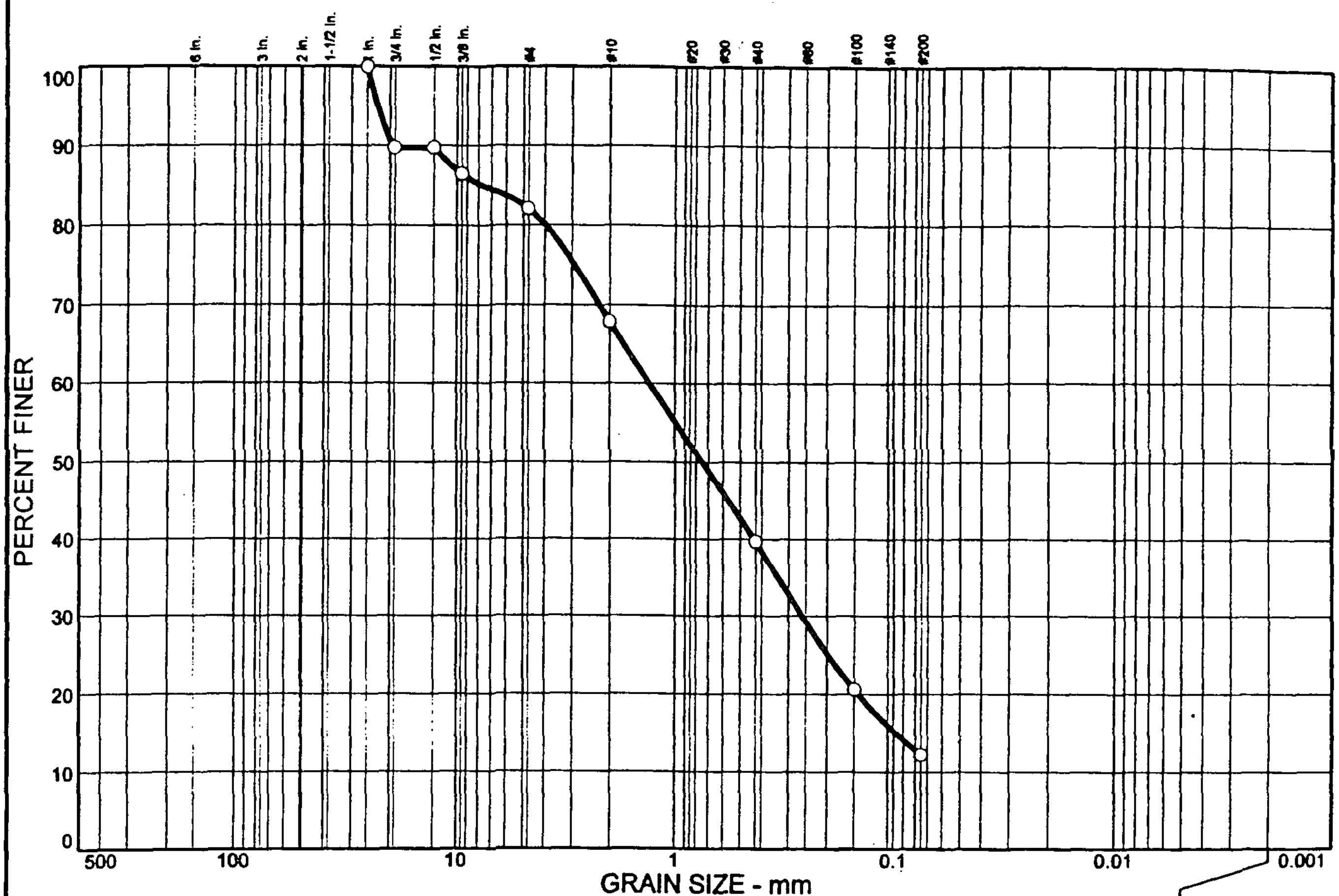
Sample No.: MW-FP-2 **Source of Sample:** Former Plant Site **Date:** 10/30/00
Location: **Elev./Depth:** 0.5-2.5'

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

301711

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	10.3	7.6	14.2	28.2	27.5	12.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	89.7		
.5 in.	89.7		
.375 in.	86.5		
#4	82.1		
#10	67.9		
#40	39.7		
#100	20.6		
#200	12.2		

* (no specification provided)

Soil Description

ID#00-205

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 7.64 D_{60}= 1.30 D_{50}= 0.744
D_{30}= 0.258 D_{15}= 0.0969 D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

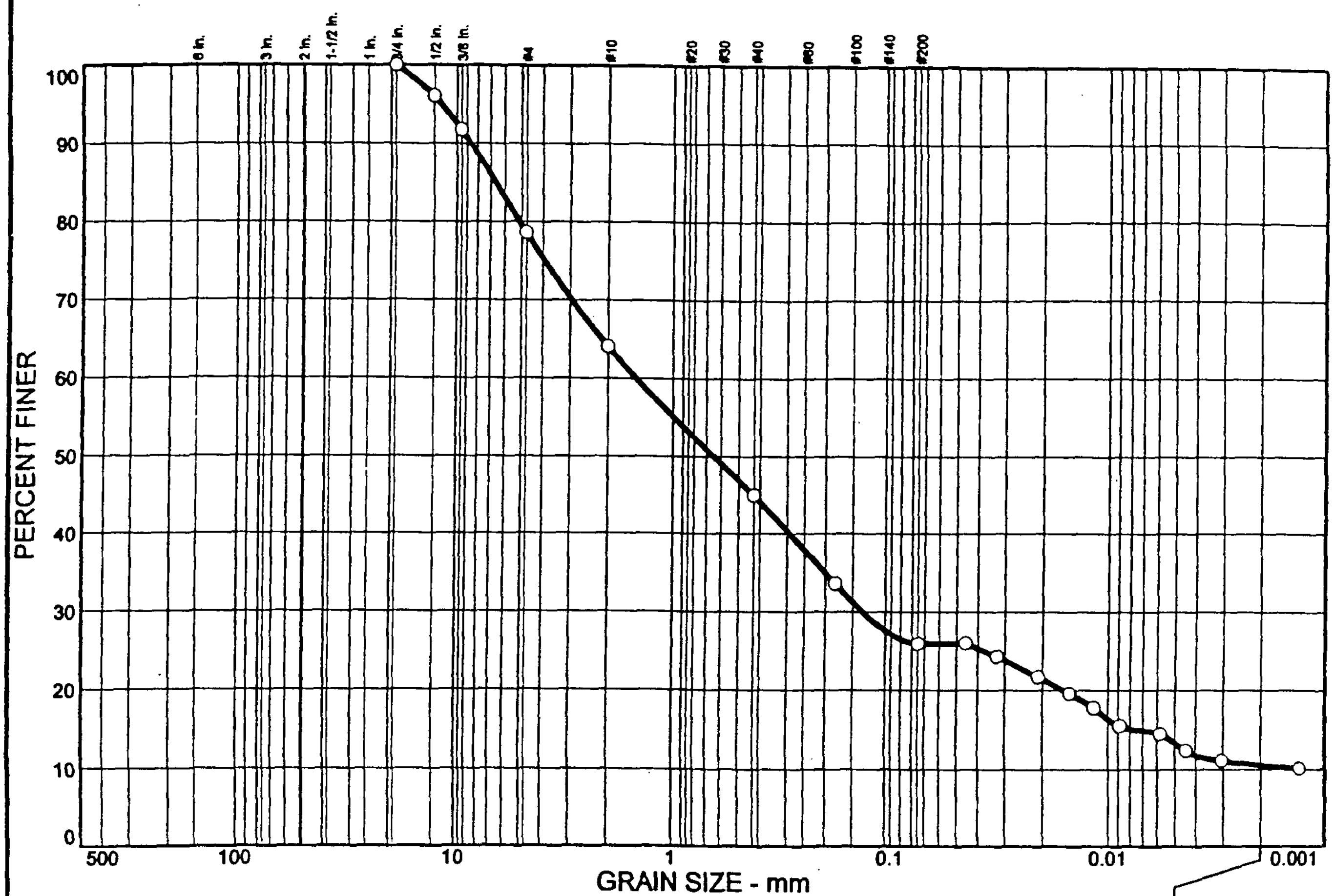
Remarks

Sample No.: MW-FP2 **Source of Sample:** Former Plant Site **Date:** 11/17/00
Location: **Elev./Depth:** (5-7')

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	21.4	14.5	19.1	19.1	15.4	10.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	96.1		
.375 in.	91.8		
#4	78.6		
#10	64.1		
#40	45.0		
#80	33.6		
#200	25.9		

* (no specification provided)

Soil Description

ID#00-206

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 6.60 D_{60}= 1.48 D_{50}= 0.642
D_{30}= 0.134 D_{15}= 0.0073 D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

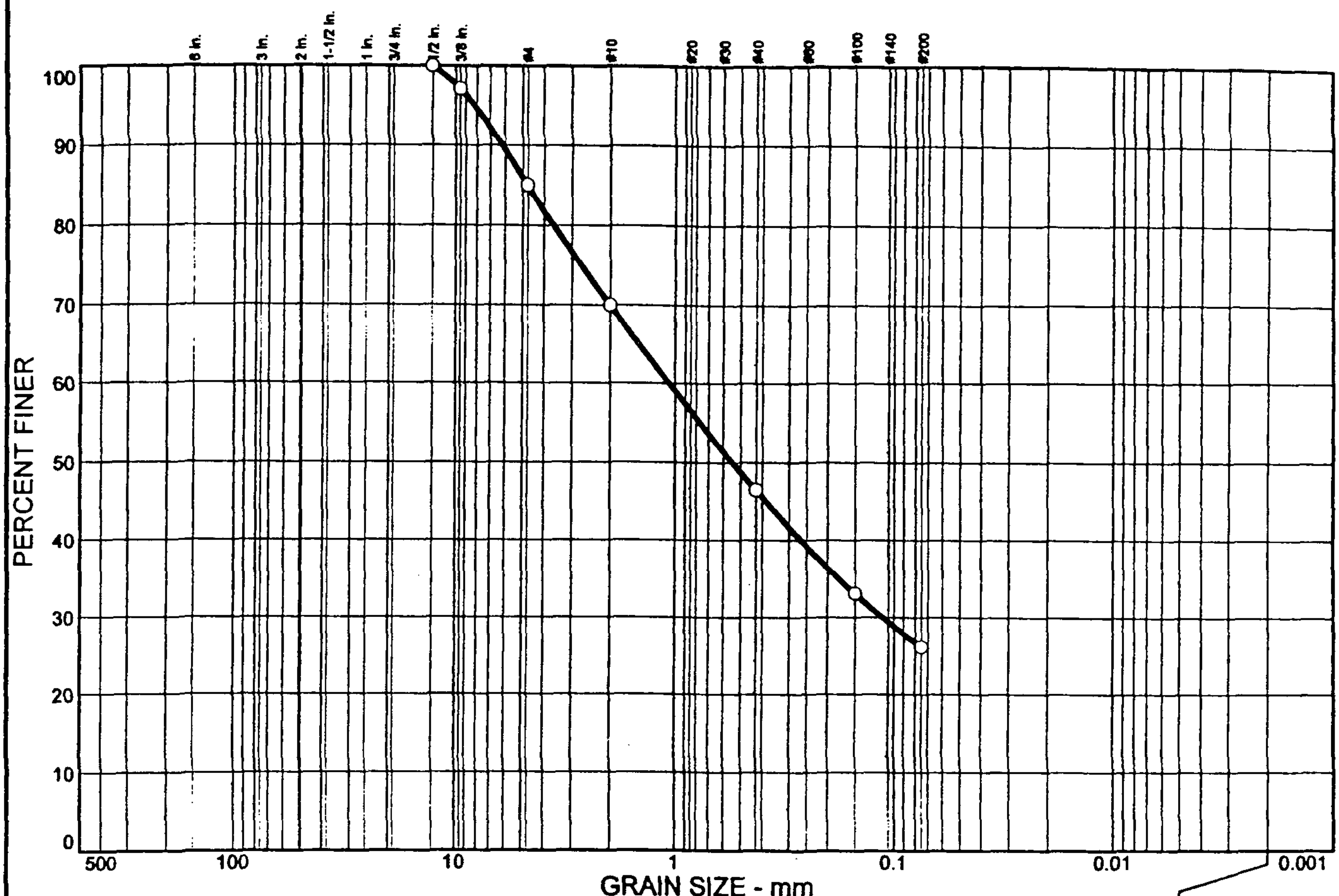
Remarks

Sample No.: SB-7 (Surf) **Source of Sample:** Former Plant Site **Date:** 11/17/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	15.0	15.0	23.5	20.3	26.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5 in.	100.0		
.375 in.	97.1		
#4	85.0		
#10	70.0		
#40	46.5		
#100	33.1		
#200	26.2		

* (no specification provided)

Soil Description

ID#00-207

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 4.75 D_{60}= 1.06 D_{50}= 0.543
D_{30}= 0.111 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

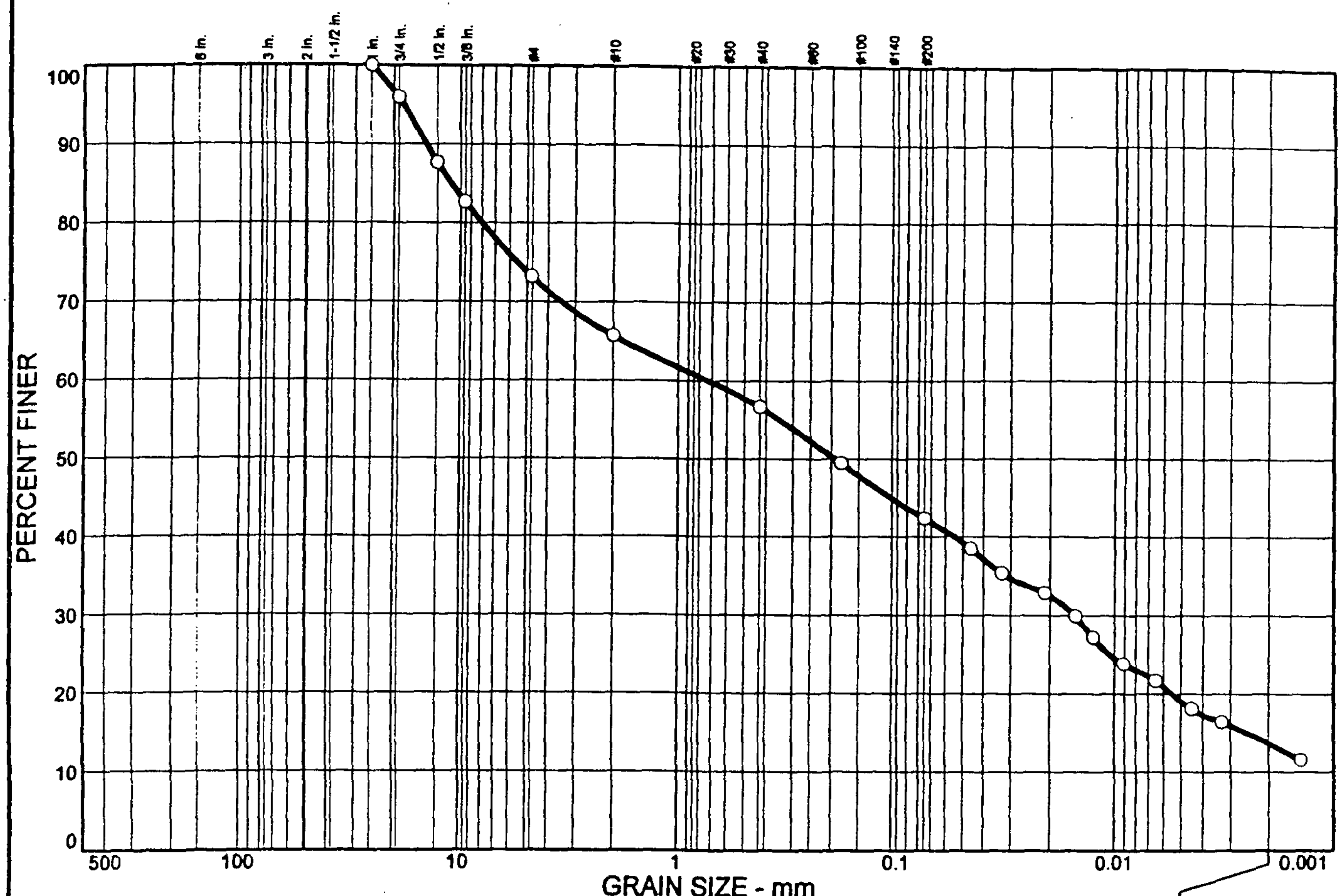
Remarks

Sample No.: SB-7 **Source of Sample:** Former Plant Site **Date:** 11/17/00
Location: **Elev./Depth:** 7-9'

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	4.0	22.8	7.5	9.0	14.3	28.7	13.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	96.0		
.5 in.	87.7		
.375 in.	82.7		
#4	73.2		
#10	65.7		
#40	56.7		
#80	49.5		
#200	42.4		

* (no specification provided)

Soil Description

ID#00-208

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 11.0 D_{60}= 0.720 D_{50}= 0.191
D_{30}= 0.0154 D_{15}= 0.0025 D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

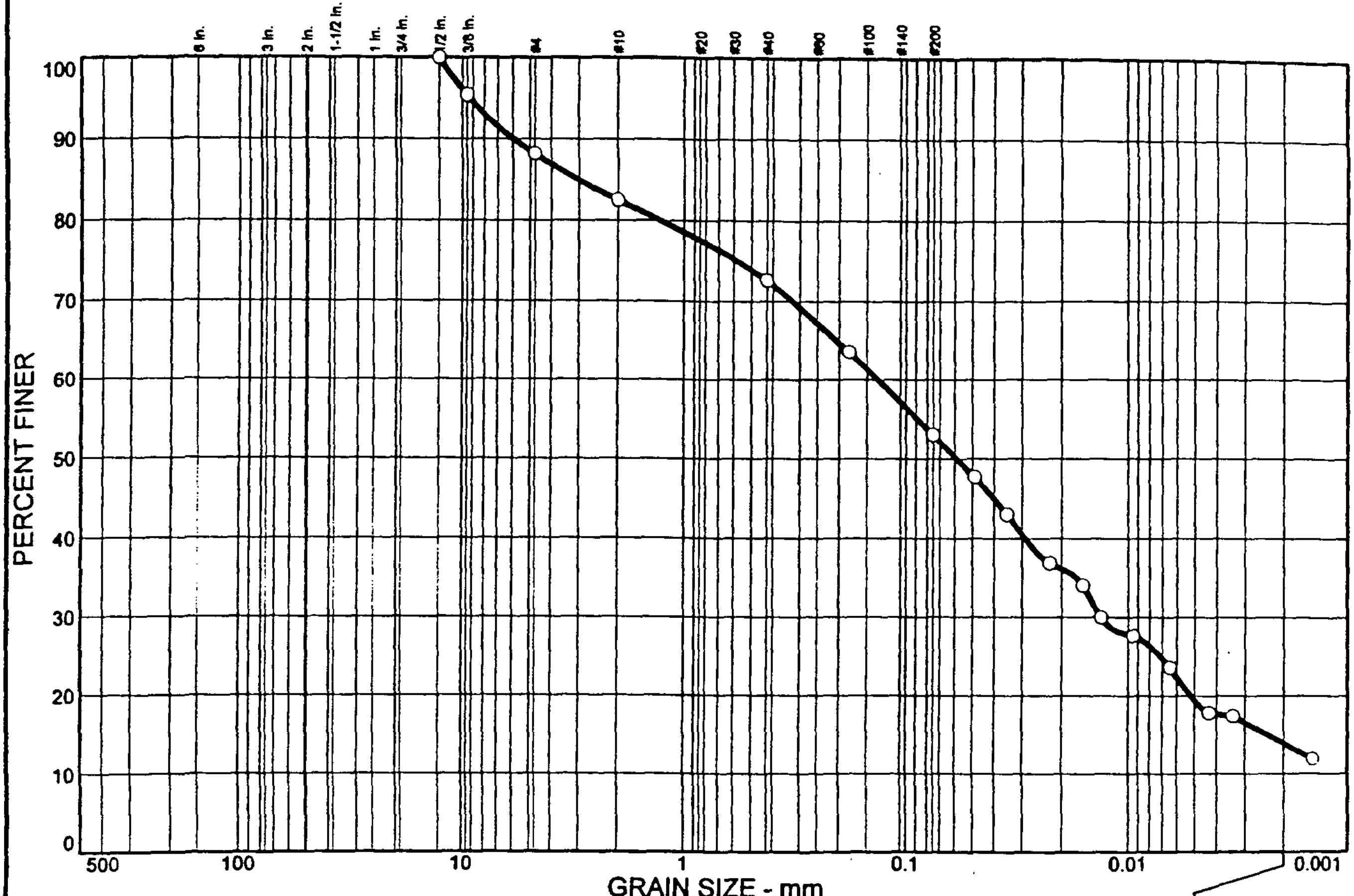
Remarks

Sample No.: SB-8 Surf. **Source of Sample:** Former Plant Site **Date:** 12/20/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	11.8	5.7	9.9	19.6	39.0	14.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5 in.	100.0		
.375 in.	95.4		
#4	88.2		
#10	82.5		
#40	72.6		
#80	63.6		
#200	53.0		

* (no specification provided)

Soil Description

ID#00-209

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 3.02 D_{60}= 0.133 D_{50}= 0.0585
D_{30}= 0.0133 D_{15}= 0.0023 D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

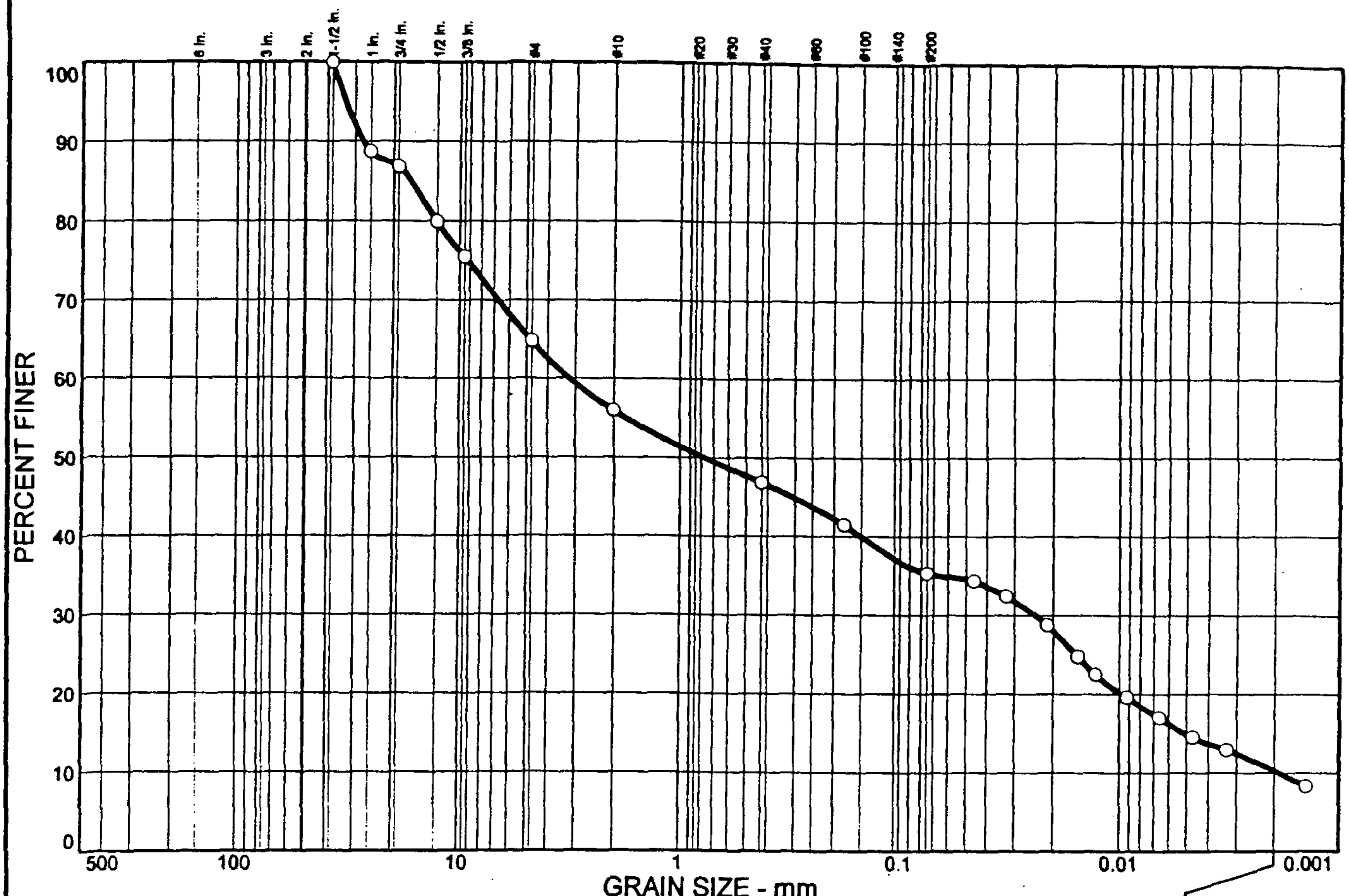
Remarks

Sample No.: SB-8 Source of Sample: Former Plant Site Date: 11/17/00
Location: Elev./Depth: 10-12'

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 Plate

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	13.2	22.0	8.8	9.1	11.6	25.0	10.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
1 in.	88.7		
.75 in.	86.8		
.5 in.	79.9		
.375 in.	75.5		
#4	64.8		
#10	56.0		
#40	46.9		
#80	41.5		
#200	35.3		

* (no specification provided)

Soil Description

ID#00-210

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 16.6 D_{60}= 3.17 D_{50}= 0.765
D_{30}= 0.0240 D_{15}= 0.0051 D_{10}= 0.0019
C_u= 1675.59 C_c= 0.10

Classification

USCS= AASHTO=

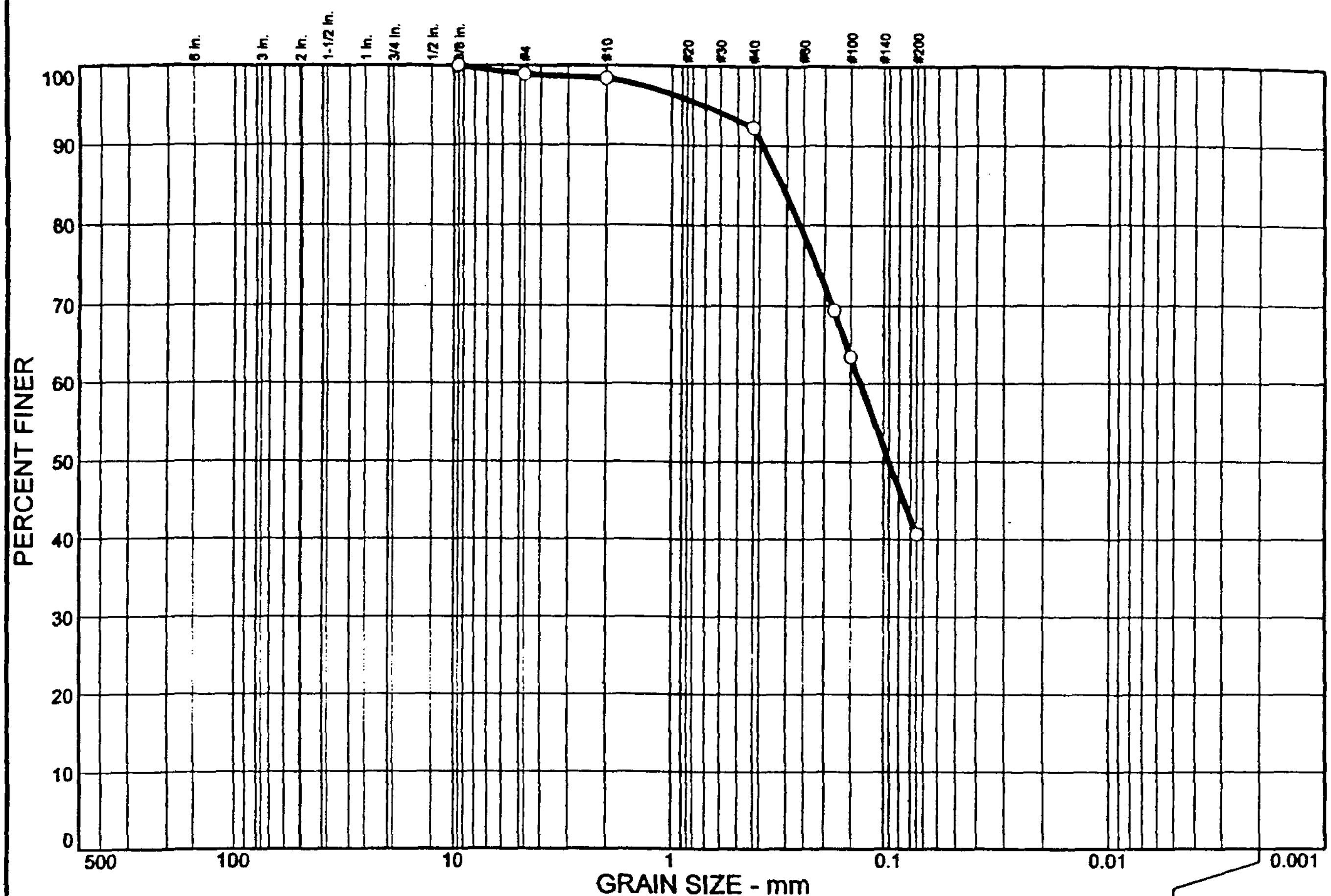
Remarks

Sample No.: SB-9 Source of Sample: Former Plant Site Date: 12/17/00
Location: Elev./Depth: 0.5-2.5'

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 Plate

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	1.1	0.5	6.1	51.6	40.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	98.9		
#10	98.4		
#40	92.3		
#80	69.4		
#100	63.5		
#200	40.7		

* (no specification provided)

Soil Description

ID#00-211

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.315 D_{60}= 0.135 D_{50}= 0.0995
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

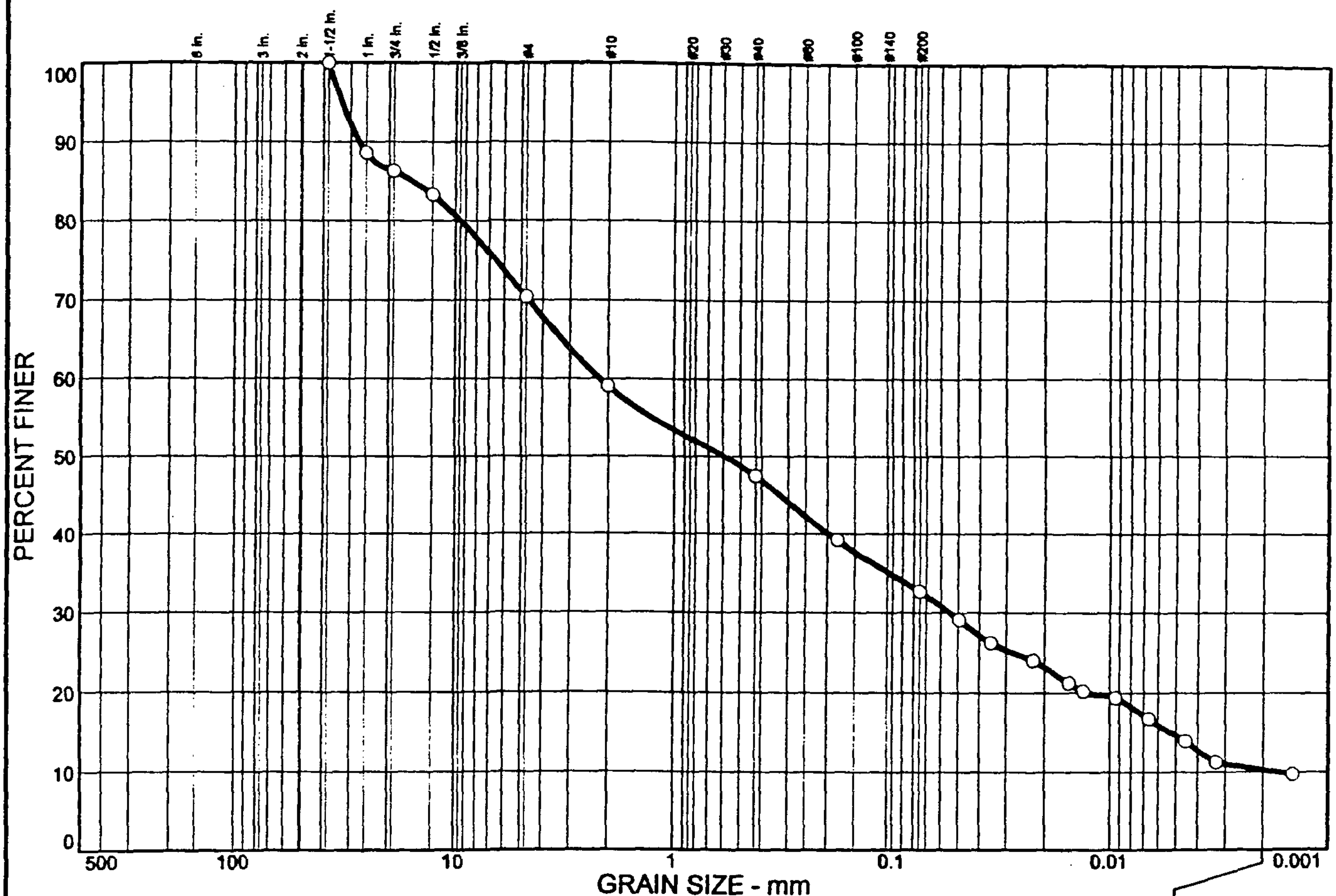
Remarks

Sample No.: SB-9, **Source of Sample:** Former Plant Site **Date:** 12/4/00
Location: **Elev./Depth:** 7-9'

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	13.7	15.9	11.3	11.6	14.8	22.4	10.3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
1 in.	88.6		
.75 in.	86.3		
.5 in.	83.3		
#4	70.4		
#10	59.1		
#40	47.5		
#80	39.2		
#200	32.7		

* (no specification provided)

Soil Description

ID#00-212

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 15.5 D_{60}= 2.18 D_{50}= 0.587
D_{30}= 0.0543 D_{15}= 0.0052 D_{10}= 0.0017
C_u= 1269.39 C_c= 0.79

Classification

USCS= AASHTO=

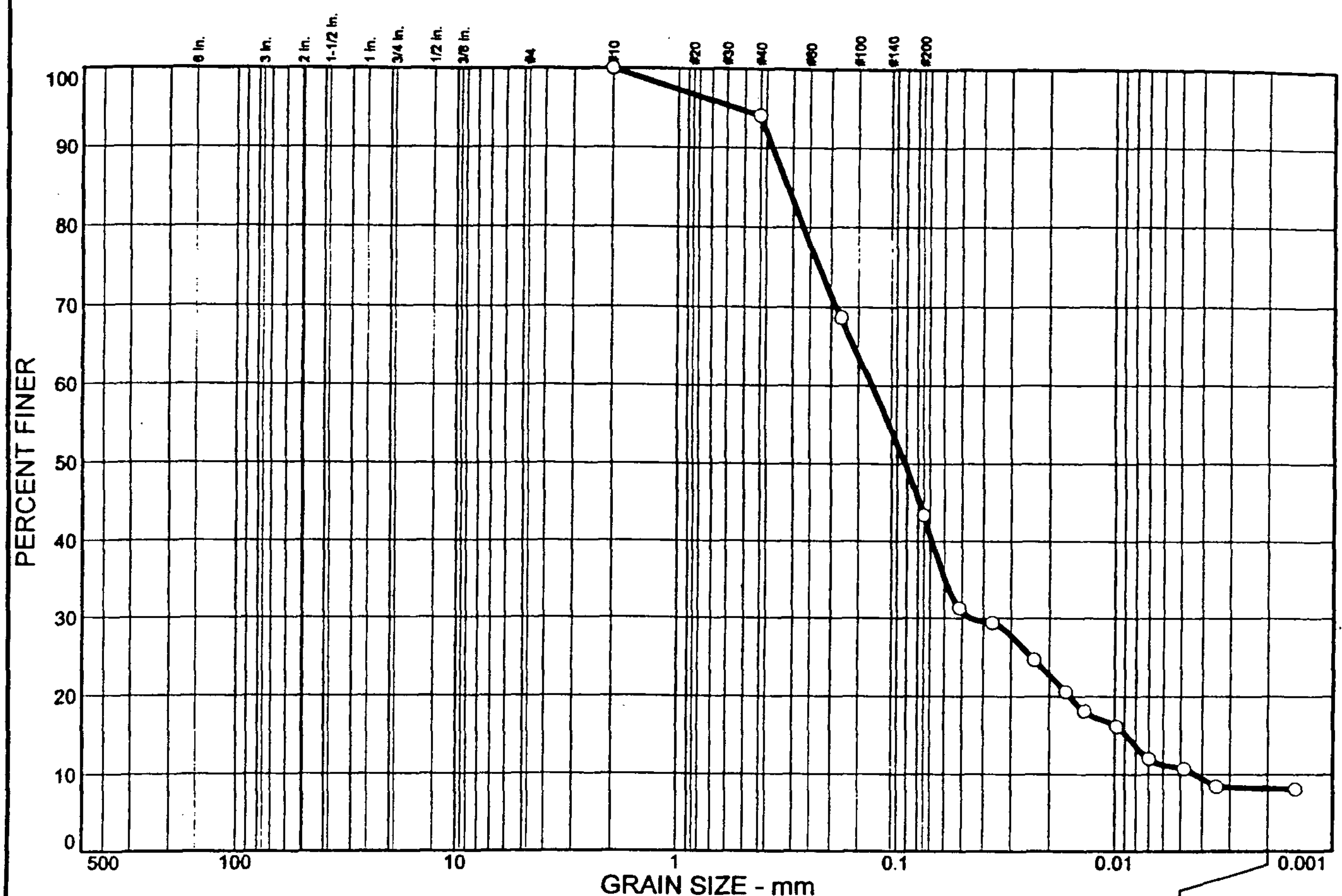
Remarks

Sample No.: SB-10, (Surf.) **Source of Sample:** Former Plant Site **Date:** 12/16/00
Location: **Elev./Depth:**

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	5.9	50.7	35.2	8.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	94.1		
#80	68.7		
#200	43.4		

* (no specification provided)

Soil Description

#00-213

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.316 D_{60}= 0.130 D_{50}= 0.0912
D_{30}= 0.0456 D_{15}= 0.0088 D_{10}= 0.0043
C_u= 30.36 C_c= 3.76

Classification

USCS= AASHTO=

Remarks

Sample No.: SB-10,
Location:

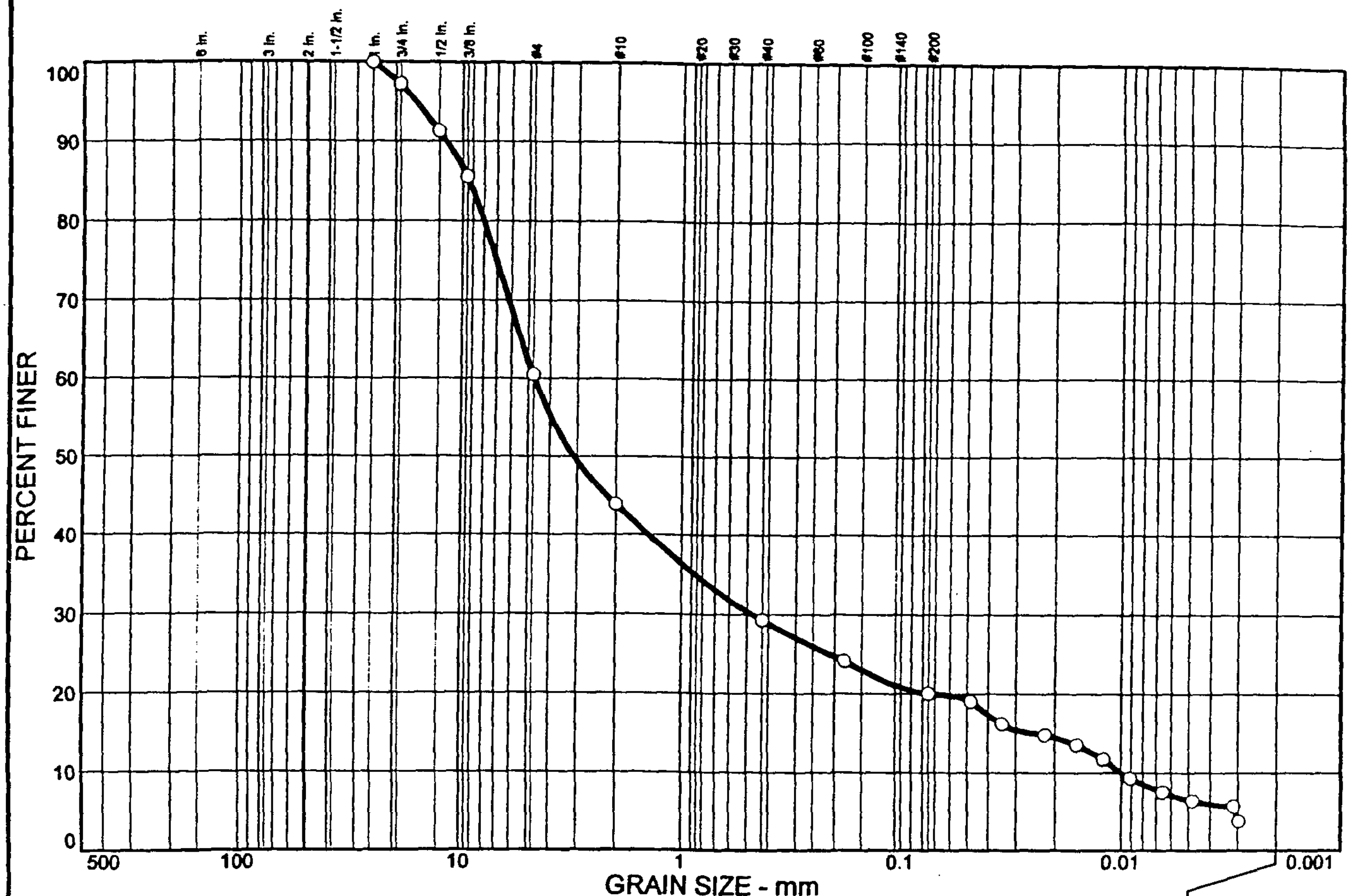
Source of Sample: Former Plant Site

Date: 12/5/00
Elev./Depth: 7-9'

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005
Plate

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	2.8	36.7	16.6	14.6	9.3	20.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	97.2		
.5 in.	91.3		
.375 in.	85.5		
#4	60.5		
#10	43.9		
#40	29.3		
#80	24.1		
#200	20.0		

* (no specification provided)

Soil Description

ID#00-214

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 9.35 D_{60}= 4.68 D_{50}= 3.09
D_{30}= 0.469 D_{15}= 0.0246 D_{10}= 0.0099
C_u= 470.51 C_c= 4.74

Classification

USCS= AASHTO=

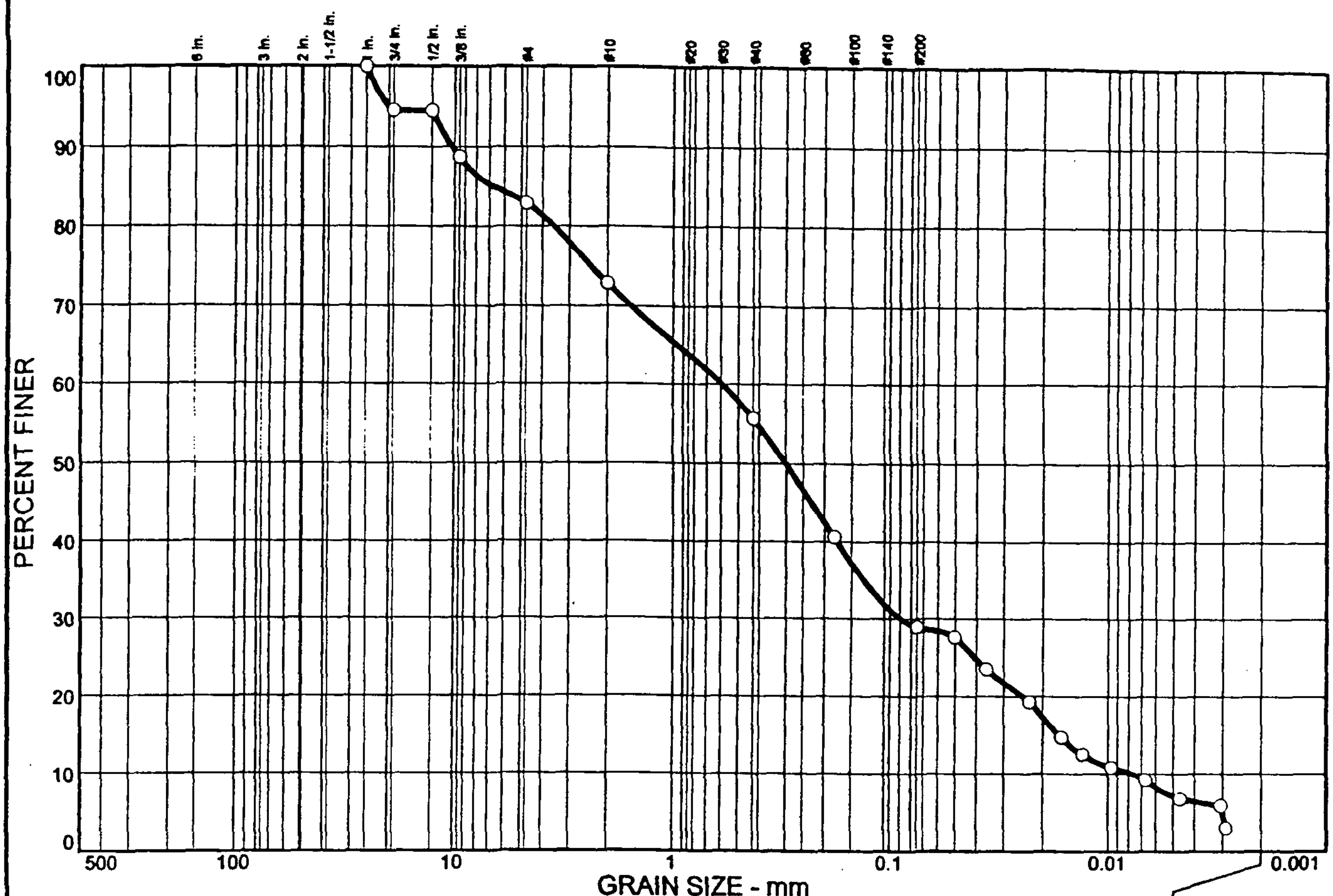
Remarks

Sample No.: MW-FP-3 Source of Sample: Former Plant Site Date: 12/20/00
Location: Elev./Depth: 0.5-2.5'

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 Plate

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	5.5	11.6	10.1	17.1	26.8	28.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	94.5		
.5 in.	94.5		
.375 in.	88.7		
#4	82.9		
#10	72.8		
#40	55.7		
#80	40.6		
#200	28.9		

* (no specification provided)

Soil Description

ID#00-215

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 6.67 D_{60}= 0.589 D_{50}= 0.300
D_{30}= 0.0890 D_{15}= 0.0169 D_{10}= 0.0076
C_u= 77.97 C_c= 1.78

Classification

USCS= AASHTO=

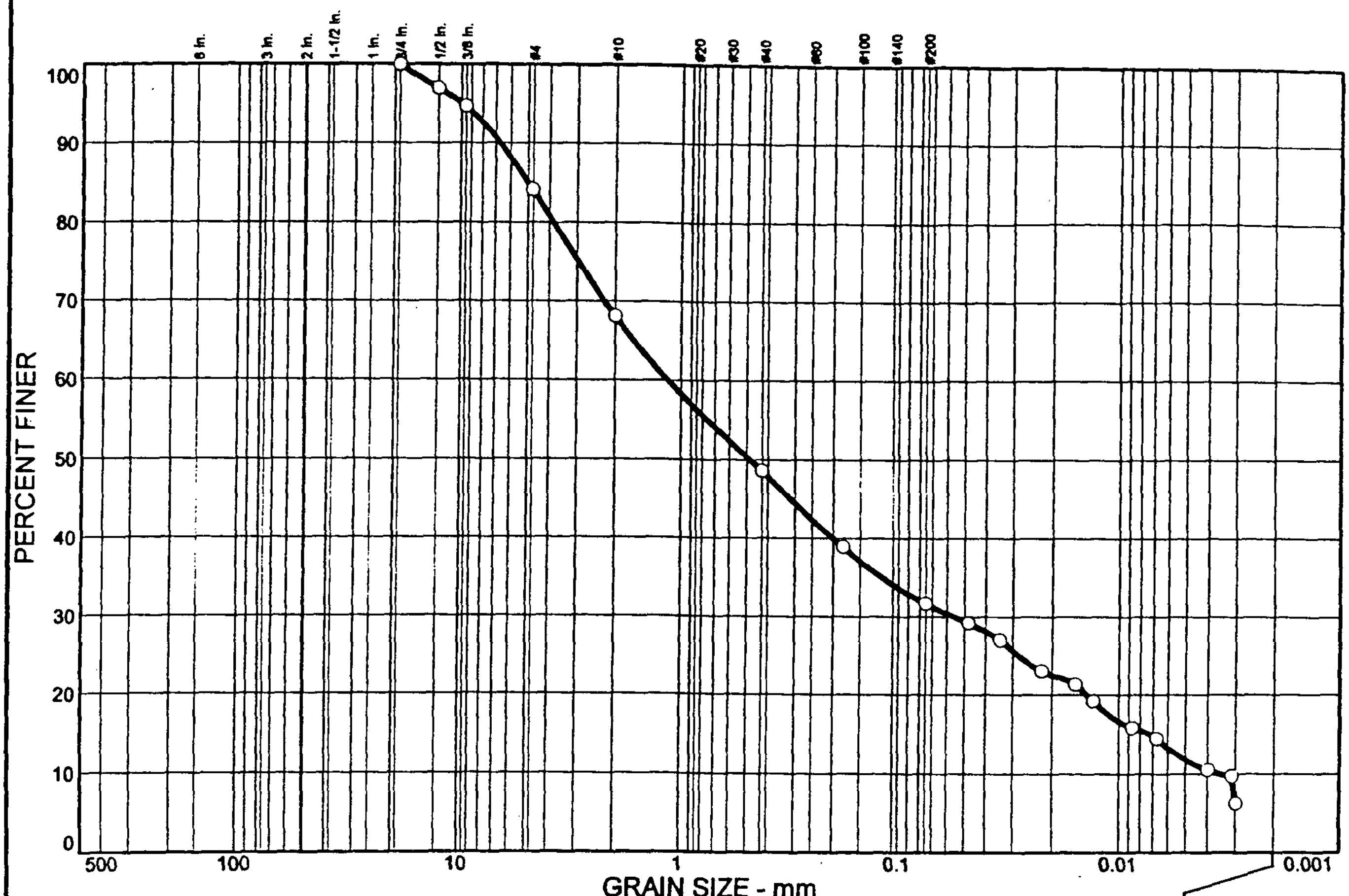
Remarks

Sample No.: MW-FP-3, **Source of Sample:** Former Plant Site **Date:** 12/19/00
Location: **Elev./Depth:** 5-7'

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	15.9	16.0	19.5	16.9	31.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	97.0		
.375 in.	94.7		
#4	84.1		
#10	68.1		
#40	48.6		
#80	38.9		
#200	31.7		

* (no specification provided)

Soil Description

ID#00-216

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 4.99 D_{60}= 1.14 D_{50}= 0.481
D_{30}= 0.0557 D_{15}= 0.0072 D_{10}= 0.0035
C_u= 326.30 C_c= 0.77

Classification

USCS= AASHTO=

Remarks

Sample No.: SB-6, **Source of Sample:** Former Plant Site **Date:** 12/19/00
Location: **Elev./Depth:** 4-6'

3rd Rock, LLC

Client: Benchmark Environmental
Project: Peter Cooper RI/FS
Project No: 00-005 **Plate**

APPENDIX P

APPENDIX P

Assessment of VOCs in Soil at MWFP-3 – Methodology and Results

GEOMATRIX

APPENDIX P

SUPPLEMENTAL SOIL SAMPLING AT THE FORMER MANUFACTURING PLANT AREA

1.0 Background

RI data collected in October 2000 indicated the presence of a limited number of chlorinated volatile organic constituents in shallow soils collected at the MWFP-3 well cluster. As this finding was unique to the Site, additional sampling of soils in the vicinity of MWFP-3 was proposed to better delineate the extent of the VOC impacts. Details of the proposed investigation were described in correspondence to USEPA dated December 17, 2001 (Attachment 1). In general, the supplemental investigation involved advancement of a series of direct-push (Geoprobe®) borings in and around the MWFP-3 cluster with corresponding field screening of retrieved soils using a Photoionization Detector (PID) to provide an indication of the extent of VOC impacts. Once approximate the limits of the impacts were established based on the field screening results, confirmatory soil samples were strategically collected for laboratory analysis to verify the limits of VOC impacts in shallow soil. A detailed description of the supplemental investigation work and findings are presented below.

2.0 Methodology

2.1 Soil Borings

A total of sixteen (16) direct-push borings designated B-1 through B-16 were advanced within the Former Manufacturing Area of the Site in the vicinity of well cluster MWFP-3 (see Figure 1). All direct-push boreholes were advanced using 1.5-inch diameter samplers 4-feet in length. Geoprobe® services were provided by Benchmark's designated subcontractor, Zebra Environmental of Niagara Falls, New York. Continuous 4-foot sample cores were retrieved from the boring locations in clear polyethylene sleeves to allow for field characterization (i.e., visual, olfactory, PID scan and headspace) of the subsurface lithology and collection of unsaturated soil samples representative of overburden soil by an experienced project hydrogeologist. All field observation and soil descriptions were recorded on Field Borehole Logs presented in Attachment 2. For each four-foot core of soil, a new, dedicated sleeve was used. All non-dedicated drilling tools were decontaminated between boring locations using potable tap water and a phosphate-free detergent (i.e., Alconox™).

Borings B-1 through B-4 were advanced radially from well MWFP-3s approximately 10-feet in all four compass directions. Boring B-5 was advanced immediately adjacent to monitoring well MWFP-3S. Borings were generally terminated at a depth of 8-feet below ground surface (bgs) due to the presence of groundwater at approximately 4 feet bgs (see Table 1). Benchmark personnel scanned each 4-foot core for total volatile organic vapors with a Photovac 2020 Photoionization Detector (PID) equipped with a 10.6 eV lamp, noted visual and/or olfactory observations and collected an unsaturated soil sample for headspace evaluation. Borings B-1 through B-5 yielded no detectable PID readings or measurable headspace VOC concentrations. Boring B-6 was completed approximately 40 feet from MWFP-3S to verify that no other VOC source was present further south of MWFP-3s. Field measurements yielded similar findings as Borings B-1 through B-5 (i.e., no detectable PID readings or measurable headspace VOC concentrations).

Based on these findings, ten (10) additional borings were located further northeast toward MW-FP3D in an attempt to locate the source of the VOC concentrations detected in the MWFP-3 soil sample data. As indicated on Figure 1, PID headspace evaluations of unsaturated soil samples for the remaining boring locations detected the presence of VOCs exceeding background concentrations (i.e., 0.0 ppm) at five of the remaining 10 boring locations: B-7 (3.7 ppm); B-8 (24.5 ppm); B-11 (31.7 ppm); B-12 (0.5 ppm) and; B-13 (223 ppm). Surrounding borings B-9, B-10, B-14, B-15 and B-16 indicated no measurable VOCs in the sample headspace.

Pertinent field observations (i.e., lithology, total depths, PID scan and headspace results etc.) are summarized and presented in Table 1 and on the Field Borehole Logs (included in Attachment 2).

2.2 Confirmatory Soil Sampling

Direct grab soil samples were collected from the unsaturated zone at several boring locations outside of the area where elevated headspace concentrations were measured. Samples were collected with an EnCore™ sampler and dedicated sleeves following the EnCore™ sample collection procedure identified in the RI/FS Work Plan. Sample locations were field-selected to surround the impacted area in all compass directions and as requested by the New York State Department of Environmental Conservation, which had a representative on-site at the time of sample collection. Table 2 identifies boring locations where conformatory samples were collected All samples were cooled to 4 °C in the field and transported under chain-of-custody command to Columbia Analytical Services, located in Rochester, New York, for analysis of Target Compound List (TCL) volatile organic compounds (VOCs) in accordance with USEPA Method 8260B.

Following lithology description and soil sample collection completion at each boring, the annulus was backfilled to existing grade with boring spoils.

3.0 Investigation Findings

Analytical results are summarized in Table 2. Each compound that was analyzed is listed on the table with its associated result to provide a complete data summary. All samples analyzed during the supplemental investigation underwent third party data validation by Ms. Judy Harry of Data Validation Services. The results of the validation generally indicate compliance to protocol requirements and adherence to quality criteria. Data qualifications, where necessary, are indicated on Table 2. The data validation report and validated data are presented in Appendix B

Volatile organic compounds reported below the respective detection limit are presented in Table 2 as blank entries. For comparison purposes, Table 2 also presents the United States Environmental Protection Agency (USEPA) Region 9 Preliminary Remediation Goals (PRGs) for residential and industrial soils for each of the detected parameters. As presented in Table 2, several volatile organic compounds were detected at trace levels for all ten unsaturated soil samples, however at concentrations significantly lower than the corresponding USEPA residential and industrial PRGs. One exception was recorded for soil sample B-9 (0.5 – 1.5 fbgs) which indicated an elevated concentration of tetrachloroethene (15 mg/kg) at a concentration exceeding the residential PRG. However, this concentration is below the corresponding industrial soil PRG.

4.0 Summary

Based upon the field screening and confirmatory sampling results described above, the approximate extent of the VOC-impacted area is presented on Figure 2. The estimated volume of soils within the impacted area are shown of Figure 2.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TURNKEY ENVIRONMENTAL RESTORATION, LLC

TABLE 1

SUMMARY OF GEOPROBE BORING LOCATIONS

PETER COOPER CORPORATION - GOWANDA SITE
COLLIER, SHANNON & SCOTT
GOWANDA, NEW YORK

Location	Date of Advancement	Distance From MWFP-3S	Distance From MWFP-3D	Total Borehole Depth (fbgs)	Fill Interval (fbgs)	Fill Thickness (feet)	PID Scan (ppm)	PID Head Space [1] (ppm)	Depth to Water [2] (fbgs)	Sample Interval (fbgs)
B-1	04/16/02	10.00	18.50	8.0	0.4 - 2.2	1.8	0.0	0.0	4.0	2.0 - 4.0
B-2	04/16/02	9.15	8.40	4.0 (refusal)	0.5 - 2.0	1.5	0.0	0.0	4.0	2.0 - 4.0
B-3	04/16/02	10.00	3.90	8.0	0.7 - 2.6	1.9	0.0	0.0	4.5	2.0 - 4.0 [3]
B-4	04/16/02	10.30	17.70	8.0	0.3 - 2.1	1.8	0.0	0.0	4.0	2.0 - 4.0 [4]
							0.0	0.0		0.5 - 1.5 [5]
B-5	04/16/02	2.30	9.00	8.0	0.3 - 2.1	1.8	0.0	0.0	4.0	NA
B-6	04/16/02	42.30	46.20	8.0	0.4 - 4.6	4.2	0.0	0.0	4.0	NA
B-7	04/16/02	10.60	2.25	8.0	0.4 - 2.4	2.0	0.0	3.7	4.0	0.5 - 1.5
B-8	04/16/02	21.20	12.50	8.0	0.3 - 4.5	4.2	0.0	24.5	4.0	NA
B-9	04/17/02	26.20	17.50	8.0	0.0 - 4.5	4.5	0.0	0.0	4.5	0.5 - 2.5
B-10	04/17/02	35.25	26.00	4.0	0.2 - 2.5	2.3	0.0	0.0	4.0	NA
B-11	04/17/02	33.85	25.20	4.0	0.0 - 3.4	3.4	0.0	31.7	3.5	NA
B-12	04/17/02	42.05	34.35	4.0	0.3 - 2.5	2.2	0.0	0.5	3.5	NA
B-13	04/17/02	21.95	14.90	4.0	1.8 - 3.5	1.7	20.0 [6]	223	3.1	NA
B-14	04/17/02	31.15	29.60	1.6 (refusal)	NA	NA	0.0	0.0	NA	NA
B-15	04/17/02	47.10	38.50	4.0	0.3 - 2.2	1.9	0.0	0.0	3.0	0.5 - 1.5
B-16	04/17/02	56.00	51.15	4.0	1.9 - 2.8	0.9	0.0	0.0	2.0 [7]	0.7 - 1.1

Notes:
1. Headspace sample collected from unsaturated soils at each location only.
2. Initial depth to water indicates first groundwater encountered during boring advancement.
3. The QA/QC sample MS/MSD was collected at boring location B-3.
4. The QA/QC sample Blind Duplicate was collected at boring location B-4.
5. Soil sample collected as per NYSDEC request.
6. PID scan of boring B-13 was recorded from interval 2.5 - 3.5 fbgs.
7. Depth to water at boring location B-16 may indicate a perched water table.

301728

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ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 2

SUMMARY OF SOIL ANALYTICAL RESULTS

PETER COOPER CORPORATION - GOWANDA SITE
COLLIER, SHANNON & SCOTT
GOWANDA, NEW YORK

Parameter	B-1 (2.0 - 4.0 fbgs)	B-2 (2.0 - 4.0 fbgs)	B-3 (2.0 - 4.0 fbgs)	B-4 (2.0 - 4.0 fbgs)	Blind Duplicate B-4 (2.0 - 4.0 fbgs)	B-4 (0.5 - 1.5 fbgs)	B-7 (0.5 - 1.5 fbgs)	B-9 (0.5 - 1.5 fbgs)	B-15 (0.5 - 1.5 fbgs)	B-16 (0.7 - 1.1 fbgs)	USEPA Residential Soil PRG (mg/kg)	USEPA Industrial Soil PRG (mg/kg)
TCL Volatile Organic Compounds (VOCs) - mg/kg [2]												
Acetone	0.02	0.023	0.031	0.029	0.023	0.019 B	0.014	0.15 J	0.036	0.021	1600	6000
Benzene					0.0033 J			0.0024 J			0.6	1.3
Bromodichloromethane											0.82	1.8
Bromoform (tribromomethane)											62	220
Bromomethane (Methyl bromide)											3.9	13
2-Butanone (Methyl ethyl ketone)	0.0029 J			0.0046 J	0.0045 J			0.015	0.0026 J		7300	27000
Methyl tertbutyl ether (MTBE)											62	160
Carbon disulfide				0.004 J	0.017			0.0017 J			360	720
Carbon tetrachloride	0.003 J	0.017	0.0095	0.008 J	0.014	0.018	0.0085 J	0.021			0.25	0.55
Chlorobenzene											150	530
Chloroethane											3	6.5
Chloroform	0.0055 J	0.018	0.0049 J	0.003 J	0.0042 J	0.0044 J	0.015	0.014			3.6	12
Chloromethane											1.2	2.6
1,2-Dibromo-3-chloropropane											0.45	2
Cyclohexane				0.0021 J	0.011			0.0052 J	0.0039 J		140	140
Dibromochloromethane											1.1	2.6
1,2-Dibromoethane											0.0069	0.028
1,2-Dichlorobenzene											370	370
1,4-Dichlorobenzene								0.0019 J			3.4	7.9
1,3-Dichlorobenzene								0.0016 J			16	63
Dichlorodifluoromethane											94	310
1,1-Dichloroethane											510	1700
1,2-Dichloroethane (EDC)											0.28	0.6
1,1-Dichloroethylene											120	410
1,2-Dichloroethylene (trans)											69	230
1,2-Dichloroethylene (cis)											43	150
1,2-Dichloropropane											0.34	0.74
trans-1,3-Dichloropropene											--	--
cis-1,3-Dichloropropene											--	--
Ethylbenzene			0.0025 J	0.0017 J	0.0024 J			0.0086 J			8.9	20
2-Hexanone (MBK)				0.0017 J							--	--
Cumene (isopropylbenzene)								0.45 J	0.0011 J		570	2000
Methyl acetate								1.1 J	0.0028 J		22000	92000
Methylcyclohexane				0.0031 J	0.017		0.0011 J	0.0092 J	0.0058 J	0.00096 J	2600	8700

301729

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 2

SUMMARY OF SOIL ANALYTICAL RESULTS

PETER COOPER CORPORATION - GOWANDA SITE
COLLIER, SHANNON & SCOTT
GOWANDA, NEW YORK

Parameter	B-1 (2.0 - 4.0 fbgs)	B-2 (2.0 - 4.0 fbgs)	B-3 (2.0 - 4.0 fbgs)	B-4 (2.0 - 4.0 fbgs)	Blind Duplicate B-4 (2.0 - 4.0 fbgs)	B-4 (0.5 - 1.5 fbgs)	B-7 (0.5 - 1.5 fbgs)	B-9 (0.5 - 1.5 fbgs)	B-15 (0.5 - 1.5 fbgs)	B-16 (0.7 - 1.1 fbgs)	USEPA Residential Soil PRG (mg/kg)	USEPA Industrial Soil PRG (mg/kg)
TCL Volatile Organic Compounds (VOCs) - mg/kg [2]												
Methylene chloride											9.1	21
Methyl isobutyl ketone (MIBK, 4-Methyl-2-Pentanone)									0.003 J	0.0021 J	790	2800
Styrene											1700	1700
1,1,2,2-Tetrachloroethane											0.41	0.93
Tetrachloroethylene (PCE)	**1.9**	**2.9**	0.11	0.039	0.075	0.0033 J	0.044	**15**	0.0011 J	0.031	1.5	3.4
Toluene				0.0015 J	0.0071 J			3.7	0.0017 J		520	520
1,2,4-Trichlorobenzene		0.001 J						0.0035 J			650	3000
1,1,1-Trichloroethane	0.041	0.031	0.014	0.023	0.036	0.026	0.016	0.098	0.0024 J	0.0016 J	1200	1200
1,1,2-Trichloroethane											0.73	1.6
Trichloroethylene (TCE)	0.0025 J	0.0074 J	0.0039 J	0.0011 J	0.0017 J		0.0026 J	0.0046 J			0.053	0.11
Trichlorofluoromethane											390	2000
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)											5600	5600
Vinyl chloride (child/adult) [3]											0.079	0.75
m,p-Xylenes	0.0014 J		0.0097	0.0049 J	0.0048 J			5	0.0023	0.0016 J	270	420
o-Xylene			0.0036 J		0.0036 J			0.0037 J				
TOTAL VOCs	**1.9763**	**2.9974**	**0.1891**	**0.1267**	**0.2246**	**0.0707**	**0.1001**	**23.8904**	**0.0627**	**0.05826**		
HEADSPACE DETERMINATION (ppm)	**0.0**	**0.0**	**0.0**	**0.0**	**--**	**0.0**	**3.7**	**0.0**	**0.0**	**0.0**	--	

Notes:
1. J = inicates an estimated value.
2. Analytical results were reported in ug/kg and converted to mg/kg for comparison to the USEPA PRG values.
3. Industrial soil PRG presented is for the average adult only.
4. A blank value indicates the compound was not detected above laboratory reporting limit.
5. Headspace determinations were performed in the field with a calibrated photoionization detector equipped with a 10.6 eV lamp.

BOLD = Indicates value has exceeded the USEPA residential soil PRG.

301730

December 17, 2001

Benchmark Environmental Engineering & Science, PLLC

Ms. Sherrel Henry
Peter Cooper Landfill Superfund Site Project Coordinator
U.S. Environmental Protection Agency
Region II
Emergency and Remedial Response Division
290 Broadway - 20th Floor
New York, NY 10007-1866

Re: Peter Cooper Landfill Site RI/FS
Proposed Supplemental Investigation Work in
Former Manufacturing Plant Area

Dear Ms. Henry:

Benchmark Environmental Engineering & Science, PLLC and Geomatrix Consultants, Inc. have prepared this correspondence to document our plans for proposed supplemental RI investigation work in the Former Manufacturing Plant Area of the above-referenced site. Specifically, we intend to perform additional investigation of soils in the vicinity of the MWFP-3 well cluster, where RI data indicated the presence of a limited number of chlorinated organic constituents. Additional sampling of soils in this area will be helpful in characterizing the extent of the impacts for presentation and evaluation in the RI/FS.

Sampling work will be performed with a direct-push (Geoprobe®, or equivalent) rig using 1-1/2" diameter x 4-foot long stainless steel spoons fitted with acetate sleeves. Four sample locations will be located at distances of 10-feet from MWFP-3 in each of four compass directions. At each location, direct-push borings will be completed to a depth of 8-feet below grade. The project hydrogeologist will examine retrieved soil cores for visual and olfactory evidence of VOC contamination, and will screen each 4-foot section with a photoionization detector (PID) fitted with a 10.7 eV lamp. Field observations and PID readings will be recorded in a field notebook. PID calibration will be performed at the beginning of the sampling event in accordance with Field Operating Procedure (FOP) 31 of our approved RI/FS Work Plan.

If PID measurements and/or observations recorded for the initial four locations indicate the presence of VOCs, additional borings will be completed along the same compass direction as the impacted boring. The spacing of the additional borings will be field determined but generally will be established at 10-foot intervals. Once the extent of contamination appears to have been delineated in each compass direction, confirmatory soil samples will be collected from the approximately 6-inch to 12-inch

50 FOUNTAIN PLAZA, SUITE 1350 • BUFFALO, NEW YORK 14202
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zone at each of these four locations. The confirmatory VOC samples will be collected using EnCore™ samplers in accordance with FOP 30 of our RI/FS Work Plan. Samples will be transmitted to our project-designated subcontract analytical laboratory, Columbia Analytical Services, for analysis of Target Compound List (TCL) VOCs in accordance with USEPA Method 8260. Applicable sample collection and analytical QA/QC procedures will be followed for the work in accordance with our approved Quality Assurance Project Plan (QAPP). As such, field QC samples will be collected for site-specific MS/MSD analysis. Dedicated plastic sleeves will be used for each boring, therefore equipment blanks are not proposed.

We would like initiate this work as soon as possible based on weather conditions and equipment availability. We will notify USEPA no less than 1-week in advance of the planned sample date. Please contact us if you have any questions or require additional information.

Sincerely,
Benchmark Environmental Engineering & Science, PLLC

Thomas H. Forbes, P.E.
Project Manager

enc.

C: J. Wittenborn (Collier Shannon)
K. McMahon (Collier Shannon)
M. Graham (Phillips Lytle)
K. Hogan (Phillips Lytle)
S. Davis (Huber Lawrence)
J. Simone (NYSEG)
R. Frappa (Geomatrix)
M. Moore (NYSDEC - 2 copies)
G. Shanahan (USEPA)
E. Belmore (NYSDEC)
E. Wohlers (Catt. County DOH)
M. Hutchinson (V. Gowanda)
D. Hettrick (NYSDOH)

File: 0021-001-400, CG

BENCHMARK
ENVIRONMENTAL
ENGINEERING &
SCIENCE, PLLC

February 18, 2002

Ms. Sherrel Henry
Peter Cooper Landfill Superfund Site Project Coordinator
U.S. Environmental Protection Agency
Region II
Emergency and Remedial Response Division
290 Broadway - 20th Floor
New York, NY 10007-1866

Re: Peter Cooper Landfill Superfund Site, Gowanda, New York
Proposed Supplemental Investigation Work

Dear Ms. Henry:

Benchmark Environmental Engineering & Science, PLLC has reviewed USEPA's comments on the Proposed Supplemental Investigation Work with respect to the Former Manufacturing Plant Area for the above-referenced site. Our responses to each of the issues raised are presented below.

General Comments

Comment No. 1: To date, the EPA has received only limited data on the PRP remedial activities associated with the Peter Cooper Gowanda site. Since the EPA has not reviewed the draft remedial investigation (RI) report, it is difficult to fully evaluate the type and level of contaminants present at the Peter Cooper Gowanda site.

The EPA appreciates the proactive approach by the PRPs to perform additional field investigations, however this is not the normal procedure. Typically, the PRPs submit the draft RI report, and the EPA reviews and evaluates the report. The EPA then submits comments to the PRPs, which may include requirements for subsequent field investigations to further delineate zones/areas of contamination.

The PRPs may proceed with such proposed work, however this investigation may not preclude the PRPs from any future additional field work that may be required by the EPA.

RESPONSE: Acknowledged.

www.benchmarkees.com
50 Fountain Plaza, Suite 1350 | Buffalo, NY 14202
phone: (716)856-0599 | fax: (716)856-0583

Specific Comments

Comment No. 1: Please indicate how the depth of 8 feet (depth of soil sampling) was determined. At MWFP-3S the top of rock was encountered at a depth of approximately 11.5 feet bgs. It is recommended that a minimum of three (4-foot) split spoons be obtained at each boring, or until the top of rock is encountered.

RESPONSE: The depth of 8 feet was intended to characterize the depth of soil that might be encountered during future industrial or commercial redevelopment. As requested we will advance three 4-foot split spoons at each boring location to characterize soils to a depth of 12 feet bgs or refusal.

Comment No. 2: The letter indicates that the 4-foot section (soil sample) will be screened with a PID. However, due to the time of year (i.e., winter) that this investigation is planned, the potential release of VOCs from the soil is low. The PID is an acceptable method for screening the contaminants, however, a more detailed analytical program should be performed (see comment 3 below).

RESPONSE: Acknowledged. However, temperatures generally have been mild throughout the fall and winter at the site. While it is expected that the upper 0-12 inches of soil may be affected by weather conditions (i.e., frozen), deeper soils are not anticipated to be significantly impacted by the ambient conditions. To mitigate the effects of cold temperatures on PID measurements, field samples will be collected from each 4-foot interval and subjected to headspace analysis per FOP 7 of our approved RI/FS Work Plan. This procedure requires transferring field samples to plastic zip-lock bags followed by temporary storage of the samples in a warm location (e.g., the cab of the truck) for 30-60 minutes prior to measurement of headspace VOC concentrations.

Comment No. 3: The letter indicates that two 4-foot long stainless steel split spoons will be obtained at each of the four planned borings. The letter then indicates that the soil samples will be screened with a PID. However, the letter does not indicate that any of the samples will be sent for TCL analysis (only confirmatory samples collected at the 6 to 12-inch zone for each of the four borings).

In order to properly delineate a zone of contamination (both vertically and horizontally), soil samples should be obtained at a minimum of two per boring and transmitted to the analytical laboratory for TCL analysis. The two soil samples with the highest PID readings should be sent for analysis. If no PID readings are obtained, then a sample from the near surface (i.e., the proposed PRP confirmatory sample) and a sample from the two foot interval above the groundwater table or the two foot interval above the top of rock, whichever comes first, should be sent for TCL analysis.

RESPONSE: There appears to be some confusion regarding the planned boring and confirmatory soil sampling program proposed under Benchmark's December 17, 2001 letter. Borings will start near MWFP-3S and proceed radially outward in each of four compass directions until field observations indicate no significant VOC contamination remains in the overburden soils and PID readings (measured as per response to comment 2, above) reach background. At that point, confirmatory samples will be collected in each compass direction from the closest boring to MWFP-3S that meets these criteria. The confirmatory samples will be analyzed for TCL volatiles to provide analytical verification that no significant VOCs remain in the overburden soils. Thus, confirmatory samples are intended to surround MWFP-3S with four overburden soil data points showing no significant VOC contamination, and will map the maximum extent of impacted soils surrounding MWFP-3S.

Per USEPA's request, we agree to modify the confirmatory sampling program to collect two samples from each of the four borings described above to satisfy concerns regarding delineation of both the aerial and vertical extent of contamination. The PID will not be used to select confirmatory sample intervals, as confirmatory samples will be collected from soils exhibiting no PID evidence of contamination. One sample from each boring will be collected from the 2-4' interval, and the second will be collected from the unsaturated soils located at the 10-12' interval or the 2-foot interval immediately above the bedrock or groundwater interface, whichever is encountered sooner. Each of the eight samples will be analyzed for TCL VOCs.

Comment No. 4: Equipment blanks will not be necessary, provided that the sampling utensils are not used to transfer or hold the soil sample prior to insertion within the sample container. Also, the stainless steel split spoons must be decontaminated between each boring utilizing a steam cleaner, and normal decontamination procedures.

RESPONSE: As indicated in the proposed scope of work, EnCore™ samplers will be used to collect confirmatory VOC samples. Additional sampling utensils are not anticipated to be required to hold the samples prior to insertion within the sample container, therefore equipment blanks will not be needed.

Since new dedicated plastic sleeves will be used at each boring location, decontamination between borings is not anticipated to be necessary unless gross contamination is encountered. However, excavation equipment will be decontaminated prior to leaving the site.

Please contact us if you have any questions concerning these responses.

Sincerely,
Benchmark Environmental Engineering & Science, PLLC

Thomas H. Forbes, P.E.
Project Manager

enc.

C: J. Wittenborn (Collier Shannon)
K. McMahon (Collier Shannon)
A. Cramer (Collier Shannon
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G. Shanahan (USEPA)
D. Hettrick (NYSDOH)
E. Wohlers (Catt. County DOH)
M. Hutchinson (V. Gowanda)
M. Derby (TAMS)

BENCHMARK
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ATTACHMENT 2

BOREHOLE LOGS

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE PLLC — TURNKEY

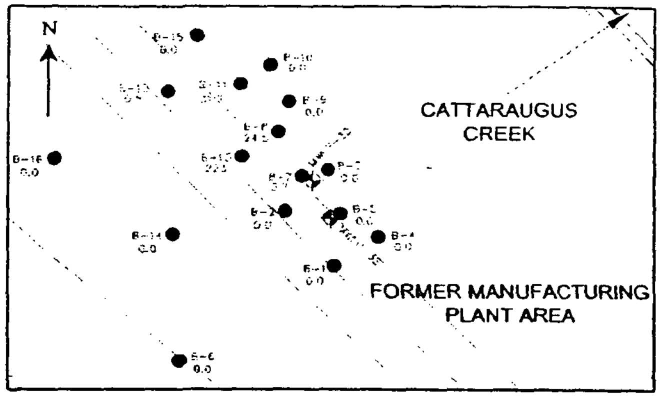
FIELD BOREHOLE LOG

Client:	PCC - Gowanda Site	Project Location:	Gowanda, New York	Boring ID:	B-1
Project Name:	Geoprobe Inv. of Well Cluster MWFP-3	Project Number:	0021-001-400	Use:	Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl):	NA	Total Depth (fbgs):	8.0
Start Date:	04/16/02	Finish Date:	04/16/02
Drilling Company:	Zebra Environmental, Inc.		
Driller:	Chris Donovan		
Helper:	none		
Logged By:	Bryan Hann		
Drill Rig Type:	Geoprobe direct-push ATV mule rig		
Drilling Method:	Direct Push		
Borehole Diameter (inches):	3.0		
Sampling Method:	1.5-inch polyethylene sleeve 4-feet in length		
Water Level(s) (fbgs):	4.0	Water Level(s) (fmsl):	NA

Boring Location:



Notes: Sample collected from 2.0 - 4.0 fbgs and analyzed for TCL VOCs via USEPA Method 8260B.

Weather: Mostly sunny, slight breeze (0-5 mph, N/NE), 60-80 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

DENSITY:	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

CONSISTENCY:	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft^2.

MOISTURE:	
DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:	
NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:			
VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
		0.0 - 0.4 **TOPSOIL:** Dark brown, moist, 90% fines, 10% fine gravel, low to medium plasticity, soft with grass rootlets, organics 0.4 - 2.2 **FILL:** Black, moist, ash, clinkers, cinders etc., very loose 2.2 - 3.1 **SILTY SAND:** Dark green/brown, moist, 60% fine sand, 30% non-plastic fines, 10% fine angular gravel, medium dense	OL/OH FILL SM	S1	NA	NA	GP	0.0	0.0	3.1/4.0
NA	4									
		0.0 - 3.1 **POORLY GRADED SAND:** Dark orange/brown w/ orange mottling, wet, 90% fine sand, 10% fine angular gravel, medium dense, slow to rapid dilatency 3.1 - 3.5 **SILTY GRAVEL:** Dark orange/brown, wet, 60% fine angular gravel, 40% non to low plasticity fines, loose	SP GM	S2	NA	NA	GP	0.0	NA	3.5/4.0
NA	8									
		END OF BORING AT 8.0 fbgs ***GROUNDWATER ENCOUNTERED APPROX. 4.0 FBGS***								
NA	12									
NA	16									

301738

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC — TURNKEY

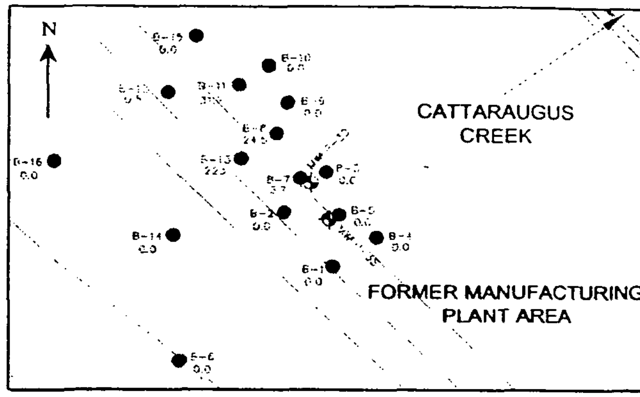
FIELD BOREHOLE LOG

Client:	PCC - Gowanda Site	Project Location:	Gowanda, New York	Boring ID:	B-2
Project Name:	Geoprobe Inv. of Well Cluster MWFP-3	Project Number:	0021-001-400	Use:	Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl):	NA	Total Depth (fbgs):	4.0
Start Date:	04/16/02	Finish Date:	04/16/02
Drilling Company:	Zebra Environmental, Inc.		
Driller:	Chris Donovan		
Helper:	none		
Logged By:	Bryan Hann		
Drill Rig Type:	Geoprobe direct-push ATV mule rig		
Drilling Method:	Direct Push		
Borehole Diameter (inches):	3.0		
Sampling Method:	1.5-inch polyethylene sleeve 4-feet in length		
Water Level(s) (fbgs):	4.0	Water Level(s) (fmsl):	NA

Boring Location:



Notes: Sample collected from 2.0 - 4.0 fbgs and analyzed for TCL VOCs via USEPA Method 8260B.

Weather: Mostly sunny, slight breeze (0-5 mph, N/NE), 60-80 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

CONSISTENCY:	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft^2.

DENSITY:	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

MOISTURE:	
DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:	
NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:			
VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
		0.0 - 0.5 **TOPSOIL:** Dark brown, moist, 90% fines, 10% fine gravel, low to medium plasticity, soft with grass rootlets, organics 0.5 - 2.0 **FILL:** Black, moist, ash, clinkers, cinders etc., very loose 2.0 - 3.1 **SILTY SAND:** Dark green/brown, moist, 60% fine sand, 30% non to low plasticity fines, 10% fine angular gravel, medium dense	OL/OH FILL SM	S1	NA	NA	GP	0.0	0.0	3.1/4.0
NA	4	REFUSAL @ 4 FBGS; NO RECOVERY GROUNDWATER IN BOTTOM OF SPOON								
NA	8	*END OF BORING AT 4.0 fbgs* *GROUNDWATER ENCOUNTERED APPROX. 4.0 FBGS*								
NA	12									
NA	16									

BENCHMARK Environmental Engineering & Science, PLLC — TurnKey

FIELD BOREHOLE LOG

Client: PCC - Gowanda Site | Project Location: Gowanda, New York | Boring ID: **B-3**

Project Name: Geoprobe Inv. of Well Cluster MWFP-3 | Project Number: 0021-001-400 | Use: Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl): NA | Total Depth (fbgs): 8.0

Start Date: 04/16/02 | Finish Date: 04/16/02

Drilling Company: Zebra Environmental, Inc.

Driller: Chris Donovan

Helper: none

Logged By: Bryan Hann

Drill Rig Type: Geoprobe direct-push ATV mule rig

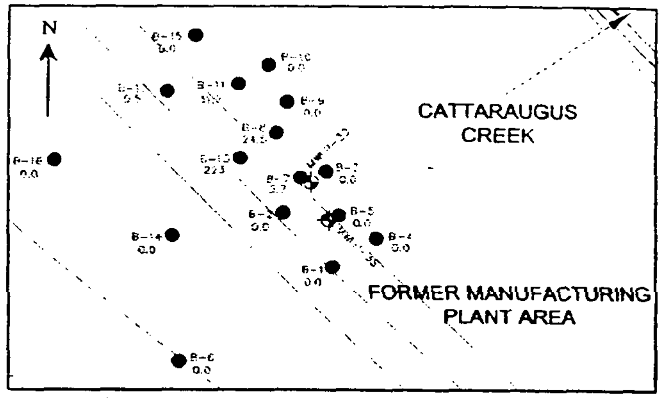
Drilling Method: Direct Push

Borehole Diameter (inches): 3.0

Sampling Method: 1.5-inch polyethylene sleeve 4-feet in length

Water Level(s) (fbgs): 4.5 | Water Level(s) (fmsl): NA

Boring Location:



Notes: Sample collected from 2.0 - 4.0 fbgs and analyzed for TCL VOCs via USEPA Method 8260B. MS/MSD sample also collected at this location.

Weather: Mostly sunny, slight breeze (0-5 mph, N/NE), 60-80 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

CONSISTENCY:	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft^2.

DENSITY:	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

MOISTURE:	
DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:	
NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:			
VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
		0.0 - 0.7 **TOPSOIL:** Dark brown, moist, 90% fines, 10% fine gravel, low to medium plasticity, soft with grass rootlets, organics 0.7 - 2.6 **FILL:** Black, moist, ash, clinkers, cinders etc., very loose 2.6 - 3.2 **SILTY SAND:** Dark orange/brown, moist, 60% fine sand, 30% non to low plasticity fines, 10% fine angular gravel, medium dense, loose when disturbed	**OL/OH FILL SM**	S1	NA	NA	GP	0.0	0.0	3.2/4.0
NA	4									
		SILTY GRAVEL: Dark orange/brown, wet, 60% fine angular gravel, 30% low plasticity fines, 10% fine sand, loose	**GM**	S2	NA	NA	GP	0.0	NA	0.3/4.0
NA	8									
		END OF BORING AT 8.0 fbgs *GROUNDWATER ENCOUNTERED APPROX. 4.5 FBGS*								
NA	12									
NA	16									

FIELD BOREHOLE LOG

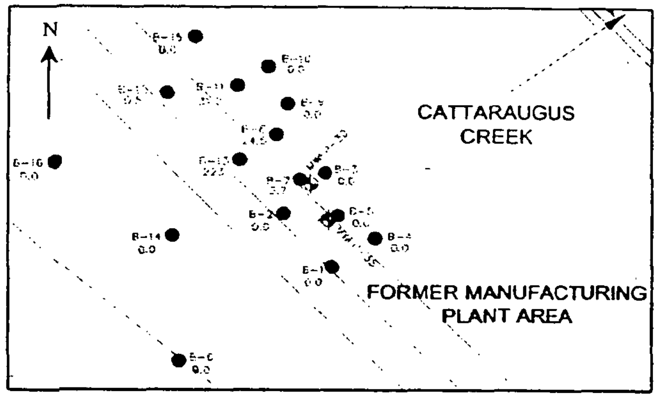
Benchmark Environmental Engineering & Science, PLLC — TurnKey

Client:	PCC - Gowanda Site	Project Location:	Gowanda, New York	Boring ID:	**B-4**
Project Name:	Geoprobe Inv. of Well Cluster MWFP-3	Project Number:	0021-001-400	Use:	Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl):	NA	Total Depth (fbgs):	8.0
Start Date:	04/16/02	Finish Date:	04/16/02
Drilling Company:	Zebra Environmental, Inc.		
Driller:	Chris Donovan		
Helper:	none		
Logged By:	Bryan Hann		
Drill Rig Type:	Geoprobe direct-push ATV mule rig		
Drilling Method:	Direct Push		
Borehole Diameter (inches):	3.0		
Sampling Method:	1.5-inch polyethylene sleeve 4-feet in length		
Water Level(s) (fbgs):	4.0	Water Level(s) (fmsl):	NA

Boring Location:



Notes: Sample collected from 2.0 - 4.0 fbgs and analyzed for TCL VOCs via USEPA Method 8260B. Soil sample also collected from 0.5 - 1.5 fbgs as per NYSDEC request and analyzed for same. Blind Duplicate collected from 2.0 - 4.0 fbgs and analyzed for same.

Weather: Mostly sunny, slight breeze (0-5 mph, N/NE), 60-80 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

DENSITY:

	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

CONSISTENCY:

	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft^2.

MOISTURE:

DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:

NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:

VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
		0.0 - 0.3 **TOPSOIL:** Dark brown, moist, 90% fines, 10% fine gravel, low to medium plasticity, soft with grass rootlets, organics 0.3 - 2.1 **FILL:** Black, moist, ash, clinkers, cinders etc., very loose 2.1 - 2.7 **POORLY GRADED SAND W/ SILT AND GRAVEL:** Dark brown, moist, 60% fine sand, 30% fine angular gravel, 10% non-plastic fines, medium dense	OL/OH FILL SP-SM	S1	NA	NA	GP	0.0	0.0	2.7/4.0
NA	4									
		0.0 - 2.7 **POORLY GRADED SAND W/ SILT:** Dark orange/brown with orange mottling, wet, 90% fine sand, 10% non-plastic fines, loose, rapid dilatency 2.7 - 3.5 **POORLY GRADED SAND W/ SILT AND GRAVEL:** Dark orange/brown, wet, 60% fine sand, 30% fine gravel, 10% non to low plasticity fines, loose	SP-SM	S2	NA	NA	GP	0.0	NA	3.5/4.0
NA	8									
		END OF BORING AT 8.0 fbgs *GROUNDWATER ENCOUNTERED APPROX. 4.0 FBGS*								
NA	12									
NA	16									

301741

Benchmark Environmental Engineering & Science, PLLC — TurnKey

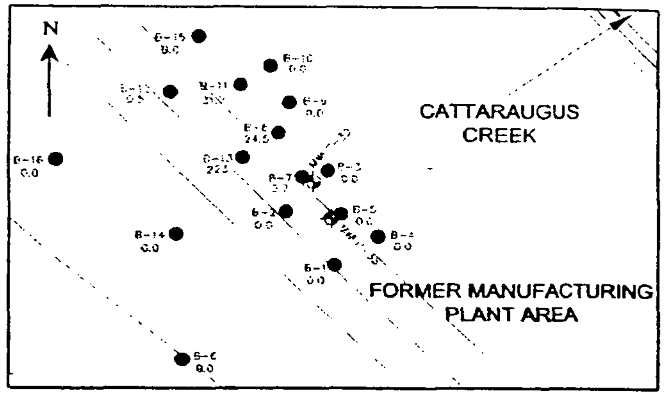
FIELD BOREHOLE LOG

Client:	PCC - Gowanda Site	Project Location:	Gowanda, New York	Boring ID:	B-5
Project Name:	Geoprobe Inv. of Well Cluster MWFP-3	Project Number:	0021-001-400	Use:	Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl):	NA	Total Depth (fbgs):	8.0
Start Date:	04/16/02	Finish Date:	04/16/02
Drilling Company:	Zebra Environmental, Inc.		
Driller:	Chris Donovan		
Helper:	none		
Logged By:	Bryan Hann		
Drill Rig Type:	Geoprobe direct-push ATV mule rig		
Drilling Method:	Direct Push		
Borehole Diameter (inches):	3.0		
Sampling Method:	1.5-inch polyethylene sleeve 4-feet in length		
Water Level(s) (fbgs):	4.0	Water Level(s) (fmsl):	NA

Boring Location:



Notes:

Weather: Mostly sunny, slight breeze (0-5 mph, N/NE), 60-80 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

DENSITY:	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

CONSISTENCY:	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft^2.

MOISTURE:	
DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:	
NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:			
VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
NA	4	0.0 - 0.3 **TOPSOIL:** Dark brown, moist, 90% fines, 10% fine gravel, low to medium plasticity, soft with grass rootlets, organics 0.3 - 2.1 **FILL:** Black, moist, ash, clinkers, cinders etc., very loose 2.1 - 2.8 **POORLY GRADED SAND W/ SILT:** Dark brown, moist, 80% fine sand, 10% fine angular gravel, 10% non-plastic fines, , medium dense 2.8 - 3.1 **POORLY GRADED GRAVEL w/ SILT AND SAND:** Light brown/tan, moist, 60% fine angular gravel, 30% fine sand, 10% non-plastic fines, loose	OL/OH FILL SP-SM GP-SM	S1	NA	NA	GP	0.0	0.0	3.1/4.0
NA	8	Same as S1 (2.8 - 3.1) above, wet	GP-SM	S2	NA	NA	GP	0.0	NA	0.9/4.0
NA	12	*END OF BORING AT 8.0 fbgs* *GROUNDWATER ENCOUNTERED APPROX. 4.0 FBGS*								
NA	16									

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC — TURNKEY

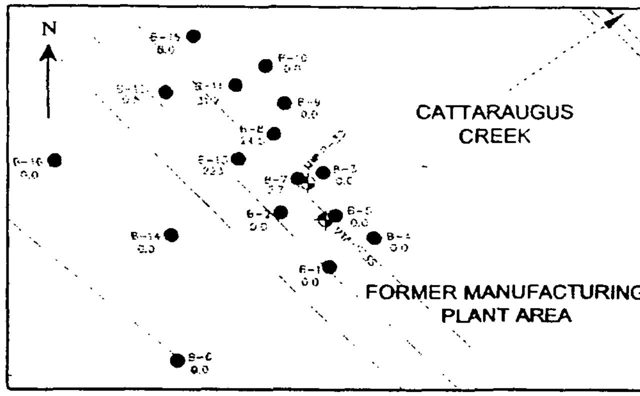
FIELD BOREHOLE LOG

Client:	PCC - Gowanda Site	Project Location:	Gowanda, New York	Boring ID:	B-6
Project Name:	Geoprobe Inv. of Well Cluster MWFP-3	Project Number:	0021-001-400	Use:	Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl):	NA	Total Depth (fbgs):	8.0
Start Date:	04/16/02	Finish Date:	04/16/02
Drilling Company:	Zebra Environmental, Inc.		
Driller:	Chris Donovan		
Helper:	none		
Logged By:	Bryan Hann		
Drill Rig Type:	Geoprobe direct-push ATV mule rig		
Drilling Method:	Direct Push		
Borehole Diameter (inches):	3.0		
Sampling Method:	1.5-inch polyethylene sleeve 4-feet in length		
Water Level(s) (fbgs):	4.0	Water Level(s) (fmsl):	NA

Boring Location:



Notes:

Weather: Mostly sunny, slight breeze (0-5 mph, N/NE), 60-80 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

DENSITY:	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

CONSISTENCY:	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft^2.

MOISTURE:	
DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:	
NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:			
VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
		0.0 - 0.4 **TOPSOIL:** Dark brown, moist, 90% fines, 10% fine gravel, low to medium plasticity, soft with grass rootlets, organics 0.4 - 1.9 **SANDY SILT W/ FILL:** Brown/tan, moist, 60% non to low plasticity fines, 30% fine sand, 10% fine angular gravel, medium dense, with wood and rootletts 1.9 - 3.5 **FILL:** Black, moist-wet, ash, clinkers, cinders etc., very loose	OL/OH ML/FILL FILL	S1	NA	NA	GP	0.0	0.0	3.5/4.0
NA	4									
		0.0 - 0.6 **FILL:** as above 0.6 - 0.8 **SILTY SAND w/ GRAVEL:** Dark orange/brown, wet, 50% fine sand, 30% fine angular gravel, 20% non-plastic fines, medium dense, slow dilatency 0.8 - 2.3 **POORLY GRADED SAND W/ SILT:** Dark orange/brown with orange mottling, wet, 90% fine-medium sand, 10% non-plastic fines, loose, rapid dilatency 2.3 - 3.0 **SILTY SAND:** Dark blue/grey, wet, 80% fine sand, 20% non to low plasticity fines, medium dense, slow dilatency	FILL SM SP-SM SM	S2	NA	NA	GP	0.0	NA	3.0/4.0
NA	8									
		END OF BORING AT 8.0 fbgs *GROUNDWATER ENCOUNTERED APPROX. 4.0 FBGS*								
NA	12									
NA	16									

FIELD BOREHOLE LOG

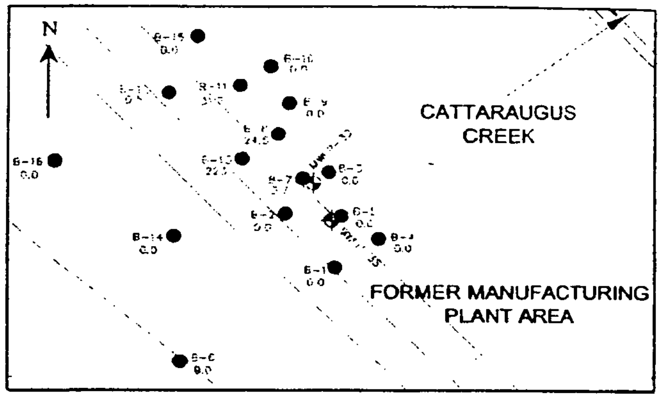
Benchmark Environmental Engineering & Science, PLLC — TurnKey

Client:	PCC - Gowanda Site	Project Location:	Gowanda, New York	Boring ID:	B-7
Project Name:	Geoprobe Inv. of Well Cluster MWFP-3	Project Number:	0021-001-400	Use:	Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl):	NA	Total Depth (fbgs):	8.0
Start Date:	04/16/02	Finish Date:	04/16/02
Drilling Company:	Zebra Environmental, Inc.		
Driller:	Chris Donovan		
Helper:	none		
Logged By:	Bryan Hann		
Drill Rig Type:	Geoprobe direct-push ATV mule rig		
Drilling Method:	Direct Push		
Borehole Diameter (inches):	3.0		
Sampling Method:	1.5-inch polyethylene sleeve 4-feet in length		
Water Level(s) (fbgs):	4.0	Water Level(s) (fmsl):	NA

Boring Location:



Notes: Sample collected from 0.5 - 1.5 fbgs and analyzed for TCL VOCs via USEPA Method 8260B.

Weather: Mostly sunny, slight breeze (0-5 mph, N/NE), 60-80 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

CONSISTENCY:

	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft^2.

DENSITY:

	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

MOISTURE:

DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:

NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:

VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
		0.0 - 0.4 **TOPSOIL:** Dark brown, moist, 90% fines, 10% fine gravel, low to medium plasticity, soft with grass rootlets, organics 0.4 - 2.4 **FILL:** Dark brown/black, moist, ash, clinkers, cinders etc., very loose	OL/OH FILL	S1	NA	NA	GP	0.0	3.7	2.4/4.0
NA	4									
		POORLY GRADED SAND W/ SILT AND GRAVEL: Dark orange/brown with orange mottling, wet, 60% fine-medium sand, 30% fine angular gravel, 10% low plasticity fines, loose	SP-SM	S2	NA	NA	GP	0.0	NA	2.2/4.0
NA	8									
		END OF BORING AT 8.0 fbgs ***GROUNDWATER ENCOUNTERED APPROX. 4.0 FBGS***								
NA	12									
NA	16									

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC — TURNKEY

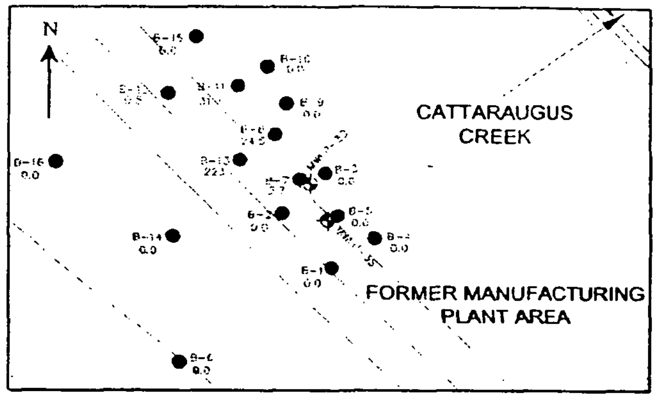
FIELD BOREHOLE LOG

Client:	PCC - Gowanda Site	Project Location:	Gowanda, New York	Boring ID:	B-8
Project Name:	Geoprobe Inv. of Well Cluster MWFP-3	Project Number:	0021-001-400	Use:	Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl):	NA	Total Depth (fbgs):	8.0
Start Date:	04/16/02	Finish Date:	04/16/02
Drilling Company:	Zebra Environmental, Inc.		
Driller:	Chris Donovan		
Helper:	none		
Logged By:	Bryan Hann		
Drill Rig Type:	Geoprobe direct-push ATV mule rig		
Drilling Method:	Direct Push		
Borehole Diameter (inches):	3.0		
Sampling Method:	1.5-inch polyethylene sleeve 4-feet in length		
Water Level(s) (fbgs):	4.0	Water Level(s) (fmsl):	NA

Boring Location:



Notes:

Weather: Mostly sunny, slight breeze (0-5 mph, N/NE), 60-80 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:	
% GRAVEL (fine, coarse)	
% SAND (fine, med., coarse)	
% FINES (indicate plasticity)	

DENSITY:	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

CONSISTENCY:	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft^2.

MOISTURE:	
DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:	
NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:			
VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area.

ELEVATION (fmsl)	DEPTH IN FEET	SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
		0.0 - 0.3 **TOPSOIL:** Dark brown, moist, 90% fines, 10% fine gravel, low to medium plasticity, soft with grass rootlets, organics 0.3 - 1.5 **FILL:** Black, moist-wet, ash, clinkers, cinders etc., very loose 1.5 - 2.5 **POORLY GRADED SAND w/ SILT AND GRAVEL WITH FILL:** Dark orange brown w/ black, moist, 60% fine sand, 30% fine angular gravel, 10% non-plastic fines, with brick	OL/OH FILL SP-SM/ FILL	S1	NA	NA	GP	0.0	24.5	2.5/4.0
NA	4	0.0 - 0.5 **FILL:** as above, wet 0.5 - 1.9 **SILTY SAND:** Dark orange/brown with orange mottling, wet, 70% fine sand, 20% non-plastic fines, 10% fine angular gravel, medium dense, rapid dilatency 1.9 - 2.4 **POORLY GRADED GRAVEL w/ SILT AND SAND:** Dark orange/brown, wet, 60% fine angular gravel, 30% fine sand, 10% low plasticity fines, loose	FILL SM GP-GM	S2	NA	NA	GP	0.0	NA	2.4/4.0
NA	8	***END OF BORING AT 8.0 fbgs*** ***GROUNDWATER ENCOUNTERED APPROX. 4.0 FBGS***								
NA	12									
NA	16									

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BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE PLLC / TURNKEY

FIELD BOREHOLE LOG

Client: PCC - Gowanda Site | Project Location: Gowanda, New York | Boring ID: B-9

Project Name: Geoprobe Inv. of Well Cluster MWFP-3 | Project Number: 0021-001-400 | Use: Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl): NA | Total Depth (fbgs): 8.0

Start Date: 04/17/02 | Finish Date: 04/17/02

Drilling Company: Zebra Environmental, Inc.

Driller: Chris Donovan

Helper: none

Logged By: Bryan Hann

Drill Rig Type: Geoprobe direct-push ATV mule rig

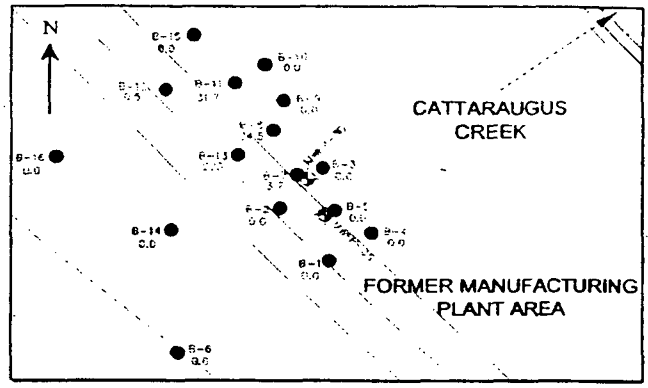
Drilling Method: Direct Push

Borehole Diameter (inches): 3.0

Sampling Method: 1.5-inch polyethylene sleeve 4-feet in length

Water Level(s) (fbgs): 4.5 | Water Level(s) (fmsl): NA

Boring Location:



Notes: Sample collected from 0.5 - 2.5 fbgs and analyzed for TCL VOCs via USEPA Method 8260B.

Weather: Sunny, slight breeze (0-5 mph, W/NW), 65-85 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

DENSITY:	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

CONSISTENCY:	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft².

MOISTURE:
- DRY — absence of moisture
- MOIST — damp, no visible water
- WET — visible free water

PLASTICITY:	
NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:			
VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
		FILL: Black, moist, ash, clinkers, cinders etc., very loose	FILL	S1	NA	NA	GP	0.0	0.0	2.6/4.0
NA	4									
		0.0 - 0.5 **FILL:** as above 0.5 - 1.2 **POORLY GRADED SAND w/ SILT:** Dark orange/brown, wet, 90% fine sand, 10% low plasticity fines, loose, rapid dilatency 1.2 - 1.5 **POORLY GRADED GRAVEL w/ SILT AND SAND:** Dark orange/brown, wet, 60% fine angular gravel, 30% fine sand, 10% low plasticity fines, loose 1.5 - 3.0 Same as 0.5 - 1.2 above 3.0 - 3.3 **SILTY SAND:** Dark green/blue, moist-wet, 80% fine sand, 15% non-plastic fines, 5% fine angular gravel, medium dense	FILL SP-SM GP-GM SP-SM SM	S2	NA	NA	GP	0.0	NA	3.3/4.0
NA	8									
		END OF BORING AT 8.0 fbgs ***GROUNDWATER ENCOUNTERED APPROX. 4.5 FBGS***								
NA	12									
NA	16									

FIELD BOREHOLE LOG

Benchmark Environmental Engineering & Science, PLLC — TurnKey

Client: PCC - Gowanda Site | Project Location: Gowanda, New York | Boring ID: **B-10**

Project Name: Geoprobe Inv. of Well Cluster MWFP-3 | Project Number: 0021-001-400 | Use: Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl): NA | Total Depth (fbgs): 4.0

Start Date: 04/17/02 | Finish Date: 04/17/02

Drilling Company: Zebra Environmental, Inc.

Driller: Chris Donovan

Helper: none

Logged By: Bryan Hann

Drill Rig Type: Geoprobe direct-push ATV mule rig

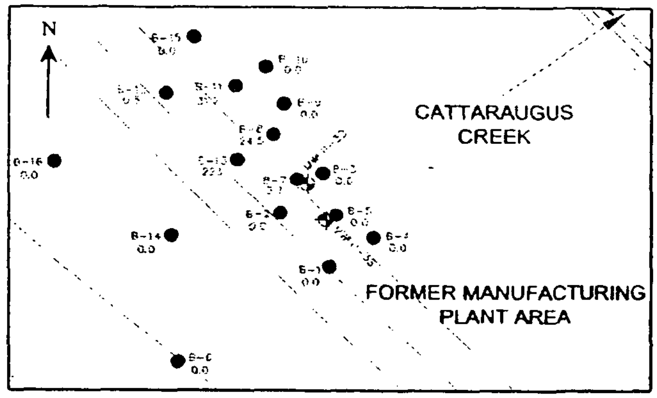
Drilling Method: Direct Push

Borehole Diameter (inches): 3.0

Sampling Method: 1.5-inch polyethylene sleeve 4-feet in length

Water Level(s) (fbgs): 4.0 | Water Level(s) (fmsl): NA

Boring Location:



Notes:

Weather: Sunny, slight breeze (0-5 mph, W/NW), 65-85 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

DENSITY:	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

CONSISTENCY:	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft^2.

MOISTURE:	
DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:	
NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:			
VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
		0.0 - 0.2 **TOPSOIL:** Dark brown, moist, 90% fines, 10% fine gravel, low to medium plasticity, soft with grass rootlets, organics 0.2 - 2.5 **FILL:** Black with orange, moist, ash, clinkers, cinders etc., very loose 2.5 - 2.8 **SILTY SAND:** Dark brown, moist, 70% fine sand, 20% low plasticity fines, 10% fine angular gravel, medium dense, with rootletts	**OL/OH FILL SM**	S1	NA	NA	GP	0.0	0.0	2.8/4.0
NA	4	***END OF BORING AT 4.0 fbgs*** ***GROUNDWATER ENCOUNTERED APPROX. 4.0 FBGS***								
NA	8									
NA	12									
NA	16									

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE PLLC / TURNKEY

FIELD BOREHOLE LOG

Client: PCC - Gowanda Site | Project Location: Gowanda, New York | Boring ID: **B-11**

Project Name: Geoprobe Inv. of Well Cluster MWFP-3 | Project Number: 0021-001-400 | Use: Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl): NA | Total Depth (fbgs): 4.0

Start Date: 04/17/02 | Finish Date: 04/17/02

Drilling Company: Zebra Environmental, Inc.

Driller: Chris Donovan

Helper: none

Logged By: Bryan Hann

Drill Rig Type: Geoprobe direct-push ATV mule rig

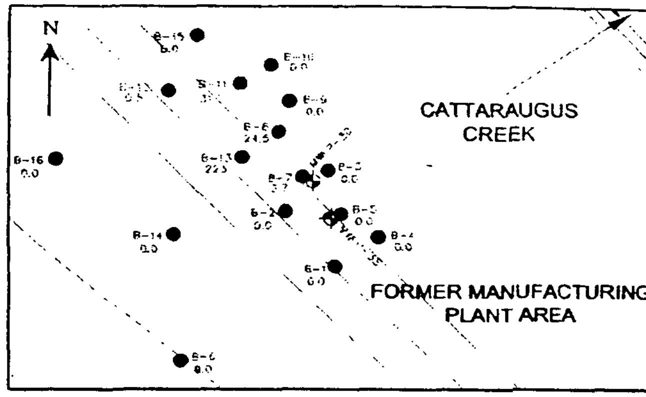
Drilling Method: Direct Push

Borehole Diameter (inches): 3.0

Sampling Method: 1.5-inch polyethylene sleeve 4-feet in length

Water Level(s) (fbgs): 3.5 | Water Level(s) (fmsl): NA

Boring Location:



Notes:

Weather: Sunny, slight breeze (0-5 mph, W/NW), 65-85 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

DENSITY:	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

CONSISTENCY:	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft².

MOISTURE:	
DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:	
NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:			
VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
		0.0 - 3.4 **FILL:** Black, moist, ash, clinkers, cinders etc., very loose 3.4 - 3.8 **SILTY SAND:** Dark orange/brown with orange mottling, wet, 80% fine sand, 15% non-plastic fines, 5% fine angular gravel, medium dense	**FILL** **SM**	S1	NA	NA	GP	0.0	31.7	3.8/4.0
NA	4	***END OF BORING AT 4.0 fbgs*** ***GROUNDWATER ENCOUNTERED APPROX. 3.5 FBGS***								
NA	8									
NA	12									
NA	16									

301748

Benchmark Environmental Engineering & Science, PLLC — TurnKey

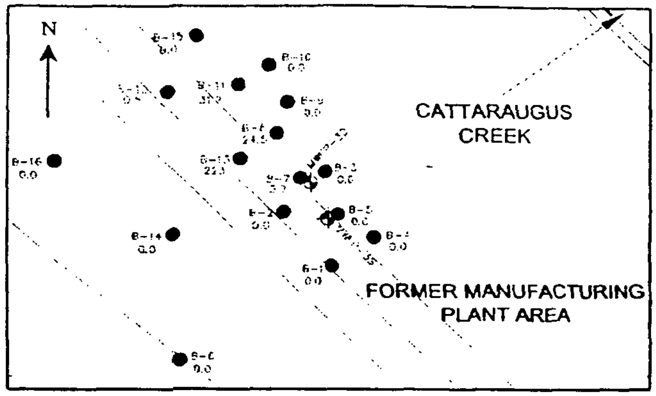
FIELD BOREHOLE LOG

Client:	PCC - Gowanda Site	Project Location:	Gowanda, New York	Boring ID:	B-12
Project Name:	Geoprobe Inv. of Well Cluster MWFP-3	Project Number:	0021-001-400	Use:	Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl):	NA	Total Depth (fbgs):	4.0
Start Date:	04/17/02	Finish Date:	04/17/02
Drilling Company:	Zebra Environmental, Inc.		
Driller:	Chris Donovan		
Helper:	none		
Logged By:	Bryan Hann		
Drill Rig Type:	Geoprobe direct-push ATV mule rig		
Drilling Method:	Direct Push		
Borehole Diameter (inches):	3.0		
Sampling Method:	1.5-inch polyethylene sleeve 4-feet in length		
Water Level(s) (fbgs):	3.5	Water Level(s) (fmsl):	NA

Boring Location:



Notes:

Weather: Sunny, slight breeze (0-5 mph, W/NW), 65-85 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

DENSITY:	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

CONSISTENCY:	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft^2.

MOISTURE:	
DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:	
NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:			
VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
		0.0 - 0.3 **TOPSOIL:** Dark brown, moist, 90% fines, 10% fine gravel, low to medium plasticity, soft with grass rootlets, organics 0.3 - 2.5 **FILL:** Black, moist, ash, clinkers, cinders etc., very loose 2.5 - 3.2 **POORLY GRADED SAND w/ SILT AND GRAVEL:** Dark orange/brown, moist-wet, 70% fine sand, 20% fine sub-angular and sub-rounded gravel, 10% low plasticity fines, dense	**OL/OH FILL SP-SM**	S1	NA	NA	GP	0.0	0.5	3.2/4.0
NA	4	***END OF BORING AT 4.0 fbgs*** ***GROUNDWATER ENCOUNTERED APPROX. 3.5 FBGS***								
NA	8									
NA	12									
NA	16									

301749

BENCHMARK Environmental Engineering & Science, PLLC — TurnKey

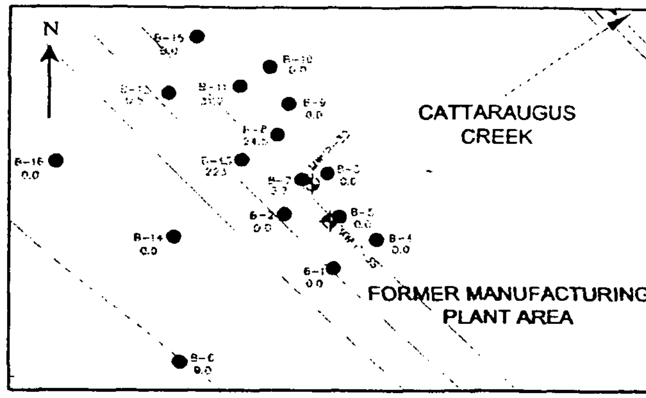
FIELD BOREHOLE LOG

Client:	PCC - Gowanda Site	Project Location:	Gowanda, New York	Boring ID:	**B-13**
Project Name:	Geoprobe Inv. of Well Cluster MWFP-3	Project Number:	0021-001-400	Use:	Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl):	NA	Total Depth (fbgs):	4.0
Start Date:	04/17/02	Finish Date:	04/17/02
Drilling Company:	Zebra Environmental, Inc.		
Driller:	Chris Donovan		
Helper:	none		
Logged By:	Bryan Hann		
Drill Rig Type:	Geoprobe direct-push ATV mule rig		
Drilling Method:	Direct Push		
Borehole Diameter (inches):	3.0		
Sampling Method:	1.5-inch polyethylene sleeve 4-feet in length		
Water Level(s) (fbgs):	3.1	Water Level(s) (fmsl):	NA

Boring Location:



Notes:

Weather: Sunny, slight breeze (0-5 mph, W/NW), 65-85 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

DENSITY:	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

CONSISTENCY:	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft^2.

MOISTURE:	
DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:	
NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:			
VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
		0.0 - 1.8 **TOPSOIL:** Dark brown, moist, 90% fines, 10% fine gravel, low to medium plasticity, soft with grass rootlets, organics 1.8 - 3.5 **FILL:** Black, moist-wet, ash, clinkers, cinders etc., very loose 3.5 - 4.0 **POORLY GRADED SAND w/ SILT:** Dark orange/brown, moist-wet, 90% fine sand, 10% non-plastic fines, medium dense, rapid dilatency	**OL/OH FILL SP-SM**	S1	NA	NA	GP	20.0	223	4.0/4.0
NA	4	***END OF BORING AT 4.0 fbgs*** ***GROUNDWATER ENCOUNTERED APPROX. 3.1 FBGS***								
NA	8									
NA	12									
NA	16									

301750

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE PLLC — TURNKEY

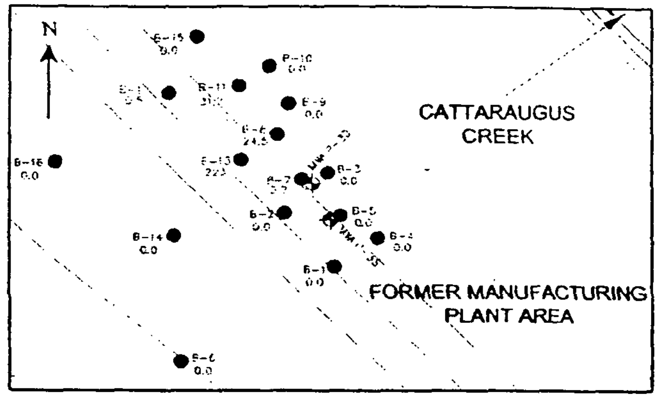
FIELD BOREHOLE LOG

Client:	PCC - Gowanda Site	Project Location:	Gowanda, New York	Boring ID:	**B-14**
Project Name:	Geoprobe Inv. of Well Cluster MWFP-3	Project Number:	0021-001-400	Use:	Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl):	NA	Total Depth (fbgs):	1.6
Start Date:	04/17/02	Finish Date:	04/17/02
Drilling Company:	Zebra Environmental, Inc.		
Driller:	Chris Donovan		
Helper:	none		
Logged By:	Bryan Hann		
Drill Rig Type:	Geoprobe direct-push ATV mule rig		
Drilling Method:	Direct Push		
Borehole Diameter (inches):	3.0		
Sampling Method:	1.5-inch polyethylene sleeve 4-feet in length		
Water Level(s) (fbgs):	NA	Water Level(s) (fmsl):	NA

Boring Location:



Notes:

Weather: Sunny, slight breeze (0-5 mph, W/NW), 65-85 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

DENSITY:	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

CONSISTENCY:	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft^2.

MOISTURE:	
DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:	
NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:			
VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
		0.0 - 0.5 **TOPSOIL:** Dark brown, moist, 90% fines, 10% fine gravel, low to medium plasticity, soft with grass rootlets, organics 0.5 - 1.6 **GRAVELLY ELASTIC SILT:** Dark brown, moist, 60% low plasticity fines, 30% fine angular gravel, 10% fine sand, firm 1.6 - ?? **CONCRETE**	**OL/OH MH**	S1	NA	NA	GP	0.0	0.0	1.6/1.6
NA	4									
		SEVERAL (5) ATTEMPTS MADE IN THE VICINITY OF B-14 REFUSAL AT 1.6 fbgs (concrete) AT EVERY LOCATION NO GROUNDWATER ENCOUNTERED								
NA	8									
NA	12									
NA	16									

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC — TURNKEY

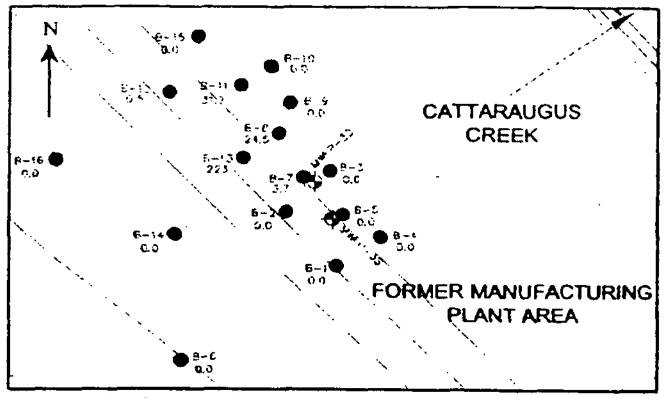
FIELD BOREHOLE LOG

Client:	PCC - Gowanda Site	Project Location:	Gowanda, New York	Boring ID:	B-15
Project Name:	Geoprobe Inv. of Well Cluster MWFP-3	Project Number:	0021-001-400	Use:	Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl):	NA	Total Depth (fbgs):	4.0
Start Date:	04/17/02	Finish Date:	04/17/02
Drilling Company:	Zebra Environmental, Inc.		
Driller:	Chris Donovan		
Helper:	none		
Logged By:	Bryan Hann		
Drill Rig Type:	Geoprobe direct-push ATV mule rig		
Drilling Method:	Direct Push		
Borehole Diameter (inches):	3.0		
Sampling Method:	1.5-inch polyethylene sleeve 4-feet in length		
Water Level(s) (fbgs):	3.0	Water Level(s) (fmsl):	NA

Boring Location:



Notes: Sample collected from 0.5 - 1.5 fbgs and analyzed for TCL VOCs via USEPA Method 8260B.

Weather: Sunny, slight breeze (0-5 mph, W/NW), 65-85 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

DENSITY:	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

CONSISTENCY:	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft^2.

MOISTURE:	
DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:	
NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:			
VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
		0.0 - 0.3 **TOPSOIL:** Dark brown, moist, 90% fines, 10% fine gravel, low to medium plasticity, soft with grass rootlets, organics 0.3 - 2.2 **FILL:** Black, moist, ash, clinkers, cinders etc., very loose 2.2 - 3.0 **SILTY SAND:** Dark orange/brown with orange mottling, moist-wet, 80% fine sand, 20% non to low plasticity fines, loose-medium dense	OL/OH FILL SM	S1	NA	NA	GP	0.0	0.0	3.0/4.0
NA	4									
		END OF BORING AT 4.0 fbgs ***GROUNDWATER ENCOUNTERED APPROX. 3.0 FBGS***								
NA	8									
NA	12									
NA	16									

301752

FIELD BOREHOLE LOG

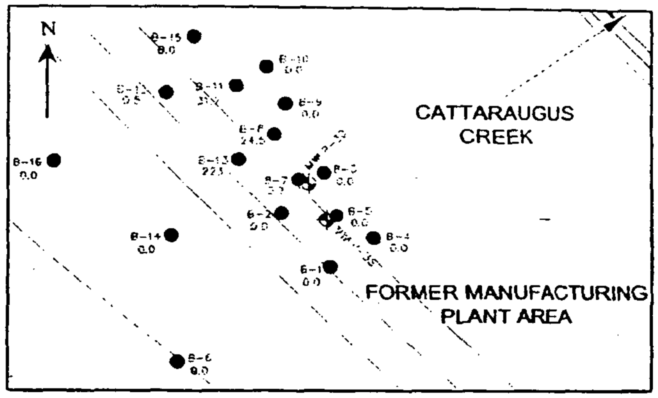
Benchmark Environmental Engineering & Science, PLLC — TurnKey

Client:	PCC - Gowanda Site	Project Location:	Gowanda, New York	Boring ID:	B-16
Project Name:	Geoprobe Inv. of Well Cluster MWFP-3	Project Number:	0021-001-400	Use:	Investigation

DRILLING AND SAMPLING INFORMATION

Surface Elev. (fmsl):	NA	Total Depth (fbgs):	4.0
Start Date:	04/17/02	Finish Date:	04/17/02
Drilling Company:	Zebra Environmental, Inc.		
Driller:	Chris Donovan		
Helper:	none		
Logged By:	Bryan Hann		
Drill Rig Type:	Geoprobe direct-push ATV mule rig		
Drilling Method:	Direct Push		
Borehole Diameter (inches):	3.0		
Sampling Method:	1.5-inch polyethylene sleeve 4-feet in length		
Water Level(s) (fbgs):	2.0 (perched)	Water Level(s) (fmsl):	NA

Boring Location:



Notes: Sample collected from 0.7 - 1.1 fbgs and analyzed for TCL VOCs via USEPA Method 8260B.

Weather: Sunny, slight breeze (0-5 mph, W/NW), 65-85 °F

MODIFIERS: The following Abbreviations should be used in descriptions.

GRADATION:
- % GRAVEL (fine, coarse)
- % SAND (fine, med., coarse)
- % FINES (indicate plasticity)

DENSITY:	N-Value
V. LOOSE	1 - 4
LOOSE	4 - 10
MED. DENSE	10 - 30
DENSE	30 - 50
V. DENSE	> 50

CONSISTENCY:	N-Value	PP
V. SOFT	< 2	0 - 1
SOFT	2 - 4	0 - 1
FIRM	5 - 8	1 - 2
STIFF	9 - 15	2 - 3
V. STIFF	16 - 30	2 - 3
HARD	> 31	3+

* PP = Pocket Penetrometer reading in tons/ft^2.

MOISTURE:	
DRY	absence of moisture
MOIST	damp, no visible water
WET	visible free water

PLASTICITY:	
NONPLASTIC	< 3 mm thread
LOW PLASTICITY	rolled, but crumbles
MEDIUM PLASTICITY	easily rolled, but crumbles
HIGH PLASTICITY	rolled several times, no crumbling

STRUCTURE:			
VARVED	1-12 mm	SLICKENSIDED	glossy shears
STRATIFIED	5 mm	BLOCKY	small lumps
LAMINATED	< 6 mm	LENSED	small pockets
FISSURED	shears	HOMOGENEOUS	

Note: Use Density with Cohesionless Soils and Consistency with Cohesive Soils.

ELEVATION (fmsl)	DEPTH IN FEET	DESCRIPTION: The following order should be followed in describing samples. NOTE: Depth starts at the solid line at the top of the description area. SOIL NAME, COLOR, MOISTURE, GRADATION, PLASTICITY, DENSITY/CONSISTENCY, STRUCTURE, OTHER FEATURES	USCS CODE	SAMPLE NO.	BLOWS PER 6"	N-VALUE	SAMPLE TYPE	PID SCAN (ppm)	PID Headspace (ppm)	FT. REC./ FT. DRIVEN
NA	4	0.0 - 0.3 **TOPSOIL:** Dark brown, moist, 90% fines, 10% fine gravel, low to medium plasticity, soft with grass rootlets, organics 0.3 - 1.9 **SANDY ELASTIC SILT:** Dark brown, moist, 60% low plasticity fines, 30% fine sand, 10% fine angular gravel, firm 1.9 - 2.8 **FILL:** Black, wet, ash, clinkers, cinders etc., very loose 2.8 - 3.1 **SILTY SAND:** Dark red/grey/brown, moist, 60% fine sand, 30% non to low plasticity fines, 10% fine angular gravel, medium dense, loose when disturbed	**OL/OH MH FILL SM**	S1	NA	NA	GP	0.0	0.0	3.1/4.0
NA	8	***END OF BORING AT 4.0 fbgs*** ***PERCED GROUNDWATER ENCOUNTERED APPROX. 2.0 FBGS***								
NA	12									
NA	16									

301753

Data Validation Services

120 Cobble Creek Road P. O. Box 208
North Creek, N. Y. 12853
Phone 518-251-4429
Facsimile 518-251-4428

July 11, 2002

Tom Forbes
Benchmark Environmental
50 Fountain Plaza Suite 1350
Buffalo, NY 14202

RE: Validation of the Peter Cooper Site Data Packages
CAS Sub Nos.R2211551

Dear Mr. Forbes:

Review has been completed for the data packages generated by Columbia Analytical Services pertaining to samples collected at the Peter Cooper site. Ten soil samples collected in Encore samplers 4/16/02 and 4/17/02 were processed for volatiles by USEPA 8260B.

Data validation was performed using guidance from the most current editions of the USEPA Region II validation SOPs HW-24 and HW-6. The following items were reviewed:

* Data Completeness
* Custody Documentation
* Holding Times
* Surrogate Recoveries
* Matrix Spike Recoveries/Duplicate Correlations
* Preparation/Calibration Blanks
* Instrumental Tunes
* Control Spike/Laboratory Control Samples
* Calibration Standards
* Method Compliance
* Sample Result Verification

Those items showing deficiencies are discussed in the following sections of this report. All others were found to be acceptable as outlined in the above-mentioned validation procedures, and as applicable for the methodology. Unless noted specifically in the following text, reported results are substantiated by the raw data, and generated in compliance with protocol requirements.

In summary, sample processing was primarily conducted with compliance to protocol requirements and with adherence to quality criteria, and most reported results are usable as reported, or with minor edit or qualification. The exception is that two samples exhibited a significant matrix effect on target analyte recoveries, resulting in elevated reporting limits and/or qualification as estimated for some compounds.

Copies of the laboratory case narratives are attached and should be reviewed in conjunction with this text. Also included in this submission are copies of the sample report forms, with recommended validation qualifiers and edits applied in red-ink.

Volatile Analyses by EPA 8260B

Four of the samples showed a matrix effect that quenched the response of one or more internal standards. For samples B-1(2-4) and B-2(2-4), the effect produced response for internal standard d5-chlorobenzene in the initial analyses which are just outside the allowable 50% limit (41% and 46%). Results for the six analytes associated with d4-1,4-dichlorobenzene, and used from have been qualified as estimated ("UJ" or "J"), as indicated on the attached edited report forms. The bias is not expected to be great.

Samples B-4(0.5-1.5) and B-9 (0.5-2.5) showed significant depression of responses of surrogate and internal standards in the undiluted analyses (20% for BFB and d5-chlorobenzene, and 6% for d4-1,4-dichlorobenzene).

Results for the seventeen analytes associated with those internal standards must be derived from the dilution analysis of B-9 (0.5-2.5), thus with elevated reporting limits. That sample reported large concentration values for some analytes (flagged as "E", also discussed below) in the initial analyses. However, very depressed internal standard responses can also result in falsely elevated quantitative values for associated detected analytes. The attached report form reflects edits and qualifications for that sample (combined from the two analyses) which best represent the constituency. All results from the initial analysis are qualified estimated due to outlying surrogate recoveries.

Sample B-4(0.5-1.5) was reanalyzed undiluted at 22 days, beyond the allowable holding time, and did not show the matrix effect, giving usable results for the seventeen analytes associated with poor internal standards. It also showed significantly lower concentrations in the reanalysis. The attached report form reflects edits and qualifications for that sample (combined from the two analyses) which best represent the constituency. All results are qualified estimated due to either matrix effect or holding time.

Results for analytes reported with the "E" flag are to be derived from the dilution analyses. Unless detailed otherwise within this report, all other results can be used from the initial analyses.

Acetone detections in B-2(2-4), B-7(0.5-1.5), and B-16(0.7-1.1) are considered contamination due to presence in the associated method blank, and results are edited to reflect nondetection. The results should have been flagged as "B" by the laboratory. Other low level acetone detections should be regarded with caution.

Matrix spike evaluations of all analytes were performed on B-3(2-4). Accuracy and precision were acceptable, with the exception of two elevated duplicate correlations (trichloroethene and chlorobenzene). Reported results are unaffected.

The blind field duplicate of B-4(2-4) showed consistently higher concentrations of detected analytes than the sample itself, but all were within 63%RPD, and no qualification to reported results is required.

Instrument tunes and calibration standard responses were acceptable. Reported results are substantiated by the raw data.

Please do not hesitate to contact me if questions or comments arise during your review of this report.

Very truly yours,

Judy Harry

Judy Harry

CAS ASP/CLP BATCHING FORM / LOGIN SHEET

SDG #:	B-1 (2-4')	BATCH COMPLETE: __yes_________	DATE REVISED: 4/22/02
SUBMISSION	R2211551	DISKETTE REQUESTED: Y___ N__x__	DATE DUE: 5/16/02
CLIENT:	Benchmark	DATE: 04/17/02	PROTOCOL:SW846
CLIENT REP:	Janice Jaeger	CUSTODY SEAL: PRESENT/ABSENT:	SHIPPING No.:
PROJECT:	PETER COOPER, GOWANDA P	CHAIN OF CUSTODY: PRESENT/ABSENT:	

CAS JOB #	CLIENT/EPA ID	MATRIX	REQUESTED PARAMETERS	DATE SAMPLED	DATE RECEIVED	pH (SOLIDS)	% SOLIDS	REMARKS SAMPLE CONDITION
544873	B-1 (2-4')	SOIL	8260	4/16/02	4/17/02			
544874	B-2 (2-4')	SOIL	8260	4/16/02	4/17/02			
544875QC	B-3 (2-4')	SOIL	8260	4/16/02	4/17/02			
544876	B-4 (0.5-1.5')	SOIL	8260	4/16/02	4/17/02			
544877	B-4 (2-4')	SOIL	8260	4/16/02	4/17/02			
544878	BLIND DUPLICATE	SOIL	8260	4/16/02	4/17/02			
544879	B-7 (0.5-1.5')	SOIL	8260	4/16/02	4/17/02			
545109	B-9 (0.5-2.5')	SOIL	8260	4/17/02	4/18/02			
545112	B-15 (0.5-1.5')	SOIL	8260	4/17/02	4/18/02			
545114	B-16 (0.7-1.1')	SOIL	8260	4/17/02	4/18/02			

CASE NARRATIVE

COMPANY: Benchmark
Peter Cooper, Gowanda Project #0021-001-400
SUBMISSION #: R2211551

Benchmark samples were collected on 04/16-17/02 in Encore sample devices and received at CAS on 04/17-18/02 in good condition.

VOLATILE ORGANICS

Ten soil samples were analyzed for a site-specific list of volatiles by method 8260 from SW-846.
All Tuning criteria for BFB were met.

All the initial and continuing calibration criteria were met for all analytes.

All internal standard areas were within QC limits except B-1 (2-4'), B-4 (0.5-1.5'), B-9 (0.5-2.5') and B-2 (2-4'). The samples were repeated as medium level dilutions and all internal standards were within limits. Due to a laboratory error, B-4 (0.5-1.5') was repeated outside the recommended holding time of 14 days. Both sets of data have been reported and all outlying internal standards have been flagged with an "*".

All surrogate standard recoveries were within acceptance limits for all samples except B-4 (0.5-1.5') and B-9 (0.5-2.5'). The samples were repeated and the surrogates were within limits. Due to a laboratory error, B-4 (0.5-1.5') was repeated outside the recommended holding time of 14 days. Both sets of data have been reported out and all outlying surrogates have been flagged with an "*".

Site specific QC was performed on B-3 (2-4'). All MSD and Reference spike recoveries were within limits. All RPD's were within limits except Chlorobenzene and Trichloroethene and have been flagged with an "*". All MS recoveries were within limits except Benzene and Trichloroethene and have been flagged with an "*".

The Laboratory Blanks associated with these analyses were free of contamination except some of the blanks contained Bromomethane, Tetrachloroethene and Acetone. All affected data has been flagged with a "B".

Various compounds for B-1 (2-4'), B-2 (2-4') and B-9 (0.5-2.5') have been flagged with an "E" as being outside the calibration range of the instrument. The samples were repeated at dilutions and both sets of data have been reported out.

All samples were analyzed within required holding times except as mentioned above.

No other analytical or QC problems were encountered.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

1 Mustard Street, Suite 250 ■ Rochester, NY 14609-6925 ■ Telephone (585) 288-5380 ■ Fax (585) 288-8475

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER, GOWANDA PROJECT #0021-001-400
Client Sample ID : B-1 (2-4')

Date Sampled : 04/16/02 09:56 Order #: 544873 Sample Matrix: SOIL/SEDIMENT
Date Received: 04/17/02 Submission #: R2211551 Percent Solid: 80.2

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/24/02			
ANALYTICAL DILUTION: 0.79			Dry Weight
ACETONE	10	20	UG/KG
BENZENE	10	9.9 U	UG/KG
BROMODICHLOROMETHANE	10	9.9 U	UG/KG
BROMOFORM	10	9.9 U	UG/KG
BROMOMETHANE	10	9.9 U	UG/KG
2-BUTANONE (MEK)	10	2.9 J	UG/KG
METHYL TERT-BUTYL ETHER	10	9.9 U	UG/KG
CARBON DISULFIDE	10	9.9 U	UG/KG
CARBON TETRACHLORIDE	10	3.0 J	UG/KG
CHLOROBENZENE	10	9.9 U	UG/KG
CHLOROETHANE	10	9.9 U	UG/KG
CHLOROFORM	10	5.5 J	UG/KG
CHLOROMETHANE	10	9.9 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	10	9.9 U J	UG/KG
CYCLOHEXANE	10	9.9 U	UG/KG
DIBROMOCHLOROMETHANE	10	9.9 U	UG/KG
1,2-DIBROMOETHANE	10	9.9 U	UG/KG
1,2-DICHLOROBENZENE	10	9.9 U J	UG/KG
1,4-DICHLOROBENZENE	10	9.9 U J	UG/KG
1,3-DICHLOROBENZENE	10	9.9 U J	UG/KG
DICHLORODIFLUOROMETHANE	10	9.9 U	UG/KG
1,1-DICHLOROETHANE	10	9.9 U	UG/KG
1,2-DICHLOROETHANE	10	9.9 U	UG/KG
1,1-DICHLOROETHENE	10	9.9 U	UG/KG
TRANS-1,2-DICHLOROETHENE	10	9.9 U	UG/KG
CIS-1,2-DICHLOROETHENE	10	9.9 U	UG/KG
1,2-DICHLOROPROPANE	10	9.9 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	10	9.9 U	UG/KG
CIS-1,3-DICHLOROPROPENE	10	9.9 U	UG/KG
ETHYLBENZENE	10	9.9 U	UG/KG
2-HEXANONE	10	9.9 U	UG/KG
ISOPROPYLBENZENE	10	9.9 U	UG/KG
METHYL ACETATE	10	9.9 U	UG/KG
METHYLCYCLOHEXANE	10	9.9 U	UG/KG
METHYLENE CHLORIDE	10	9.9 U	UG/KG
4-METHYL-2-PENTANONE	10	9.9 U	UG/KG
STYRENE	10	9.9 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	10	9.9 U J	UG/KG
TETRACHLOROETHENE	10	1900 ~~520 E~~	UG/KG
TOLUENE	10	9.9 U	UG/KG
1,2,4-TRICHLOROBENZENE	10	9.9 U J	UG/KG
1,1,1-TRICHLOROETHANE	10	41	UG/KG
1,1,2-TRICHLOROETHANE	10	9.9 U	UG/KG
TRICHLOROETHENE	10	2.5 J	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER, GOWANDA PROJECT #0021-001-400
Client Sample ID : B-1 (2-4')

Date Sampled : 04/16/02 09:56 **Order #:** 544873 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 04/17/02 **Submission #:** R2211551 **Percent Solid:** 80.2

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/24/02			
ANALYTICAL DILUTION: 0.79			Dry Weight
TRICHLOROFLUOROMETHANE	10	9.9 U	UG/KG
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	9.9 U	UG/KG
VINYL CHLORIDE	10	9.9 U	UG/KG
M+P-XYLENE	10	1.4 J	UG/KG
O-XYLENE	10	9.9 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
BROMOFLUOROBENZENE	(42 - 149 %)	55	%
TOLUENE-D8	(71 - 128 %)	84	%
DIBROMOFLUOROMETHANE	(70 - 127 %)	90	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER, GOWANDA PROJECT #0021-001-400
Client Sample ID : B-2 (2-4')

Date Sampled : 04/16/02 10:30 **Order #:** 544874 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 04/17/02 **Submission #:** R2211551 **Percent Solid:** 84.2

DATE ANALYZED : 04/25/02
ANALYTICAL DILUTION: 0.78

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	23 U	UG/KG
BENZENE	10	9.3 U	UG/KG
BROMODICHLOROMETHANE	10	9.3 U	UG/KG
BROMOFORM	10	9.3 U	UG/KG
BROMOMETHANE	10	9.3 U	UG/KG
2-BUTANONE (MEK)	10	9.3 U	UG/KG
METHYL TERT-BUTYL ETHER	10	9.3 U	UG/KG
CARBON DISULFIDE	10	9.3 U	UG/KG
CARBON TETRACHLORIDE	10	17	UG/KG
CHLOROBENZENE	10	9.3 U	UG/KG
CHLOROETHANE	10	9.3 U	UG/KG
CHLOROFORM	10	18	UG/KG
CHLOROMETHANE	10	9.3 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	10	9.3 UJ	UG/KG
CYCLOHEXANE	10	9.3 U	UG/KG
DIBROMOCHLOROMETHANE	10	9.3 U	UG/KG
1,2-DIBROMOETHANE	10	9.3 U	UG/KG
1,2-DICHLOROBENZENE	10	9.3 UJ	UG/KG
1,4-DICHLOROBENZENE	10	9.3 UJ	UG/KG
1,3-DICHLOROBENZENE	10	9.3 UJ	UG/KG
DICHLORODIFLUOROMETHANE	10	9.3 U	UG/KG
1,1-DICHLOROETHANE	10	9.3 U	UG/KG
1,2-DICHLOROETHANE	10	9.3 U	UG/KG
1,1-DICHLOROETHENE	10	9.3 U	UG/KG
TRANS-1,2-DICHLOROETHENE	10	9.3 U	UG/KG
CIS-1,2-DICHLOROETHENE	10	9.3 U	UG/KG
1,2-DICHLOROPROPANE	10	9.3 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	10	9.3 U	UG/KG
CIS-1,3-DICHLOROPROPENE	10	9.3 U	UG/KG
ETHYLBENZENE	10	9.3 U	UG/KG
2-HEXANONE	10	9.3 U	UG/KG
ISOPROPYLBENZENE	10	9.3 U	UG/KG
METHYL ACETATE	10	9.3 U	UG/KG
METHYLCYCLOHEXANE	10	9.3 U	UG/KG
METHYLENE CHLORIDE	10	9.3 U	UG/KG
4-METHYL-2-PENTANONE	10	9.3 U	UG/KG
STYRENE	10	9.3 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	10	9.3 UJ	UG/KG
TETRACHLOROETHENE	10	2900 ~~680 E~~	UG/KG
TOLUENE	10	9.3 U	UG/KG
1,2,4-TRICHLOROBENZENE	10	1.0 J	UG/KG
1,1,1-TRICHLOROETHANE	10	31	UG/KG
1,1,2-TRICHLOROETHANE	10	9.3 U	UG/KG
TRICHLOROETHENE	10	7.4 J	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER, GOWANDA PROJECT #0021-001-400
Client Sample ID : B-2 (2-4')

Date Sampled : 04/16/02 10:30 **Order #:** 544874 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 04/17/02 **Submission #:** R2211551 **Percent Solid:** 84.2

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/25/02			
ANALYTICAL DILUTION: 0.78			Dry Weight
TRICHLOROFLUOROMETHANE	10	9.3 U	UG/KG
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	9.3 U	UG/KG
VINYL CHLORIDE	10	9.3 U	UG/KG
M+P-XYLENE	10	9.3 U	UG/KG
O-XYLENE	10	9.3 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
BROMOFLUOROBENZENE	(42 - 149 %)	53	%
TOLUENE-D8	(71 - 128 %)	83	%
DIBROMOFLUOROMETHANE	(70 - 127 %)	87	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER, GOWANDA PROJECT #0021-001-400
Client Sample ID : B-3 (2-4')

Date Sampled : 04/16/02 11:12 **Order #:** 544875 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 04/17/02 **Submission #:** R2211551 **Percent Solid:** 82.9

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/24/02			
ANALYTICAL DILUTION: 0.75			Dry Weight
ACETONE	10	31	UG/KG
BENZENE	10	9.0 U	UG/KG
BROMODICHLOROMETHANE	10	9.0 U	UG/KG
BROMOFORM	10	9.0 U	UG/KG
BROMOMETHANE	10	9.0 U	UG/KG
2-BUTANONE (MEK)	10	9.0 U	UG/KG
METHYL TERT-BUTYL ETHER	10	9.0 U	UG/KG
CARBON DISULFIDE	10	9.0 U	UG/KG
CARBON TETRACHLORIDE	10	9.5	UG/KG
CHLOROBENZENE	10	9.0 U	UG/KG
CHLOROETHANE	10	9.0 U	UG/KG
CHLOROFORM	10	4.9 J	UG/KG
CHLOROMETHANE	10	9.0 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	10	9.0 U	UG/KG
CYCLOHEXANE	10	9.0 U	UG/KG
DIBROMOCHLOROMETHANE	10	9.0 U	UG/KG
1,2-DIBROMOETHANE	10	9.0 U	UG/KG
1,2-DICHLOROBENZENE	10	9.0 U	UG/KG
1,4-DICHLOROBENZENE	10	9.0 U	UG/KG
1,3-DICHLOROBENZENE	10	9.0 U	UG/KG
DICHLORODIFLUOROMETHANE	10	9.0 U	UG/KG
1,1-DICHLOROETHANE	10	9.0 U	UG/KG
1,2-DICHLOROETHANE	10	9.0 U	UG/KG
1,1-DICHLOROETHENE	10	9.0 U	UG/KG
TRANS-1,2-DICHLOROETHENE	10	9.0 U	UG/KG
CIS-1,2-DICHLOROETHENE	10	9.0 U	UG/KG
1,2-DICHLOROPROPANE	10	9.0 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	10	9.0 U	UG/KG
CIS-1,3-DICHLOROPROPENE	10	9.0 U	UG/KG
ETHYLBENZENE	10	2.5 J	UG/KG
2-HEXANONE	10	9.0 U	UG/KG
ISOPROPYLBENZENE	10	9.0 U	UG/KG
METHYL ACETATE	10	9.0 U	UG/KG
METHYLCYCLOHEXANE	10	9.0 U	UG/KG
METHYLENE CHLORIDE	10	9.0 U	UG/KG
4-METHYL-2-PENTANONE	10	9.0 U	UG/KG
STYRENE	10	9.0 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	10	9.0 U	UG/KG
TETRACHLOROETHENE	10	110	UG/KG
TOLUENE	10	9.0 U	UG/KG
1,2,4-TRICHLOROBENZENE	10	9.0 U	UG/KG
1,1,1-TRICHLOROETHANE	10	14	UG/KG
1,1,2-TRICHLOROETHANE	10	9.0 U	UG/KG
TRICHLOROETHENE	10	3.9 J	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER, GOWANDA PROJECT #0021-001-400
Client Sample ID : B-3 (2-4')

Date Sampled : 04/16/02 11:12 **Order #:** 544875 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 04/17/02 **Submission #:** R2211551 **Percent Solid:** 82.9

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/24/02			
ANALYTICAL DILUTION: 0.75			Dry Weight
TRICHLOROFLUOROMETHANE	10	9.0 U	UG/KG
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	9.0 U	UG/KG
VINYL CHLORIDE	10	9.0 U	UG/KG
M+P-XYLENE	10	9.7	UG/KG
O-XYLENE	10	3.6 J	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
BROMOFLUOROBENZENE	(42 - 149 %)	75	%
TOLUENE-D8	(71 - 128 %)	86	%
DIBROMOFLUOROMETHANE	(70 - 127 %)	89	%

COLUMBIA ANALYTICAL SERVICES 301765

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/22/02

Benchmark
Project Reference: PETER COOPER, GOWANDA PROJECT #0021-001-400
Client Sample ID : B-4 (0.5-1.5')

Date Sampled : 04/16/02 12:13 **Order #:** 544876 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 04/17/02 **Submission #:** R2211551 **Percent Solid:** 82.3

DATE ANALYZED : 04/24/02
ANALYTICAL DILUTION: 1.33

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	57 J	UG/KG
BENZENE	10	2.2 J	UG/KG
BROMODICHLOROMETHANE	10	16 U	UG/KG
BROMOFORM	10	16 U	UG/KG
BROMOMETHANE	10	16 U	UG/KG
2-BUTANONE (MEK)	10	7.7 J	UG/KG
METHYL TERT-BUTYL ETHER	10	16 U	UG/KG
CARBON DISULFIDE	10	5.7 J	UG/KG
CARBON TETRACHLORIDE	10	220	UG/KG
CHLOROBENZENE	10	16 U	UG/KG
CHLOROETHANE	10	16 U	UG/KG
CHLOROFORM	10	84	UG/KG
CHLOROMETHANE	10	16 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	10	16 U	UG/KG
CYCLOHEXANE	10	16 U	UG/KG
DIBROMOCHLOROMETHANE	10	16 U	UG/KG
1,2-DIBROMOETHANE	10	16 U	UG/KG
1,2-DICHLOROBENZENE	10	2.9 J	UG/KG
1,4-DICHLOROBENZENE	10	4.1 J	UG/KG
1,3-DICHLOROBENZENE	10	3.4 J	UG/KG
DICHLORODIFLUOROMETHANE	10	16 U	UG/KG
1,1-DICHLOROETHANE	10	2.2 J	UG/KG
1,2-DICHLOROETHANE	10	16 U	UG/KG
1,1-DICHLOROETHENE	10	16 U	UG/KG
TRANS-1,2-DICHLOROETHENE	10	16 U	UG/KG
CIS-1,2-DICHLOROETHENE	10	16 U	UG/KG
1,2-DICHLOROPROPANE	10	16 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	10	16 U	UG/KG
CIS-1,3-DICHLOROPROPENE	10	16 U	UG/KG
ETHYLBENZENE	10	1.9 J	UG/KG
2-HEXANONE	10	16 U	UG/KG
ISOPROPYLBENZENE	10	6.8 J	UG/KG
METHYL ACETATE	10	16 U	UG/KG
METHYLCYCLOHEXANE	10	6.7 J	UG/KG
METHYLENE CHLORIDE	10	16 U	UG/KG
4-METHYL-2-PENTANONE	10	9.4 J	UG/KG
STYRENE	10	16 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	10	16 U	UG/KG
TETRACHLOROETHENE	10	~~160~~ 3.3 J	UG/KG
TOLUENE	10	3.4 J	UG/KG
1,2,4-TRICHLOROBENZENE	10	6.3 J	UG/KG
1,1,1-TRICHLOROETHANE	10	280	UG/KG
1,1,2-TRICHLOROETHANE	10	16 U	UG/KG
TRICHLOROETHENE	10	1.7 J	UG/KG

COLUMBIA ANALYTICAL SERVICES 301766

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/22/02

Benchmark
Project Reference: PETER COOPER, GOWANDA PROJECT #0021-001-400
Client Sample ID : B-4 (0.5-1.5')

Date Sampled : 04/16/02 12:13 **Order #:** 544876 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 04/17/02 **Submission #:** R2211551 **Percent Solid:** 82.3

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/24/02			
ANALYTICAL DILUTION: 1.33			Dry Weight
TRICHLOROFLUOROMETHANE	10	16 U J	UG/KG
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	16 U	UG/KG
VINYL CHLORIDE	10	16 U	UG/KG
M+P-XYLENE	10	6.0 J	UG/KG
O-XYLENE	10	3.6 J	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
BROMOFLUOROBENZENE	(42 - 149 %)	19 *	%
TOLUENE-D8	(71 - 128 %)	67 *	%
DIBROMOFLUOROMETHANE	(70 - 127 %)	120	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER, GOWANDA PROJECT #0021-001-400
Client Sample ID : B-4 (2-4')

Date Sampled : 04/16/02 12:05 **Order #:** 544877 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 04/17/02 **Submission #:** R2211551 **Percent Solid:** 87.3

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/25/02			
ANALYTICAL DILUTION: 0.79			Dry Weight
ACETONE	10	29	UG/KG
BENZENE	10	9.0 U	UG/KG
BROMODICHLOROMETHANE	10	9.0 U	UG/KG
BROMOFORM	10	9.0 U	UG/KG
BROMOMETHANE	10	9.0 U	UG/KG
2-BUTANONE (MEK)	10	4.6 J	UG/KG
METHYL TERT-BUTYL ETHER	10	9.0 U	UG/KG
CARBON DISULFIDE	10	4.0 J	UG/KG
CARBON TETRACHLORIDE	10	8.0 J	UG/KG
CHLOROBENZENE	10	9.0 U	UG/KG
CHLOROETHANE	10	9.0 U	UG/KG
CHLOROFORM	10	3.0 J	UG/KG
CHLOROMETHANE	10	9.0 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	10	9.0 U	UG/KG
CYCLOHEXANE	10	2.1 J	UG/KG
DIBROMOCHLOROMETHANE	10	9.0 U	UG/KG
1,2-DIBROMOETHANE	10	9.0 U	UG/KG
1,2-DICHLOROBENZENE	10	9.0 U	UG/KG
1,4-DICHLOROBENZENE	10	9.0 U	UG/KG
1,3-DICHLOROBENZENE	10	9.0 U	UG/KG
DICHLORODIFLUOROMETHANE	10	9.0 U	UG/KG
1,1-DICHLOROETHANE	10	9.0 U	UG/KG
1,2-DICHLOROETHANE	10	9.0 U	UG/KG
1,1-DICHLOROETHENE	10	9.0 U	UG/KG
TRANS-1,2-DICHLOROETHENE	10	9.0 U	UG/KG
CIS-1,2-DICHLOROETHENE	10	9.0 U	UG/KG
1,2-DICHLOROPROPANE	10	9.0 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	10	9.0 U	UG/KG
CIS-1,3-DICHLOROPROPENE	10	9.0 U	UG/KG
ETHYLBENZENE	10	1.7 J	UG/KG
2-HEXANONE	10	1.7 J	UG/KG
ISOPROPYLBENZENE	10	9.0 U	UG/KG
METHYL ACETATE	10	9.0 U	UG/KG
METHYLCYCLOHEXANE	10	3.1 J	UG/KG
METHYLENE CHLORIDE	10	9.0 U	UG/KG
4-METHYL-2-PENTANONE	10	9.0 U	UG/KG
STYRENE	10	9.0 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	10	9.0 U	UG/KG
TETRACHLOROETHENE	10	39	UG/KG
TOLUENE	10	1.5 J	UG/KG
1,2,4-TRICHLOROBENZENE	10	9.0 U	UG/KG
1,1,1-TRICHLOROETHANE	10	23	UG/KG
1,1,2-TRICHLOROETHANE	10	9.0 U	UG/KG
TRICHLOROETHENE	10	1.1 J	UG/KG

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COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER, GOWANDA PROJECT #0021-001-400
Client Sample ID : B-4 (2-4')

Date Sampled : 04/16/02 12:05 Order #: 544877 Sample Matrix: SOIL/SEDIMENT
Date Received: 04/17/02 Submission #: R2211551 Percent Solid: 87.3

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/25/02			
ANALYTICAL DILUTION: 0.79			Dry Weight
TRICHLOROFLUOROMETHANE	10	9.0 U	UG/KG
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	9.0 U	UG/KG
VINYL CHLORIDE	10	9.0 U	UG/KG
M+P-XYLENE	10	4.9 J	UG/KG
O-XYLENE	10	9.0 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
BROMOFLUOROBENZENE	(42 - 149 %)	76	%
TOLUENE-D8	(71 - 128 %)	87	%
DIBROMOFLUOROMETHANE	(70 - 127 %)	90	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER, GOWANDA PROJECT #0021-001-400
Client Sample ID : BLIND DUPLICATE

Date Sampled : 04/16/02 **Order #:** 544878 **Sample Matrix:** SOIL/SEDIMEN
Date Received: 04/17/02 **Submission #:** R2211551 **Percent Solid:** 84.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/25/02			
ANALYTICAL DILUTION: 0.77			Dry Weight
ACETONE	10	23	UG/KG
BENZENE	10	3.3 J	UG/KG
BROMODICHLOROMETHANE	10	9.2 U	UG/KG
BROMOFORM	10	9.2 U	UG/KG
BROMOMETHANE	10	9.2 U	UG/KG
2-BUTANONE (MEK)	10	4.5 J	UG/KG
METHYL TERT-BUTYL ETHER	10	9.2 U	UG/KG
CARBON DISULFIDE	10	17	UG/KG
CARBON TETRACHLORIDE	10	14	UG/KG
CHLOROBENZENE	10	9.2 U	UG/KG
CHLOROETHANE	10	9.2 U	UG/KG
CHLOROFORM	10	4.2 J	UG/KG
CHLOROMETHANE	10	9.2 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	10	9.2 U	UG/KG
CYCLOHEXANE	10	11	UG/KG
DIBROMOCHLOROMETHANE	10	9.2 U	UG/KG
1,2-DIBROMOETHANE	10	9.2 U	UG/KG
1,2-DICHLOROBENZENE	10	9.2 U	UG/KG
1,4-DICHLOROBENZENE	10	9.2 U	UG/KG
1,3-DICHLOROBENZENE	10	9.2 U	UG/KG
DICHLORODIFLUOROMETHANE	10	9.2 U	UG/KG
1,1-DICHLOROETHANE	10	9.2 U	UG/KG
1,2-DICHLOROETHANE	10	9.2 U	UG/KG
1,1-DICHLOROETHENE	10	9.2 U	UG/KG
TRANS-1,2-DICHLOROETHENE	10	9.2 U	UG/KG
CIS-1,2-DICHLOROETHENE	10	9.2 U	UG/KG
1,2-DICHLOROPROPANE	10	9.2 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	10	9.2 U	UG/KG
CIS-1,3-DICHLOROPROPENE	10	9.2 U	UG/KG
ETHYLBENZENE	10	2.4 J	UG/KG
2-HEXANONE	10	9.2 U	UG/KG
ISOPROPYLBENZENE	10	9.2 U	UG/KG
METHYL ACETATE	10	9.2 U	UG/KG
METHYLCYCLOHEXANE	10	17	UG/KG
METHYLENE CHLORIDE	10	9.2 U	UG/KG
4-METHYL-2-PENTANONE	10	9.2 U	UG/KG
STYRENE	10	9.2 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	10	9.2 U	UG/KG
TETRACHLOROETHENE	10	75	UG/KG
TOLUENE	10	7.1 J	UG/KG
1,2,4-TRICHLOROBENZENE	10	9.2 U	UG/KG
1,1,1-TRICHLOROETHANE	10	36	UG/KG
1,1,2-TRICHLOROETHANE	10	9.2 U	UG/KG
TRICHLOROETHENE	10	1.7 J	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER, GOWANDA PROJECT #0021-001-400
Client Sample ID : BLIND DUPLICATE

Date Sampled : 04/16/02 Order #: 544878 Sample Matrix: SOIL/SEDIMENT
Date Received: 04/17/02 Submission #: R2211551 Percent Solid: 84.1

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/25/02			
ANALYTICAL DILUTION: 0.77			Dry Weight
TRICHLOROFLUOROMETHANE	10	9.2 U	UG/KG
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	9.2 U	UG/KG
VINYL CHLORIDE	10	9.2 U	UG/KG
M+P-XYLENE	10	4.8 J	UG/KG
O-XYLENE	10	3.6 J	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
BROMOFLUOROBENZENE	(42 - 149 %)	70	%
TOLUENE-D8	(71 - 128 %)	87	%
DIBROMOFLUOROMETHANE	(70 - 127 %)	84	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER, GOWANDA PROJECT #0021-001-400
Client Sample ID : B-7 (0.5-1.5')

Date Sampled : 04/16/02 15:09 Order #: 544879 Sample Matrix: SOIL/SEDIME
Date Received: 04/17/02 Submission #: R2211551 Percent Solid: 87.3

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/25/02			
ANALYTICAL DILUTION: 0.88			Dry Weight
ACETONE	10	14 u	UG/KG
BENZENE	10	10 U	UG/KG
BROMODICHLOROMETHANE	10	10 U	UG/KG
BROMOFORM	10	10 U	UG/KG
BROMOMETHANE	10	10 U	UG/KG
2-BUTANONE (MEK)	10	10 U	UG/KG
METHYL TERT-BUTYL ETHER	10	10 U	UG/KG
CARBON DISULFIDE	10	10 U	UG/KG
CARBON TETRACHLORIDE	10	8.5 J	UG/KG
CHLOROBENZENE	10	10 U	UG/KG
CHLOROETHANE	10	10 U	UG/KG
CHLOROFORM	10	15	UG/KG
CHLOROMETHANE	10	10 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	10	10 U	UG/KG
CYCLOHEXANE	10	10 U	UG/KG
DIBROMOCHLOROMETHANE	10	10 U	UG/KG
1,2-DIBROMOETHANE	10	10 U	UG/KG
1,2-DICHLOROBENZENE	10	10 U	UG/KG
1,4-DICHLOROBENZENE	10	10 U	UG/KG
1,3-DICHLOROBENZENE	10	10 U	UG/KG
DICHLORODIFLUOROMETHANE	10	10 U	UG/KG
1,1-DICHLOROETHANE	10	10 U	UG/KG
1,2-DICHLOROETHANE	10	10 U	UG/KG
1,1-DICHLOROETHENE	10	10 U	UG/KG
TRANS-1,2-DICHLOROETHENE	10	10 U	UG/KG
CIS-1,2-DICHLOROETHENE	10	10 U	UG/KG
1,2-DICHLOROPROPANE	10	10 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	10	10 U	UG/KG
CIS-1,3-DICHLOROPROPENE	10	10 U	UG/KG
ETHYLBENZENE	10	10 U	UG/KG
2-HEXANONE	10	10 U	UG/KG
ISOPROPYLBENZENE	10	10 U	UG/KG
METHYL ACETATE	10	10 U	UG/KG
METHYLCYCLOHEXANE	10	1.1 J	UG/KG
METHYLENE CHLORIDE	10	10 U	UG/KG
4-METHYL-2-PENTANONE	10	10 U	UG/KG
STYRENE	10	10 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	10	10 U	UG/KG
TETRACHLOROETHENE	10	44	UG/KG
TOLUENE	10	10 U	UG/KG
1,2,4-TRICHLOROBENZENE	10	10 U	UG/KG
1,1,1-TRICHLOROETHANE	10	16	UG/KG
1,1,2-TRICHLOROETHANE	10	10 U	UG/KG
TRICHLOROETHENE	10	2.6 J	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER, GOWANDA PROJECT #0021-001-400
Client Sample ID : B-7 (0.5-1.5')

Date Sampled : 04/16/02 15:09 Order #: 544879 Sample Matrix: SOIL/SEDIMENT
Date Received: 04/17/02 Submission #: R2211551 Percent Solid: 87.3

ANALYTE		PQL	RESULT	UNITS
DATE ANALYZED : 04/25/02				
ANALYTICAL DILUTION: 0.88				Dry Weight
TRICHLOROFLUOROMETHANE		10	10 U	UG/KG
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH		10	10 U	UG/KG
VINYL CHLORIDE		10	10 U	UG/KG
M+P-XYLENE		10	10 U	UG/KG
O-XYLENE		10	10 U	UG/KG
SURROGATE RECOVERIES	QC LIMITS			
BROMOFLUOROBENZENE	(42 - 149 %)		83	%
TOLUENE-D8	(71 - 128 %)		90	%
DIBROMOFLUOROMETHANE	(70 - 127 %)		84	%

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/22/02

Benchmark
Project Reference: PETER COOPER - GOWANDA PROJECT #0021-001-400
Client Sample ID : B-9 (0.5-2.5')

Date Sampled : 04/17/02 12:10 **Order #:** 545109 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 04/18/02 **Submission #:** R2211551 **Percent Solid:** 80.6

DATE ANALYZED : 04/25/02
ANALYTICAL DILUTION: 1.10

ANALYTE	PQL	RESULT	UNITS
			Dry Weight
ACETONE	10	150 J	UG/KG
BENZENE	10	2.4 J	UG/KG
BROMODICHLOROMETHANE	10	14 U J	UG/KG
BROMOFORM	10	1400 U ~~14 U~~	UG/KG
BROMOMETHANE	10	14 U J	UG/KG
2-BUTANONE (MEK)	10	15	UG/KG
METHYL TERT-BUTYL ETHER	10	14 U	UG/KG
CARBON DISULFIDE	10	1.7 J	UG/KG
CARBON TETRACHLORIDE	10	21	UG/KG
CHLOROBENZENE	10	1400 U ~~14 U~~	UG/KG
CHLOROETHANE	10	14 U J	UG/KG
CHLOROFORM	10	14	UG/KG
CHLOROMETHANE	10	14 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	10	1400 U ~~14 U~~	UG/KG
CYCLOHEXANE	10	5.2 J	UG/KG
DIBROMOCHLOROMETHANE	10	1400 U ~~14 U~~	UG/KG
1,2-DIBROMOETHANE	10	~~14 U~~	UG/KG
1,2-DICHLOROBENZENE	10	~~14 U~~	UG/KG
1,4-DICHLOROBENZENE	10	1.9 J J	UG/KG
1,3-DICHLOROBENZENE	10	1.6 J	UG/KG
DICHLORODIFLUOROMETHANE	10	14 U	UG/KG
1,1-DICHLOROETHANE	10	14 U	UG/KG
1,2-DICHLOROETHANE	10	14 U	UG/KG
1,1-DICHLOROETHENE	10	14 U	UG/KG
TRANS-1,2-DICHLOROETHENE	10	14 U	UG/KG
CIS-1,2-DICHLOROETHENE	10	14 U	UG/KG
1,2-DICHLOROPROPANE	10	14 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	10	14 U	UG/KG
CIS-1,3-DICHLOROPROPENE	10	14 U	UG/KG
ETHYLBENZENE	10	8.6 J	UG/KG
2-HEXANONE	10	1400 U ~~14 U~~	UG/KG
ISOPROPYLBENZENE	10	14 U J	UG/KG
METHYL ACETATE	10	14 U	UG/KG
METHYLCYCLOHEXANE	10	9.2 J	UG/KG
METHYLENE CHLORIDE	10	14 U	UG/KG
4-METHYL-2-PENTANONE	10	14 U	UG/KG
STYRENE	10	1400 U ~~14 U~~	UG/KG
1,1,2,2-TETRACHLOROETHANE	10	1400 U ~~14 U~~	UG/KG
TETRACHLOROETHENE	10	15,000 ~~740 E~~	UG/KG
TOLUENE	10	3700 ~~11 J~~	UG/KG
1,2,4-TRICHLOROBENZENE	10	3.5 J J	UG/KG
1,1,1-TRICHLOROETHANE	10	98	UG/KG
1,1,2-TRICHLOROETHANE	10	14 U	UG/KG
TRICHLOROETHENE	10	4.6 J	UG/KG

COLUMBIA ANALYTICAL SERVICES

301774

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/22/02

Benchmark
Project Reference: PETER COOPER - GOWANDA PROJECT #0021-001-400
Client Sample ID : B-9 (0.5-2.5')

Date Sampled : 04/17/02 12:10 **Order #:** 545109 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 04/18/02 **Submission #:** R2211551 **Percent Solid:** 80.6

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/25/02			
ANALYTICAL DILUTION: 1.10			Dry Weight
TRICHLOROFLUOROMETHANE	10	14 U J	UG/KG
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	14 U	UG/KG
VINYL CHLORIDE	10	14 U	UG/KG
M+P-XYLENE	10	5000 ~~35~~	UG/KG
O-XYLENE	10	3.7 J J	UG/KG

SURROGATE RECOVERIES	QC LIMITS		
BROMOFLUOROBENZENE	(42 - 149 %)	19 *	%
TOLUENE-D8	(71 - 128 %)	70 *	%
DIBROMOFLUOROMETHANE	(70 - 127 %)	110	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER - GOWANDA PROJECT #0021-001-400
Client Sample ID : B-15 (0.5-1.5')

Date Sampled : 04/17/02 11:02 **Order #:** 545112 **Sample Matrix:** SOIL/SEDIME
Date Received: 04/18/02 **Submission #:** R2211551 **Percent Solid:** 88.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/25/02			
ANALYTICAL DILUTION: 0.79			Dry Weight
ACETONE	10	36	UG/KG
BENZENE	10	9.0 U	UG/KG
BROMODICHLOROMETHANE	10	9.0 U	UG/KG
BROMOFORM	10	9.0 U	UG/KG
BROMOMETHANE	10	9.0 U	UG/KG
2-BUTANONE (MEK)	10	2.6 J	UG/KG
METHYL TERT-BUTYL ETHER	10	9.0 U	UG/KG
CARBON DISULFIDE	10	9.0 U	UG/KG
CARBON TETRACHLORIDE	10	9.0 U	UG/KG
CHLOROBENZENE	10	9.0 U	UG/KG
CHLOROETHANE	10	9.0 U	UG/KG
CHLOROFORM	10	9.0 U	UG/KG
CHLOROMETHANE	10	9.0 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	10	9.0 U	UG/KG
CYCLOHEXANE	10	3.9 J	UG/KG
DIBROMOCHLOROMETHANE	10	9.0 U	UG/KG
1,2-DIBROMOETHANE	10	9.0 U	UG/KG
1,2-DICHLOROBENZENE	10	9.0 U	UG/KG
1,4-DICHLOROBENZENE	10	9.0 U	UG/KG
1,3-DICHLOROBENZENE	10	9.0 U	UG/KG
DICHLORODIFLUOROMETHANE	10	9.0 U	UG/KG
1,1-DICHLOROETHANE	10	9.0 U	UG/KG
1,2-DICHLOROETHANE	10	9.0 U	UG/KG
1,1-DICHLOROETHENE	10	9.0 U	UG/KG
TRANS-1,2-DICHLOROETHENE	10	9.0 U	UG/KG
CIS-1,2-DICHLOROETHENE	10	9.0 U	UG/KG
1,2-DICHLOROPROPANE	10	9.0 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	10	9.0 U	UG/KG
CIS-1,3-DICHLOROPROPENE	10	9.0 U	UG/KG
ETHYLBENZENE	10	9.0 U	UG/KG
2-HEXANONE	10	9.0 U	UG/KG
ISOPROPYLBENZENE	10	1.1 J	UG/KG
METHYL ACETATE	10	2.8 J	UG/KG
METHYLCYCLOHEXANE	10	5.8 J	UG/KG
METHYLENE CHLORIDE	10	9.0 U	UG/KG
4-METHYL-2-PENTANONE	10	3.0 J	UG/KG
STYRENE	10	9.0 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	10	9.0 U	UG/KG
TETRACHLOROETHENE	10	1.1 J	UG/KG
TOLUENE	10	1.7 J	UG/KG
1,2,4-TRICHLOROBENZENE	10	9.0 U	UG/KG
1,1,1-TRICHLOROETHANE	10	2.4 J	UG/KG
1,1,2-TRICHLOROETHANE	10	9.0 U	UG/KG
TRICHLOROETHENE	10	9.0 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER - GOWANDA PROJECT #0021-001-400
Client Sample ID : B-15 (0.5-1.5')

Date Sampled : 04/17/02 11:02 **Order #:** 545112 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 04/18/02 **Submission #:** R2211551 **Percent Solid:** 88.0

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/25/02			
ANALYTICAL DILUTION: 0.79			Dry Weight
TRICHLOROFLUOROMETHANE	10	9.0 U	UG/KG
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	9.0 U	UG/KG
VINYL CHLORIDE	10	9.0 U	UG/KG
M+P-XYLENE	10	2.3 J	UG/KG
O-XYLENE	10	9.0 U	UG/KG

SURROGATE RECOVERIES	QC LIMITS	RESULT	UNITS
BROMOFLUOROBENZENE	(42 - 149 %)	64	%
TOLUENE-D8	(71 - 128 %)	85	%
DIBROMOFLUOROMETHANE	(70 - 127 %)	90	%

COLUMBIA ANALYTICAL SERVICES

VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER - GOWANDA PROJECT #0021-001-400
Client Sample ID : B-16 (0.7-1.1')

Date Sampled : 04/17/02 11:55 **Order #:** 545114 **Sample Matrix:** SOIL/SEDIME
Date Received: 04/18/02 **Submission #:** R2211551 **Percent Solid:** 89.2

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/25/02			
ANALYTICAL DILUTION: 0.84			Dry Weight
ACETONE	10	21 U	UG/KG
BENZENE	10	9.4 U	UG/KG
BROMODICHLOROMETHANE	10	9.4 U	UG/KG
BROMOFORM	10	9.4 U	UG/KG
BROMOMETHANE	10	9.4 U	UG/KG
2-BUTANONE (MEK)	10	9.4 U	UG/KG
METHYL TERT-BUTYL ETHER	10	9.4 U	UG/KG
CARBON DISULFIDE	10	9.4 U	UG/KG
CARBON TETRACHLORIDE	10	9.4 U	UG/KG
CHLOROBENZENE	10	9.4 U	UG/KG
CHLOROETHANE	10	9.4 U	UG/KG
CHLOROFORM	10	9.4 U	UG/KG
CHLOROMETHANE	10	9.4 U	UG/KG
1,2-DIBROMO-3-CHLOROPROPANE	10	9.4 U	UG/KG
CYCLOHEXANE	10	9.4 U	UG/KG
DIBROMOCHLOROMETHANE	10	9.4 U	UG/KG
1,2-DIBROMOETHANE	10	9.4 U	UG/KG
1,2-DICHLOROBENZENE	10	9.4 U	UG/KG
1,4-DICHLOROBENZENE	10	9.4 U	UG/KG
1,3-DICHLOROBENZENE	10	9.4 U	UG/KG
DICHLORODIFLUOROMETHANE	10	9.4 U	UG/KG
1,1-DICHLOROETHANE	10	9.4 U	UG/KG
1,2-DICHLOROETHANE	10	9.4 U	UG/KG
1,1-DICHLOROETHENE	10	9.4 U	UG/KG
TRANS-1,2-DICHLOROETHENE	10	9.4 U	UG/KG
CIS-1,2-DICHLOROETHENE	10	9.4 U	UG/KG
1,2-DICHLOROPROPANE	10	9.4 U	UG/KG
TRANS-1,3-DICHLOROPROPENE	10	9.4 U	UG/KG
CIS-1,3-DICHLOROPROPENE	10	9.4 U	UG/KG
ETHYLBENZENE	10	9.4 U	UG/KG
2-HEXANONE	10	9.4 U	UG/KG
ISOPROPYLBENZENE	10	9.4 U	UG/KG
METHYL ACETATE	10	9.4 U	UG/KG
METHYLCYCLOHEXANE	10	0.96 J	UG/KG
METHYLENE CHLORIDE	10	9.4 U	UG/KG
4-METHYL-2-PENTANONE	10	2.1 J	UG/KG
STYRENE	10	9.4 U	UG/KG
1,1,2,2-TETRACHLOROETHANE	10	9.4 U	UG/KG
TETRACHLOROETHENE	10	31	UG/KG
TOLUENE	10	9.4 U	UG/KG
1,2,4-TRICHLOROBENZENE	10	9.4 U	UG/KG
1,1,1-TRICHLOROETHANE	10	1.6 J	UG/KG
1,1,2-TRICHLOROETHANE	10	9.4 U	UG/KG
TRICHLOROETHENE	10	9.4 U	UG/KG

COLUMBIA ANALYTICAL SERVICES

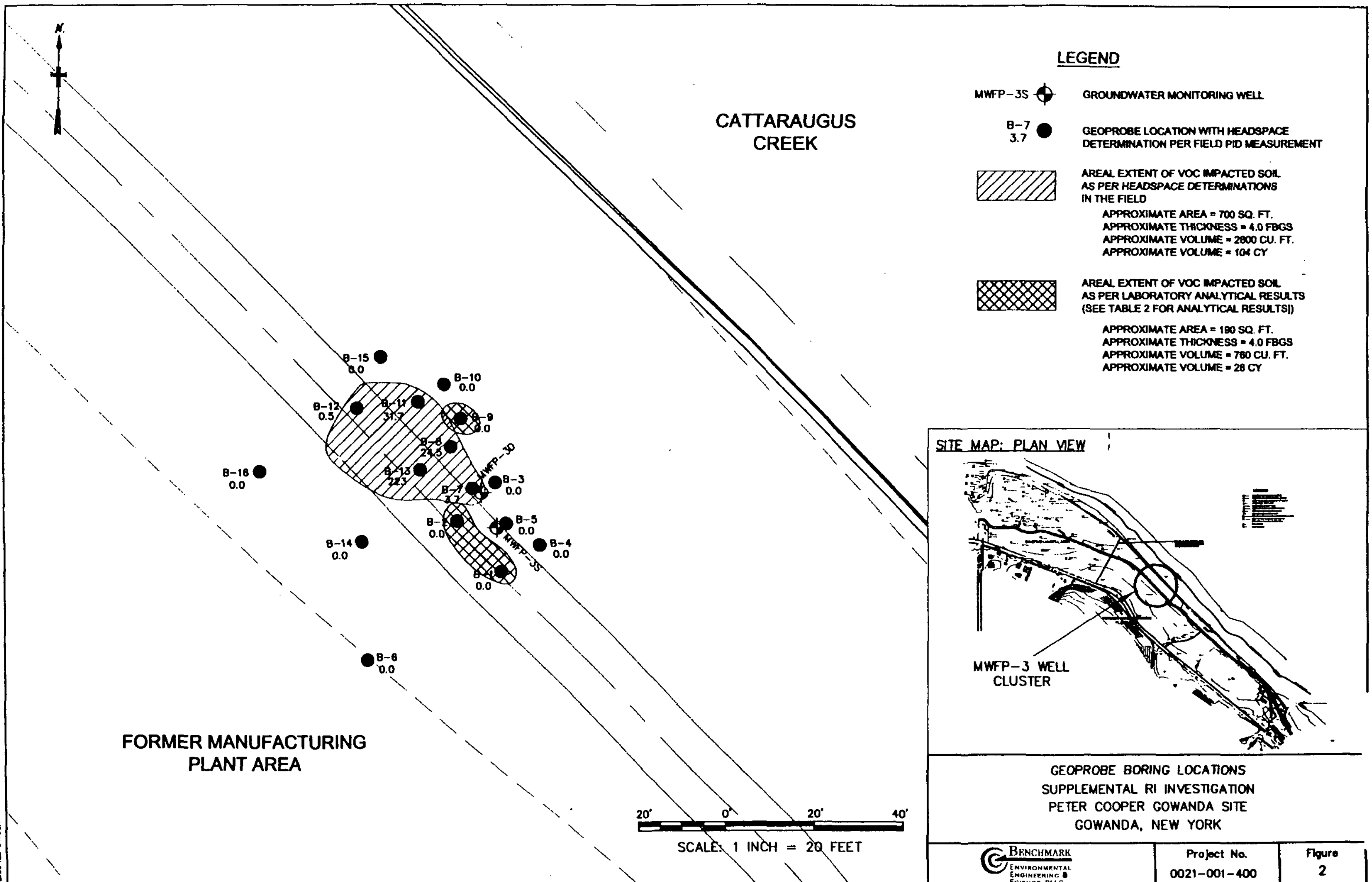
VOLATILE ORGANICS
METHOD 8260B
Reported: 05/14/02

Benchmark
Project Reference: PETER COOPER - GOWANDA PROJECT #0021-001-400
Client Sample ID : B-16 (0.7-1.1')

Date Sampled : 04/17/02 11:55 **Order #:** 545114 **Sample Matrix:** SOIL/SEDIMENT
Date Received: 04/18/02 **Submission #:** R2211551 **Percent Solid:** 89.2

ANALYTE	PQL	RESULT	UNITS
DATE ANALYZED : 04/25/02			
ANALYTICAL DILUTION: 0.84			Dry Weight
TRICHLOROFLUOROMETHANE	10	9.4 U	UG/KG
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETH	10	9.4 U	UG/KG
VINYL CHLORIDE	10	9.4 U	UG/KG
M+P-XYLENE	10	1.6 J	UG/KG
O-XYLENE	10	9.4 U	UG/KG

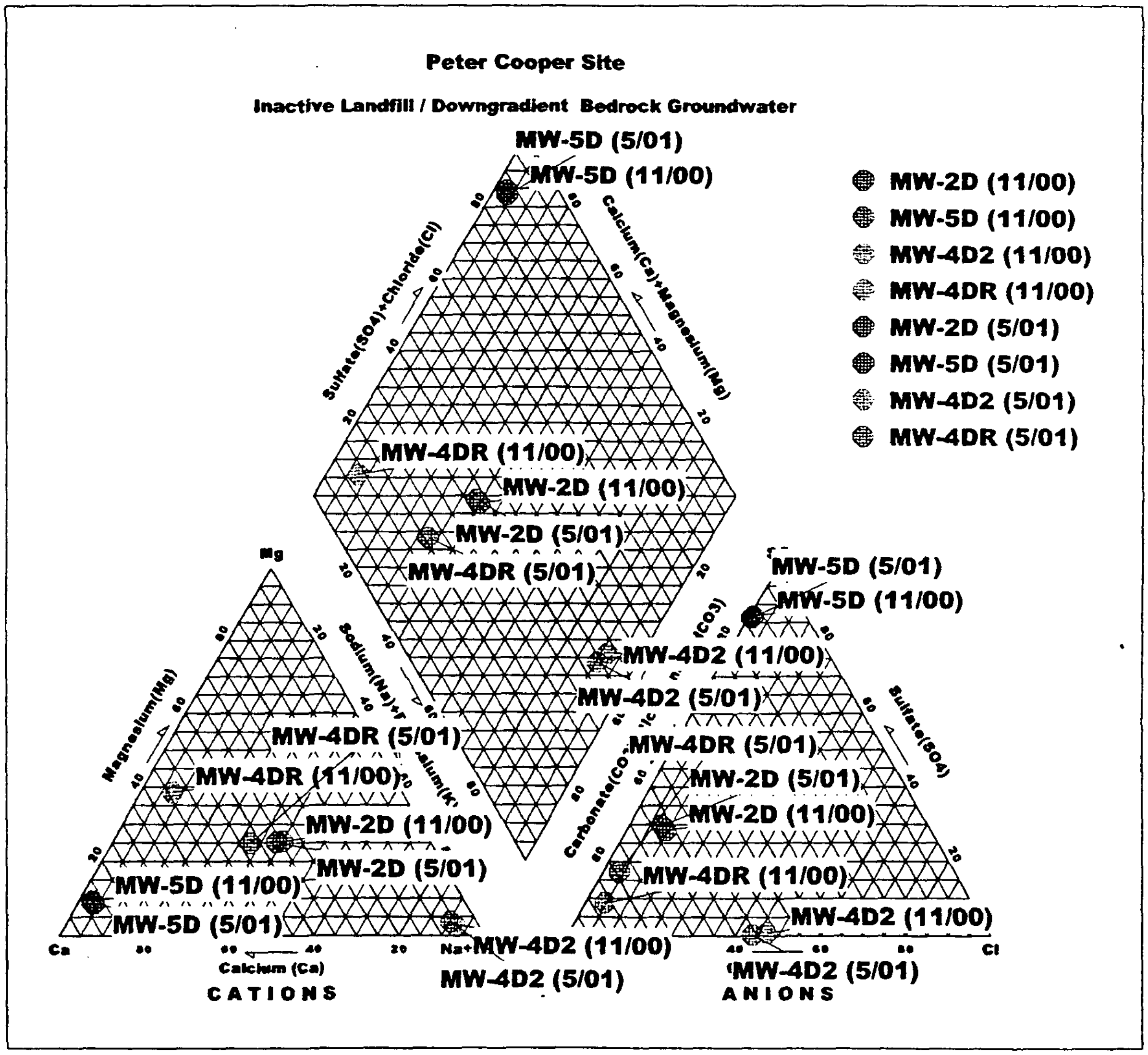
SURROGATE RECOVERIES	QC LIMITS		
BROMOFLUOROBENZENE	(42 - 149 %)	75	%
TOLUENE-D8	(71 - 128 %)	87	%
DIBROMOFLUOROMETHANE	(70 - 127 %)	89	%


N
CATTARAUGUS CREEK
FORMER MANUFACTURING PLANT AREA
LEGEND
MWFP-3S GROUNDWATER MONITORING WELL
B-7 3.7 GEOPROBE LOCATION WITH HEADSPACE DETERMINATION PER FIELD PID MEASUREMENT
AREAL EXTENT OF VOC IMPACTED SOIL AS PER HEADSPACE DETERMINATIONS IN THE FIELD
APPROXIMATE AREA = 700 SQ. FT.
APPROXIMATE THICKNESS = 4.0 FBGS
APPROXIMATE VOLUME = 2800 CU. FT.
APPROXIMATE VOLUME = 104 CY
AREAL EXTENT OF VOC IMPACTED SOIL AS PER LABORATORY ANALYTICAL RESULTS (SEE TABLE 2 FOR ANALYTICAL RESULTS])
APPROXIMATE AREA = 190 SQ. FT.
APPROXIMATE THICKNESS = 4.0 FBGS
APPROXIMATE VOLUME = 760 CU. FT.
APPROXIMATE VOLUME = 28 CY
B-15 0.0
B-10 0.0
B-12 0.5
B-11 31.7
B-9 0.0
B-8 24.5
B-13 223
B-16 0.0
B-7 3.7
MWFP-3D
B-3 0.0
B-5 0.0
MWFP-3S
B-4 0.0
B-14 0.0
0.0
B-6 0.0
20' 0' 20' 40'
SCALE: 1 INCH = 20 FEET
SITE MAP: PLAN VIEW
MWFP-3 WELL CLUSTER
GEOPROBE BORING LOCATIONS
SUPPLEMENTAL RI INVESTIGATION
PETER COOPER GOWANDA SITE
GOWANDA, NEW YORK
BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC
Project No. 0021-001-400
Figure 2

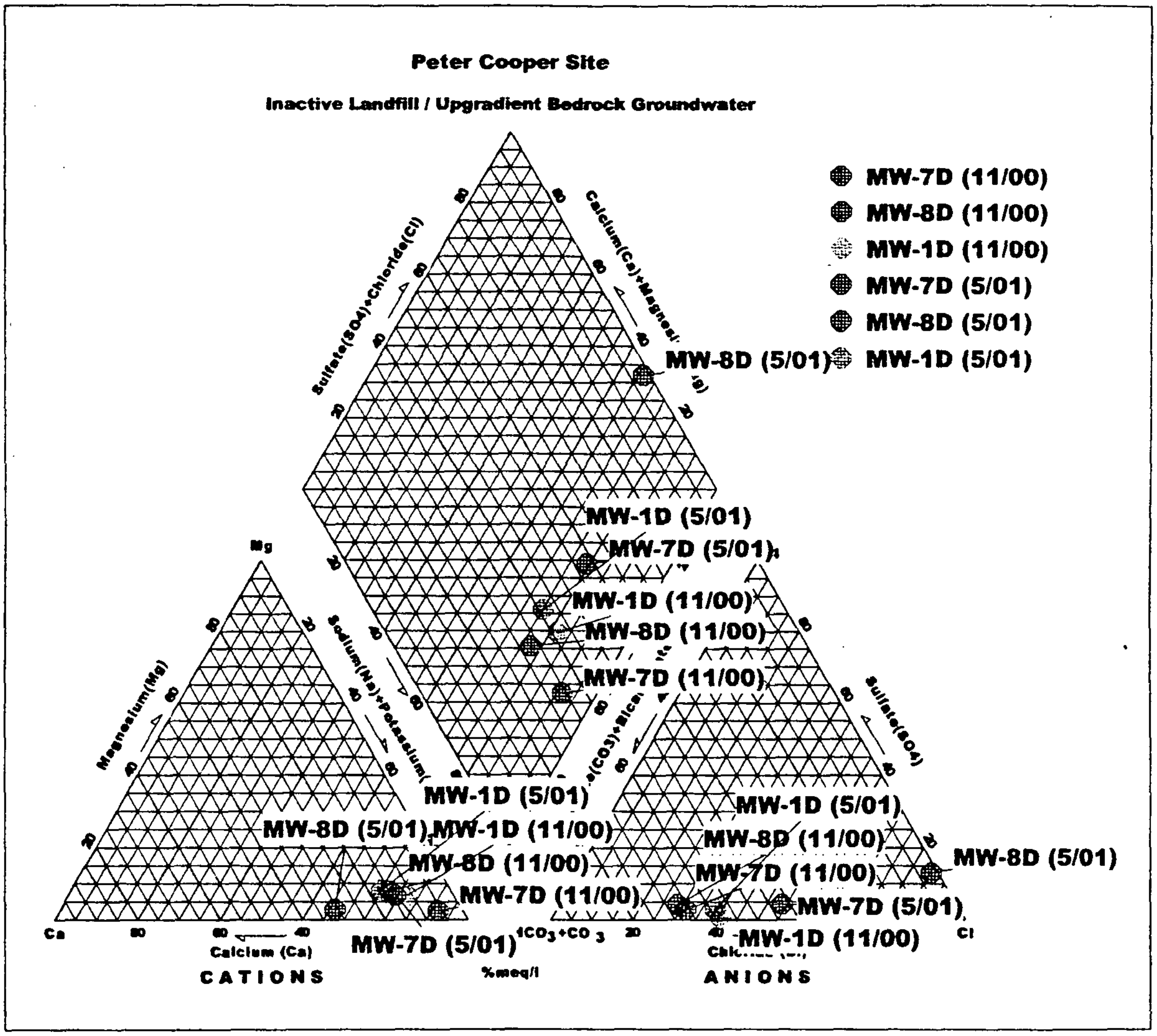
301779

APPENDIX G

APPENDIX Q
Piper Hydrochemical Facies Plots

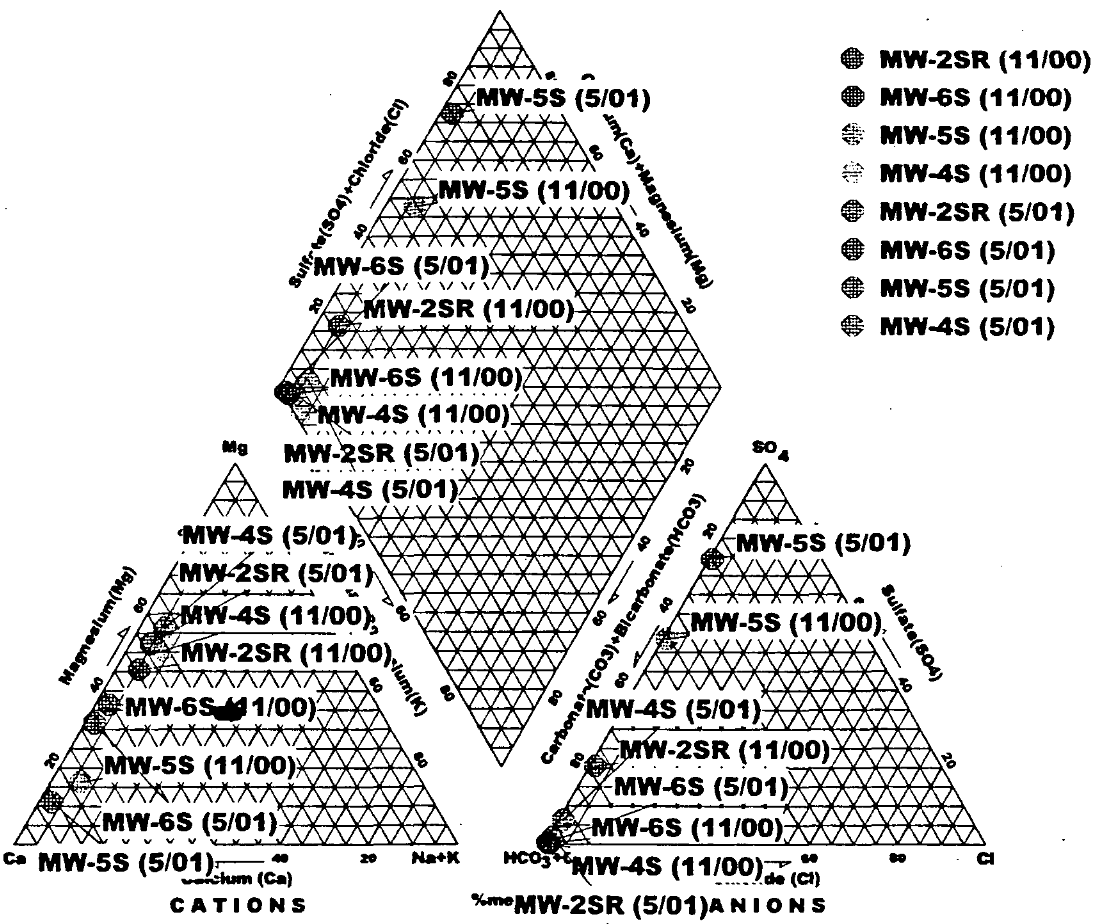

Peter Cooper Site
Inactive Landfill / Downgradient Bedrock Groundwater
MW-2D (11/00)
MW-5D (11/00)
MW-4D2 (11/00)
MW-4DR (11/00)
MW-2D (5/01)
MW-5D (5/01)
MW-4D2 (5/01)
MW-4DR (5/01)
Sulfate(SO4)+Chloride(Cl)
Calcium(Ca)+Magnesium(Mg)
Mg
Magnesium(Mg)
Ca
Calcium (Ca)
Na+
CATIONS
Sulfate(SO4)
Cl
ANIONS

301782


Peter Cooper Site
Inactive Landfill / Upgradient Bedrock Groundwater
MW-7D (11/00)
MW-8D (11/00)
MW-1D (11/00)
MW-7D (5/01)
MW-8D (5/01)
MW-1D (5/01)
CATIONS
%meq/l
ANIONS
Calcium (Ca)
Magnesium(Mg)
Sodium(Na)+Potassium(
Sulfate(SO4)
Cl
Ca
Mg

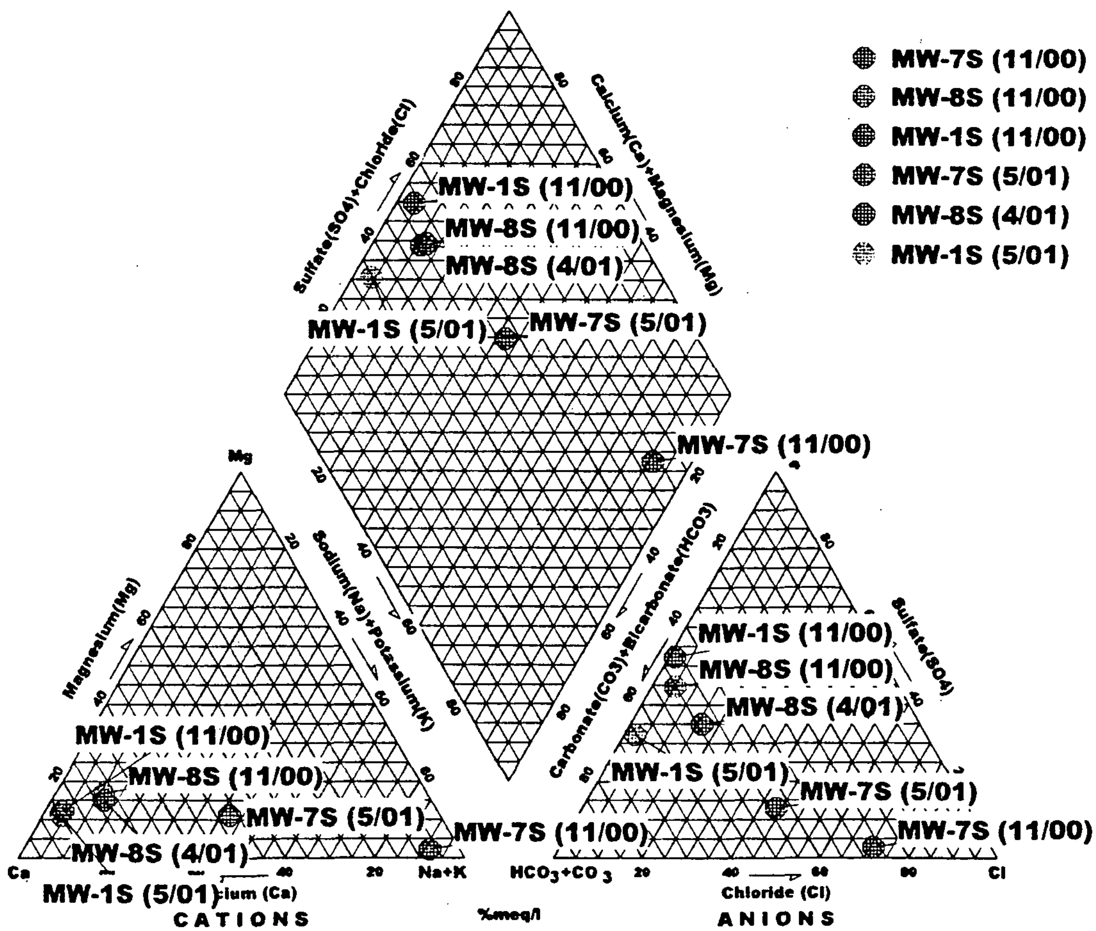
Peter Cooper Site

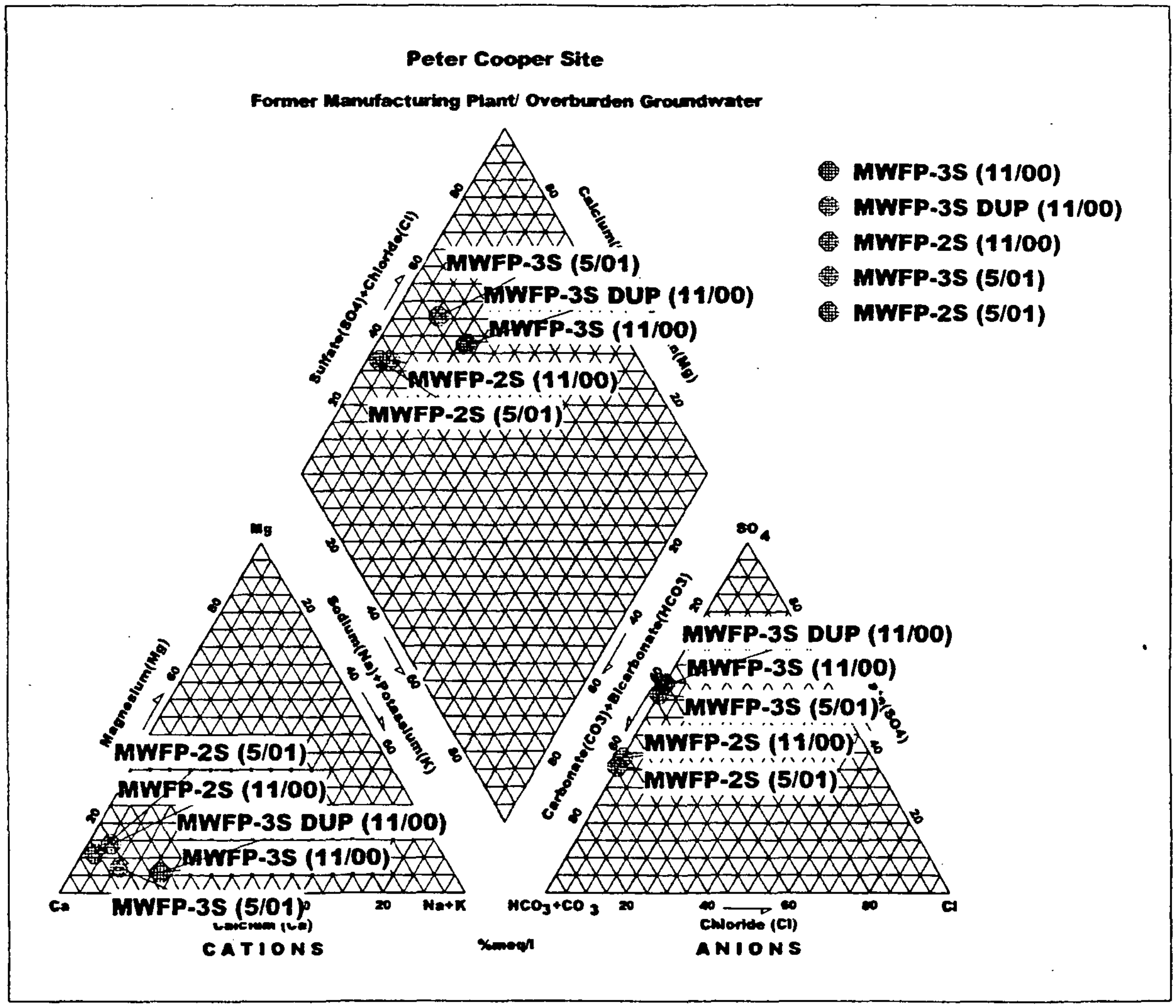
Inactive Landfill / Downgradient Overburden Groundwater

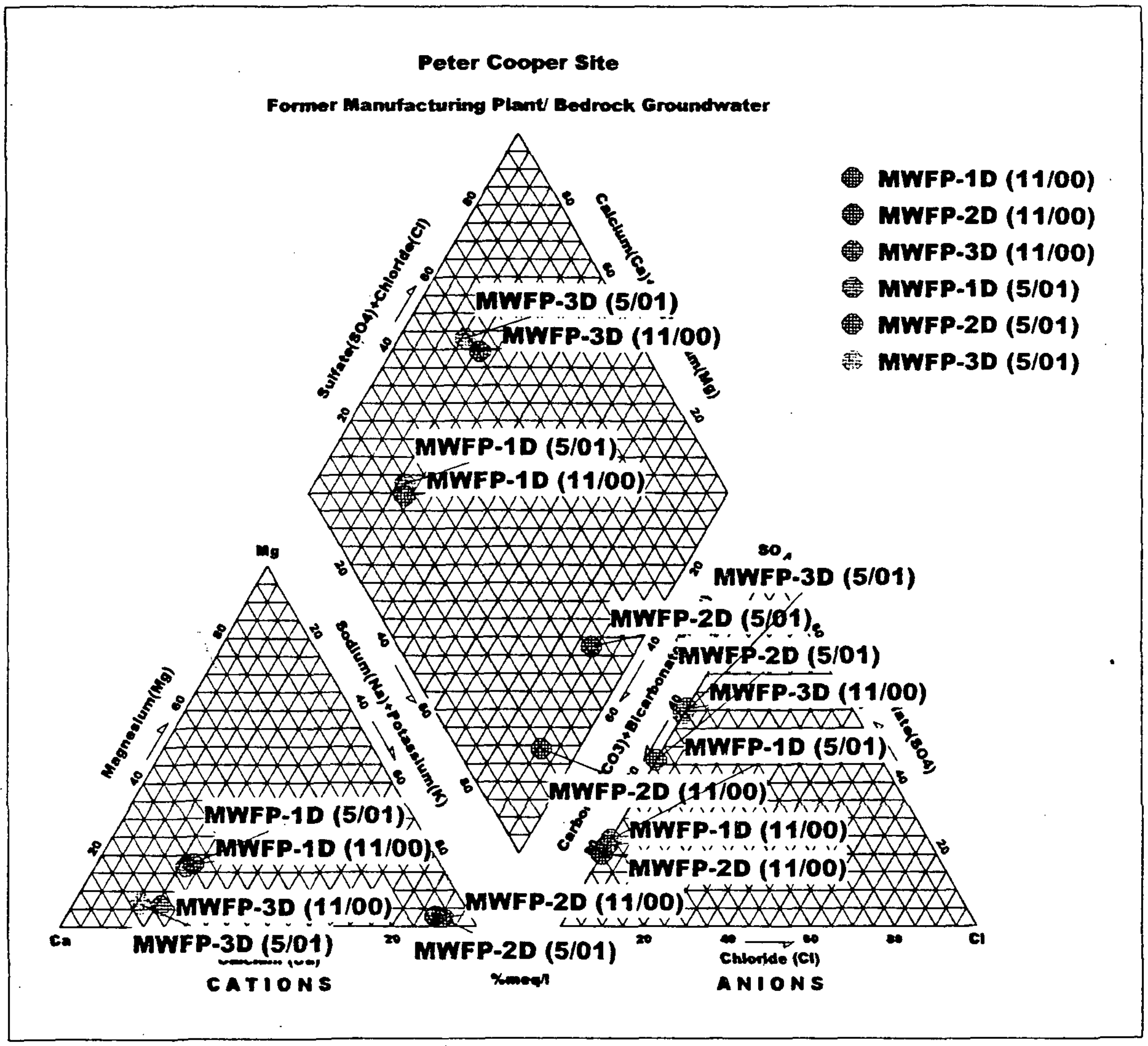


Peter Cooper Site

Inactive Landfill / Upgradient Overburden Groundwater




Peter Cooper Site
Former Manufacturing Plant/ Overburden Groundwater
MWFP-3S (11/00)
MWFP-3S DUP (11/00)
MWFP-2S (11/00)
MWFP-3S (5/01)
MWFP-2S (5/01)
Sulfate(SO4)+Chloride(Cl)
Sodium(Na)+Potassium(K)
Carbonate(CO3)+Bicarbonate(HCO3)
Magnesium(Mg)
Mg
Ca
Na+K
SO_4
HCO_3+CO_3
Cl
Chloride (Cl)
CATIONS
%meq/l
ANIONS



Peter Cooper Site
Former Manufacturing Plant/ Bedrock Groundwater
MWFP-1D (11/00)
MWFP-2D (11/00)
MWFP-3D (11/00)
MWFP-1D (5/01)
MWFP-2D (5/01)
MWFP-3D (5/01)
Mg
Ca
Cl
Chloride (Cl)
CATIONS
%meq/l
ANIONS

APPENDIX R

301788

APPENDIX R

U.S. EPA RI Comments and Respondent Responses

338 Harris Hill Road, Suite 201
Williamsville, New York 14221
(716) 565-0624 · Fax (716) 565-0625

GEOMATRIX

August 29, 2003
Project 5771

Mr. Kevin Lynch
Section Chief
United States Environmental Protection Agency
Region II
290 Broadway, 20th Floor
New York, NY 10007-1866

Subject: Responses to United States Environmental Protection Agency Comments
Remedial Investigation Report
Peter Cooper Landfill Site – AO No. CERCLA-022000-2014
Gowanda, New York

Dear Mr. Lynch:

Attached are responses to United States Environmental Protection Agency comments dated July 18, 2003 on the Remedial Investigation Report prepared by Geomatrix Consultants, Inc. (Geomatrix) and Benchmark Environmental Engineering & Science, PLLC for the Peter Cooper Landfill Site in Gowanda, New York.

Please contact us if you have questions.

Sincerely yours,
GEOMATRIX CONSULTANTS, INC.

Richard H. Frappa, P.G.
Senior Hydrogeologist

Enclosure

J. Wittenborn (Collier Shannon)
A. Cramer (Collier Shannon)
M. Graham (Phillips Lytle)
K. Hogan (Phillips Lytle)
S. Davis (Huber Lawrence)
J. Simone (NYSEG)
K. McMahon (Collier Shannon)
G. Shanahan (USEPA)
S. Henry (USEPA)
M. Moore (NYSDEC)
E. Belmore (NYSDEC)
E. Wohlers (Catt. County DOH)
M. Hutchinson (V. Gowanda)
D. Hettrick (NYSDOH)
J. Mayo (CDM)
T. Forbes (Benchmark)

RI Comment - Responses

1. ***The groundwater sampling procedure outlined in section 2.4.7 references the USEPA Region II Groundwater Sampling SOP, dated March 16, 1998, however, it appears that this procedure was not followed throughout the groundwater sampling program. Aside from the wells that were not suitable for low-flow sampling (i.e., MW-7S and MW-8D), sampling of several wells was completed using procedures not consistent with the USEPA Region II Groundwater Sampling SOP. For example, monitoring wells MW-2S(R), MW-3(R), and MW-6 were sampled initially using a peristaltic pump. The USEPA Region II Groundwater Sampling SOP states that peristaltic pumps may not be used for collection of volatile organic water samples. Any deviation from the QAPP/SOPs should be clearly explained. A new table that lists each well, sampling event, method used (i.e., low-flow with submersible, purge-and-bailer, etc.), and any deviations from QAPP would be useful.***

   Response:
   The RI report text identifies wells that were not sampled in accordance with USEPA Region II Groundwater Sampling SOP, dated March 16, 1998. The referenced wells are located in the sludge fill area and were sampled in accordance with the USEPA approved RI work plan. The work plan specified using a peristaltic pump for purging to reduce sample turbidity. Actual groundwater samples were collected using a bailer not the peristaltic pump. The RI sampling protocols did not deviate from the work plan. However, the RI text will be revised to provide more specific information regarding the collection of groundwater samples not using the USEPA low flow sampling method.

2. ***Metal data from the 1996 EPA/Weston investigation was not utilized in the RI report. Data from this investigation is presented, but was not used. The result should be summarized and should be used to supplement data collect as part of the current RI.***

   Response:
   The 1996 EPA/Weston metals data and other data collected during the investigation were presented in Appendix B-4 of the RI Report. Where appropriate, the metals data from this investigation will be used to supplement data discussed in the RI Report.

3. ***Sampling results for each media should be summarized in figures. For example, there should be a figure(s) corresponding to Figure 3-5A that summarizes groundwater concentrations for site COPCs for the November 2000 sampling event.***

Response:
All analytical data is tabulated in the RI Report and a summary of constituents exceeding appropriate benchmark criteria summarized in the text. If the reader retains a figure showing sample locations and reads the summary provided in the report text, having analytical summaries presented on figures is not necessary.

4. ***In addition to the physical descriptions of the Sludge Fill and Cindery Fill areas included in the RI Report, an estimate of the total volume of Sludge Fill and Cindery Fill should be provided. This estimate should be based on historical info/data, RI geophysical work, test pits, soil borings, well installation logs, etc. A figure(s) should be included showing the estimated thickness of fill(s) using contour lines.***

Response:
Volume estimates are necessary for evaluation of remedial alternatives for the feasibility study. The only practical remedial alternative involving the need for volume estimates is excavation and removal of the sludge fill. Therefore, a volume estimate and isopach map of the sludge fill will be provided in the revised RI Report.

5. ***There are several issues in Section 3.6.1 that need to be addressed and include:***

a) ***The text indicates that the soil cover ranged from a thickness from 10 to 45 inches, and the soil thickness contours as presented on Figure 3-10. Exposed material is currently present at the site, and has been documented by previous investigators. The 1996 Weston report stated the following, "The landfill cap appeared to vary in thickness, and in some areas was missing completely". Exposed areas should be delineated and presented on a revised Figure 3-10. The text should also be revised to reflect actual range of soil cover thickness.***

Response:
Figure 3-10 will be revised to show a small, localized area of the sludge fill area near gas monitoring well GMW-2 where the cover soils are absent. The text will be revised to present the range of cover thickness and will refer to the area where the cover has been eroded.

b) ***The text states (Section 3.6.1 - page 42 and 43) that the soil cover consists primarily of silts and clays. However, based on the information noted in***

Tables 3-8 and 3-9, the primary cover soils consisted of silts and sands, with minor amounts of clay and gravel.

Response:
The percent of silt and clay (also known as percent fines) of the cover soil tested for grain size distribution ranged from 55 to 70.5%. Therefore the majority of the soil particle size covering the sludge fill is silt and clay. It is acknowledged that fine sand represents nearly a third of the soil matrix in most samples analyzed. Therefore, the description of the grain size distribution of the cover soil will be revised to "the cover soil material consists primarily of silt and clay with some fine sand and minor gravel".

c) ***The permeability values obtained from the Shelby tubes seem low. Review of the permeability (hydraulic conductivity) data could not be completed, as the permeability data was not included in the appendices of the report. Additionally, as stated in the second paragraph of Section 3.6.1., the sludge fill has a high liquid limit, indicating that the "cover" soils above the sludge fill are permeable. Lastly, the text indicates, along with the Soil Testing Summary" table of Appendix O, that the permeability/hydraulic conductivity testing is in-place and in-situ tests. Neither of these statements are correct, as these tests were performed in a soils laboratory.***

Response:
Laboratory permeability data will be obtained from geotechnical testing lab and incorporated into Appendix O. Table 3-7 and the text in 3.6.1 will state that the vertical hydraulic conductivity of the cover soil was obtained from a Shelby tube and analyzed in the laboratory.

6. The RI should discuss the differences in the quality of groundwater samples collected upgradient and downgradient of the waste-fill area.

Response:
Acknowledged. Water quality differences between samples collected from upgradient and downgradient wells will be discussed in the revised RI Report.

Specific Comments.

1. **Cover Page**

The site name should be changed to: Peter Cooper Landfill Site.

Response:
Acknowledged.

2. ***Section 1.2.1, 3rd Paragraph, Page 2***

The source of the information pertaining to the installation of a 6-inch clay barrier layer and 18-30 inches of barrier protection soil vegetated with grass should be included in the Report.

Response:
Acknowledged. The referenced information was obtained from the O'Brien & Gere 1991 Feasibility Study Report. The appropriate reference will be made in the revised RI report.

3. ***Section 1.2.2, 6th Paragraph, Page 3***

Results of the 1996 Weston report were not discussed in the RI report. These results of the 1996 Weston report should be summarized and discussed in this RI report.

Response:
The results of the 1996 Weston report are included in Appendix B and discussed in the RI/FS Work Plan in Section 2.1.5. This information will be reiterated in the RI Report.

4. ***Section 2.0, Sampling locations and Rationale, 1st Paragraph, Page 6***

The Work Plan for the RI should be introduced in the first or second paragraph of this section.

Response:
Acknowledged.

5. <u>*Section 2.1.1.1, Geophysical Survey Methodology, Page 7*</u>

A discussion on the findings of the downhole logging should be included. In formation should be provided detailing whether or not total dissolved solids (TDS) was detected. If so, did the value increase or decrease with depth. The TDS results should be presented somewhere in the report. Also, an explanation should be provided in the report to explain why this down-hole logging method was only performed in one well. In order to more accurately determine vertical extent of potential impacts to the bedrock groundwater, several wells should have been logged, including an upgradient bedrock well.

<u>Response:</u>
A detailed discussion of the downhole logging is included in Appendix C of the RI Report. Downhole logging data are also referred to as EM-39 results.

TDS data for the bedrock wells are included in Table 4-8 and are similar in the shallow and deeper bedrock. The conclusion from the downhole logging was that variations in lithology rather than pore water chemistry were responsible for variations in the vertical conductivity plots.

Downhole logging of the deepest downgradient well MW-4D2 was specified in the USEPA approved work plan. If the downhole logging proved to be a successful tool in assessing groundwater impacts, it would have been considered for use elsewhere on site. As shown in Figure 5-1, comparison of ammonia and sulfide concentrations and depth appears to be an accurate indicator of vertical groundwater impacts rather than conductivity.

6. <u>*Section 2.1.3.2, Sludge Fill, Page 10*</u>

The second to last sentence indicates that a discrete sample (ST-2) was collected for in-situ permeability. Please revise to indicate that the permeability test was performed in a soils laboratory.

<u>Response:</u>
Acknowledged.

7. <u>*Section 2.2.1.2, Former Manufacturing Plant Area, Page 11*</u>

The map referenced in this section (located in Appendix A) is not discernible. Please provide a legible copy of the map.

Response:
Acknowledged.

8. ***Section 2.2.2.1, Inactive Landfill Area, Page 12***

The test should be revised to indicated that surface soil sampling was performed in October, not November.

Response:
Acknowledged.

9. ***Section 2.2.4, Geotechnical Data, Page 13***

Please state the dates of the soil sampling for the Former Manufacturing Plant Area.

Response:
Acknowledged. This section will be revised to indicate that the samples were collected on October 5, 6, and 9, 2000 during soil boring advancement and subsurface soil sample collection.

10. ***Section 2.3.1, Gas Sampling Methodology, 2nd Paragraph, Page 15***

Please indicate that the purge water was drummed. Also, please indicate the section that the results are presented in.

Response:
Consistent with the work plan, purge water was discharged to the ground surface. The section will be revised to refer to Section 4.3 for gas sampling results.

11. ***Section 2.4.1;2.4.1.2 {no 2.4.1.1 was found]; 2.4.1.2, Pages 16-17***

Section 2.4.1 states that four wells were unusable; and 2.4.1.2 states that four replacement wells were installed (corresponding to the list in 2.4.1). But section

2.4.1.2 states that five unusable wells (including MW-1S, which is not one of the four discussed previously) were unusable and abandoned. Please clarify.

Response:
The section heading of the RI text will be revised accordingly. The text in the report will be revised to reference that O'Brien & Gere (OBG) installed an additional shallow well at the MW-1 series location after finding the original well MW-1S unusable. Geomatrix decommissioned the shallow, unusable well that OBG did not abandon.

12. *Section 2.4.3, Abandonment of Groundwater Monitoring Wells, Pages 17*

An explanation should be provided in the RI report for the corroded condition of the decommissioned monitoring wells. This is a factor that would need to be included in any remedial alternative feasibility.

Response:
The decommissioned wells were installed in the early 1980s and are constructed of cast iron pipe with galvanized-iron wells screens. The rate of corrosion of iron well screens is in-part dependent on groundwater pH, dissolved oxygen concentration, and the concentration of dissolved iron in groundwater. Low concentrations of dissolved iron in overburden groundwater (typically 0 mg/l), coupled with varying concentrations of dissolved oxygen, lead to oxidation of the iron, and dissolution into the surrounding groundwater as the system attempts to attain equilibrium. This process has occurred over a period of approximately 20 years, which is beyond the typical life-expectancy of a galvanized-iron well screen under these conditions. Factors that contribute to the corrosion of metal well screens will be discussed in this section of the report and noted in the feasibility study.

13. *Section 2.7.3, Methods of Chemical Analysis, Page 29*

As the 'Walkley Black Titration Method' for TOC is not in common use a description should be provided. In addition, a statement should be provided to explain why the USEPA Region 2 (L Kahn) TOC method was not used.

Response:
The Walkley Black Titration method was specified in the approved work plan. The method has been accepted by the NYSDEC on State Superfund projects to determine TOC for chemical partitioning analysis in soil.

14. ***Section 2.8, QA/QC Measures, 2nd Paragraph, Page 30***

It is not strictly accurate to say that hexavalent chromium is not present in samples in which total chromium was not detected. What is true is that it is unlikely that the hexavalent chromium concentration is greater than the detection (reporting) limit for total chromium in such samples. Please revise the paragraph accordingly.

Response:
Acknowledged. This paragraph will be revised to state that hexavalent chromium was not detected above the laboratory detection limit.

15. ***Section 2.8, QA/QC Measures, last Paragraph, Page 30***

USEPA split samples constituted only a small fraction of the total number of samples collected and analyzed by Geomatrix and its laboratory. The fact that Cr+6 was not present at concentrations above groundwater standards in split samples analyzed by USEPA laboratories does not demonstrate that site groundwater concentrations of Cr+6 are below applicable criteria.

Response:
Acknowledged.

16. ***Section 2.8, QA/QC Measures, Page 31***

EPA disagrees that 'laboratory analyses met the data quality objectives of the remedial investigation'. The lack of usable or reliable hexavalent chromium data is a significant deficiency. To some extent this deficiency can be addressed through the use of the total chromium data; but this approach does not fully compensate for the lack of Cr+6 data.

Response:
The statement will be qualified to reflect that certain data rejections for hexavalent chromium occurred but the overall characterization of metal constituent concentrations in groundwater was not compromised based on the data quality of total chromium analysis.

17. ***Section 3.2.1, Site Physiography, 2nd Paragraph, Page 33***

The Paragraph describes the five-acre fill area as being in the NE portion of the inactive landfill Area. However, as described on Page 1 of the RI Report, the fill is at the extreme NW corner of the landfill. Please clarify.

Response:
The sentence will be revised to indicate that the 5-acre fill area is located in the northwestern corner of the Inactive Landfill Area.

18. *Section 3.4, (please note there are two section 3.4), Site Geology, Page 37*

Bedrock outcrops should be identified on Figures 3-1A and 3-1B. The locations of the bedrock outcrops should also be included in the development of the bedrock contours for both figures. Also, the first sentence on page 38 states that the overburden is from a few feet to nearly 20 feet. Based in the data presented in Table 3-3, the overburden exceeds 23 feet (GMW-1). Please check and revise the text.

Response:
The bedrock outcrops are located on the hill, on the south side of Palmer Street, opposite the former manufacturing plant area. The outcrops are off-site and are on private property so mapping and elevation data were not obtained during the study. Therefore, the locations of the outcrops cannot be accurately shown on the figures.

The text will be revised to provide a maximum range of 23 feet.

19. *Section 3.5.1, Hydraulic Properties, Page 40*

The bedrock groundwater elevations shown on figures 3-6A and 3-8A do not represent the actual groundwater flow around MW-5D. The overburden groundwater elevation at MW-5S fits into the overall overburden groundwater flow regime. However, and EPA is in agreement, that the bedrock groundwater level for MW-5D is anomalously high, and does not "fit" into the bedrock groundwater flow regime. Based on experience, when the bedrock groundwater level is high and the groundwater bedrock does not fit into the groundwater flow pattern, this could indicate that the casing seal may be leaking.

Although this anomalously high reading may change the local bedrock groundwater flow regime around the MW-5D well, the overall regional bedrock groundwater flow seems to be towards the creek (based on the review of the bedrock groundwater contours of both the former manufacturing area and the inactive landfill area).

Figures 3-6A and 3-8A currently show the groundwater flow from MW-7D towards the creek, but does not take in consideration the actual groundwater elevation at MW-5D.

Response:
A plausible reason for the anomalously high water level was provided in the report. While a leaking casing is possible, it is not likely since the water level in the adjacent shallow well MW-5S was unaffected during well development of MW-5D which would be anticipated if the well seal was faulty.

Since the water level condition is anomalous, flow vectors were not drawn in the immediate vicinity of the well and the interpretation of flow shown on the figures is valid.

20. *Section 3.5.1, Hydraulic Properties, Page 40*

For Figure 3-6A the bedrock groundwater elevation of 668, 666, and 664 are missing. Therefore, the bedrock groundwater contour maps (both figures) should be revised to reflect the actual groundwater elevations. In order to achieve a better understanding of the bedrock flow regime, it is recommended that the bedrock groundwater maps of the former manufacturing area and the inactive landfill area be combined. Surface water elevations as well as their locations should also be presented on these two figures.

Response:
The bedrock groundwater elevations referred to above are not consistent with the groundwater elevations measured in on-site wells.

Based on the scale and length of the site, the breakup of the groundwater flow characterization based on area (Inactive Landfill Area and Former Manufacturing Plant Area) is appropriate, especially when groundwater is primarily toward the Creek.

The surface water elevation monitoring points are located at upstream and downstream sampling points which are located beyond the limits of mapping shown on the figures. However, the figures will be revised to identify the surface water elevation of the closest monitoring point in the creek

21. *Section 3.5.2, Description of... Groundwater Flow, 2nd Paragraph, Page 41*

This paragraph discusses groundwater contribution to surface water in Cattaraugus Creek. It is not clear why the contribution of groundwater flux is considered "inconsequential". If this is a simple comparison of groundwater flux to stream flow then of course the difference would be great, however, using the term "inconsequential" does not seem to apply given the fact that impacts to Cattaraugus Creek and sediments have occurred.

Response:
Acknowledged. The term "inconsequential" was used to compare the Site's groundwater contribution to the volume of stream flow in Cattaraugus Creek. The term will be changed to "minor".

22. *Section 3.6.1, Characterization and Delineation of the Sludge Fill, Page 42*

The limits of the sludge fill has not been defined from test pit TD-5 to the north west. The actual limits of the sludge material should be determined in this area.

Response:
Test pit TP-5/G identified sludge fill to a depth of 12 feet. The test pit is located approximately 25 east of the retaining wall of the former dam. It is assumed that the sludge extends westward up to the retaining wall of the former dam

23. *Section 3.6.1, Characterization and .....of the Sludge Fill, 3rd Paragraph, Page 42*

The paragraph describes soil cover 10 inches to 45 inches, with areas indicating a geotextile fabric below the soil cover– this suggests that the landfill was closed. Information should be provided to support this conclusion, since, the "landfill" was in fact not a landfill, but a sludge dumping ground. If there was in fact a cover of any sort that was put on the Inactive Landfill when the transfer of materials to Markhams was made around 1972, there should be more discussion in the RI report concerning what was done.

Response:
Sludge fill area closure information will be summarized in the RI Report.

24. *Section 4.1, Sludge Fill, Page 45*

The sludge fill results for SVOCs and COPCs were determined from only one composite sample. The Work Plan did not call for any additional sampling because it was felt that historical data would be incorporated. Without inclusion of previous sample results the data presented is inadequate to characterize the sludge fill material.

Response:
Sludge fill characterization data obtained from previous investigations and presented in Appendix B of the RI Report will be discussed in revisions to Section 4.1.

25. *Section 4.2, Solid, Page 46*

The applicability of the TAGM 'background' values is questionable. First, the values in TAGM 4046 for inorganics are for the eastern US; the extent to which those ranges are applicable to native soils in Gowanda is unknown. Second, in all cases where the TAGM 4046 values are presented as a range of values, the high end of the range was used for comparison. Third, even assuming 'background' is a relevant comparison criterion, risk-based concentrations should also be discussed (e.g., Region 9 RBCs).

Response:
Since metals naturally occur in soil, a comparison of metals concentrations detected at the Peter Cooper Gowanda Site to a benchmark that provides some relative measure of the significance of the concentrations detected, taking into account the natural occurrence of these constituents, is justified. Since background metals data specific to the Village of Gowanda were not available, Site metals concentrations were compared with metals concentrations found naturally in the eastern U.S. Soils in western New York are glacially-derived and naturally contain wide variations in metals concentrations. Based on our experience, greenfield sites throughout western New York have metals concentrations that fall at both the low and high end of the range of metals found in eastern U.S. soils. The comparison of metals concentrations to eastern U.S. soils, as well as State specific background metals concentrations, is referenced in the New York Department of Environmental Conservation TAGM #4046. The identification of metals concentrations at the PCC Site above the range found in eastern U.S. soils is used only used for qualitative comparison in the RI Report and does not imply any assessment of risk. Risk of metals presence at the Site is addressed in the Human Health and Ecological Risk Assessment Reports. Section 4.2 of the RI

Report will be revised to provide rationale for the comparison of site metals data to the range of metals values presented in TAGM #4046.

26. Section 4.2.1.1, Surface Soil, Page 47

Again, the background' values are the high end of the range. The low ends of the range for these metals (As - 3 mg/kg; Cr - 1.5 mg/kg; and Zn - 9 mg/kg) would indicate that the site concentrations exceed background in all samples. Risk-based concentration criteria for arsenic are even lower than the low end of the background range.

Response:
See response to specific comment 31 above.

27. Section 4.2.2.1, Surface Soil, Page 48

The investigation of the area around MWFP-3 to determine the areal extent of VOC contamination was appropriate. However, the samples in which field instruments detected organic vapors should have been analyzed. It would have been especially useful to analyze a sample from B-13 (the highest PID reading) so that both the nature of the contamination and to determine whether the observed maximum might be higher than the concentrations in samples from MWFP-3.

Response:
The intent of the Supplemental Investigation program was to determine the approximate aerial and vertical extent of the VOC contamination in the vicinity of MWFP-3 to allow for evaluation of appropriate remedial measures specific to this sub-area during the FS. While additional soil samples from borings exhibiting elevated PID readings may have exhibited different concentrations of VOCs than MWFP-3, it is unlikely that this data would change the outcome of the RI or subsequent evaluations in the FS. The remedial technologies applicable to such a small area of VOC-impacted soil are not substantially dependent on concentration.

28. Section 4.2.21, Surface Soil, Page 48-49

The Region 9 'guidance values' cited for VOCs and SVOCs are no longer accurate. The industrial PRG for chloroform is now (October 2002) 12 mg/kg (3.6 mg/kg residential); and the industrial PRG for PCE is 3.4 mg/kg (1.5 mg/kg residential). Similarly, the PRGs for carcinogenic PAHs are about 25 percent lower than cited (e.g., the industrial PRG for benzo[a]anthracene is now 2.1 mg/kg, not 2.9 mg/kg).

Response:
The Region 9 PRGs referenced in tables and discussion of guidance value comparison in the RI Report will be revised to reflect changes to the Region 9 PRGs (October 2002) that occurred during preparation of the draft RI Report.

29. *Section 4.2.21, Surface Soil, Page 49*

According to Table 4-9, total Hexavalent chromium was detected at MW-2D (5/4/2001) at a an estimated concentration of 0.0592 mg/l. Please revise and highlight this value in Table-4-9.

Response:
Acknowledged

30. *Section 4.3, Landfill Gas, Pages 50-51*

Some perspective on the concentrations listed (page 51) would be useful. Although the gas samples are not 'ambient air', comparison to ambient air screening criteria would at least provide some relative measure of the significance of the various VOCs detected. The highest reported concentrations of acetone, carbon disulfide, 2-butanone, 4-methyl-2-pentanone; toluene; and xlyenes exceed the Region 9 ambient air screening criteria. All detections of benzene and ethylbenzene exceed those criteria. No criteria are exceeded by styrene, 2-hexanone, or trichlorofluoromethane (freon 13).

Response:
The direct comparison of soil gas VOC concentrations detected in the well headspace to ambient air criteria is not an appropriate benchmark for comparison since human exposure to these concentrations is not realistic.

31. *Section 4.4, Groundwater, General, Page 51*

The text references all NYSDEC criteria as 'guidance values'. Most of the values cited are standards, only a few are guidance values. The text should also clearly state which values are used (i.e., for groundwater, the Class GA criteria). As with other matrices, the Region 9 PRGs should be referenced, as well as the NYSDEC criteria.

Response:
Acknowledged. The terminology referring to guidance values will be changed to standards with any guidance values identified. The presentation of New York State Class GA groundwater standards without Region 9 Tap Water PRGs is valid since the groundwater is not used as a source of drinking water, municipally-supplied water is available along Palmer Street, and risk-based comparisons are presented in the risk assessment.

32. *Section 4.4.1.1, Overburden, 3rd Paragraph, Page 52*

Although the phenol concentration (480 µg/L) exceeds the NYSDEC class GA standard of 1 µg/L, the detected concentration is below the Region 9 tap water PRG (2200 µg/L for a hazard index of 0.1).

Response:
Acknowledged. The comparison to Region 9 PRGs is presented in the risk assessment.

33. *Section 4.4.1.1, Overburden, 4th Paragraph, Page 52*

The fact that the dissolved arsenic concentration exceeds 10 µg/L in the only two samples in which it was analyzed should be included in the report.

Response:
The NYS Class GA Standards were used as the benchmark for comparison of chemical constituents detected in groundwater. The NYS Class GA Standard for arsenic is 25 ug/l.

34. *Section 4.4.1.2, Bedrock, Page 54*

As noted previously, most of the 'guidance values' are in fact standards; only the criterion shown for magnesium is in fact a guidance value. The discussion of the metals concentrations does not provide the whole picture. Total arsenic concentrations of 19 µg/L or higher have been detected at least once in three of the seven bedrock wells. Wells 2D, 5D, and 7D have not been analyzed for dissolved arsenic; of the remaining four wells, dissolved arsenic has been detected at concentrations over 10 µg/L in one (4DR), or detection limits are too high (25 µg/L) to assess in another (4D2).

Response:
See response to comment #31 and #33.

35. *Section 4.4.1.2, FMPA, Overburden, Page 55*

The comments regarding the guidance values and evaluation criteria (especially for arsenic) are also applicable to this section. It should also be noted in this section that the detection of PCE and other chlorinated organics in groundwater at MWFP-3S is consistent with the detection of PCE and other chlorinated organics in the surface soil in the MWFP-3S boring and in headspace of other borings in the vicinity.

Response:
See response to comment #31. The text will be revised to state that the detection of PCE in the groundwater at MWFP-3S is consistent with the presence of chlorinated aliphatic hydrocarbons in soil detected at that location.

36. *Section 4.5, Seeps, Page 58*

Several of the criteria (i.e., for chromium and zinc) are hardness-dependent. It is unclear from the text or Table 4-1 how the cited criteria were derived (no mention of the fact that they are hardness-dependent). EPA could reproduce the chromium criterion listed in the RI (422 µg/L) using the average hardness value of the three seep samples (about 835 mg/L). However, as it is not the seep but the creek which is the Class C water body, it would be more appropriate to use the hardness of the creek. On this basis, the hardness in about 181 mg/L (average of the two sampling events - 196 mg/L in November 2000 and 166 mg/L in May 2001); and the resulting criterion for chromium is 120 µg/L. However, EPA could not reproduce the zinc

criterion regardless of what hardness value was used. However, a Class C criterion of 137 µg/L was calculated using a hardness of 181 mg/L and criterion of about 500 µg/L with hardness of 835 mg/L (the RI cites 17 µg/L as the zinc criterion). With the EPA-calculated criteria (using creek hardness values), more chromium exceeds criteria but none of the zinc concentrations exceed.

Response:
Acknowledged. The Creek hardness value will be used to calculate benchmark criteria for comparison of seep water chemistry.

37. *Section 4.6, Surface Water, 2nd paragraph, last sentence, Page 59*

This sentence states that ammonia was not detected above guidance values. According to Table 4-13, ammonia was detected in Cattaraugus Creek Water sample #4 at 0.442 mg/l (5/2/2001), slightly above the guidance value. Please revise. Also, this value should be highlighted in Table 4-13.

Response:
Acknowledged. The detected concentration of 0.442 mg/l in Creek Water#4 sample slightly exceeds the hardness-based ammonia criteria calculated for the May 2, 2000 sampling event of 0.44 mg/l. The table and text will be revised.

38. *Section 4.7.1, Wetland Area, Page 52*

The basis for comparing wetland sediment data to industrial soil screening criteria is unclear; there are NYSDEC sediment criteria to which the data can be compared for potential ecological effects. (As both human and ecological receptors could be exposed to wetland sediments, discussing both criteria is warranted.) It is also worthy of note that BTEX compounds were detected in every wetland sediment sample analyzed; only the chlorobenzenes were not detected.

Response:
The wetland area is generally dry with standing water present only during seasonally wet periods. As a result, the area delineated as wetlands can be considered soils since it is heavily vegetated and some wetland type vegetation exists. Therefore, comparison to soil screening criteria is an appropriate benchmark. However, to acknowledge the potential ecological effects, NYSDEC sediment criteria will be added to the table for comparison and the text will be revised. The low concentration of BTEX is likely the result of urban runoff that is discharged to the wetland area from

the Village storm sewer south of Broadway. Other constituents detected in the wetland may be derived from urban runoff as well.

39. ***Section 4.7.2, Sediment, Cattaraugus Creek, last sentence, Page 60***

This sentence states that "Metals concentrations were below guidance values including hexavalent chromium (present at concentrations ranging from 6.3 to 8.6 mg/kg)." According to Table 4-15, it appears that this statement applies to total chromium, not hexavalent. Please revise paragraph accordingly.

Also, according to Table 4-15, creek sediment samples exceeded the guidance value for arsenic in all samples. The guidance value for nickel was exceeded in Creek Sample #4. These values should be highlighted in Table 4-15.

Response:
Acknowledged. Hexavalent chromium was not detected in the samples and total chromium was detected within the specified range. The RI text will be revised.

40. ***Section 5.0 , Chemical Migration Assessment, Leaching, Page 61***

EPA concurs that this is a viable migration pathway. However, the relevant soil data should be compared to criteria for assessing this pathway (both the USEPA Soil Screening Levels and the Region 9 PRG tables have migration to groundwater criteria for many contaminants).

Response:
Comparing soil data to criteria such as USEPA Soil Screening Levels is appropriate to speculate on whether or not groundwater impacts are likely in the absence of groundwater quality data or when equilibrium chemical-soil partitioning has not been established. Since chemical presence in overburden groundwater derived from more than 30 years of leaching was assessed through collection and analysis of groundwater samples, the comparison to SSLs or similar criteria derived from theoretical partitioning equations is not necessary.

41. ***Section 5.2.1, Surface Water Runoff, Page 63***

This section should be revised to indicate that while there are some relatively flat areas on the site, there are steep slopes (north side of the Inactive Landfill Area)

toward the creek, and toward the west at the edge of the landfill area (among other places).

Response:
Acknowledged. Section 5.2.1 will be revised to include a discussion of potentially higher runoff rates along the northern perimeter of the sludge fill area.

42. Section 5.2.2, Groundwater Migration, Page 64

The text states that the reason for the lack of hydrochemical impact in the deeper bedrock is likely caused by upward vertical hydraulic gradients in the bedrock. Although the initial groundwater level data (Table 3-4) of the well pair MW-4D(R)/MW-4D2 suggests an upward gradient, the last recorded reading (April 30, 2001) suggests the opposite (a downward gradient). Any additional elevation data that supports an upward gradient from the lower bedrock to the upper bedrock should be presented.

Response:
Cattaraugus Creek is the regional groundwater discharge boundary for the upper bedrock in the Zoar Valley/Gowanda area. Since the last major glacial event (approximately 12,000 years ago), stream flow in the creek has cut the streambed deep into bedrock. Upward vertical hydraulic gradients were measured in five of six water level monitoring events. The downward vertical hydraulic gradient identified on April 30, 2001 is anomalous compared to the other data. It is possible that short term gradient reversals occur but the data suggest that they would be short in duration.

43. Section 5.2.2, Groundwater Migration, Page 64

For PCE, the site chemistry does not support the fact that the site groundwater is amendable to reductive dechlorination and degradation of chlorinated aliphatic compounds. Although PCE was detected, the daughter products were not. The text should be clarified.

Response:
Anaerobic and reducing conditions in groundwater are amenable to reductive dechlorination of chlorinated aliphatic hydrocarbons. The lack of chemical constituents that are byproducts of partial degradation of PCE in groundwater suggests

that either conditions are suitable for complete degradation to CO2 and water or chemical degradation did not occur. The text will be revised to reflect both possibilities.

44. *<u>Section 5.2.2, Groundwater Migration, Page 64</u>*

Documentation should be provided to support the statement that trivalent chromium is less mobile than hexavalent chromium.

<u>Response:</u>
According to Table 4-15 in Hazardous Waste Management (LaGrega et al., 1994), chromium (+3) is relatively insoluble, and strongly adsorbs to surfaces (immobile), whereas chromium in the +6 oxidation state (hexavalent chromium) is relatively mobile. This reference will be added to the text.

45. *<u>Section 5.2.2, Groundwater Migration, Page 65</u>*

This section provides a good summary of how groundwater and contaminants flow into the Creek. However, there are statements in this section that attempt to minimize the Site impacts to the Creek, referencing natural attenuation and the obvious effects of stream dilution. What is not discussed in this section is the fact that there is impacts (Site COPCs including arsenic, chromium, and zinc) to the wetlands and Cattaraugus Creek sediments. A discussion of contaminant flux to the wetlands/sediments should be included in this section or separate section of this report.

<u>Response:</u>
Because chemical constituents were detected in groundwater above criteria used for comparison, a more detailed assessment of groundwater and surface water interaction was warranted. Potential chemical migration pathways affecting the quality of wetland and Creek sediments will be incorporated into the revised text. The discussion however cannot be accurately presented in terms of contaminant flux since site related impacts to these media are extremely limited, barely quantifiable, and likely not the only potential source of chemical constituents to these media (i.e. Village storm water runoff).

46. *<u>Section 7 - References</u>*

USEPA Region 9 PRGs should be updated to reflect the October 2002 revision (also, Region 9 should be added to the 'USEPA' citation).

The NOAA and NYSDEC TAGM 4046 references are undated.

NYSDEC references should include the sediment screening guidance document.

The source of the NY groundwater criteria should be referenced (i.e., either TOGS 1.1.1 or the NYCRR citations where the criteria published).

Response:
Acknowledged. Appropriate references will be added to the report.

Comments on Tables

47. *Table 2.3, Comparison of QA/QC Samples-Gas Media*

The relative percent difference can not be calculated when the analyte is not detected (U or UJ). Therefore, no numerical RPDs should be shown for most of samples for which RPDs are shown (page 1 of 9 - most VOCs; page 2; all TP-4 4 VOCs and most WSS-6 VOCs; pages 3, 4, and 5 - almost all organics; pages 5-6 metals [antimony, beryllium, cadmium, Cr+6, mercury, silver, and thallium in one or more samples]; pages 7, 8, and 9 most organics, many metals, and some 'other geotechnical parameters'). There are significant deviations between the landfill gas duplicate sample pair and this should be discussed in the report.

Response:
Acknowledged. The table will be modified not to show RPD values when concentrations are qualified with a U or UJ. The deviation between the soil gas sample and duplicate will be discussed in Section 2.8.

48. *Table 4.1, Analytical Results for Inactive Landfill...,*

Data on this table were either not validated or qualifiers from validation were not applied. There should be no 'E' flag on validated data (e.g.,acetone, 2-butanone). Based on the note for 'E' at the end of the table, the 'E' flag should be changed to 'J'.

Response:
The data on Table 4-1 were validated. The detected concentration of acetone and 2-butanone qualified with an E should be reported as a J and will be changed on the table.

49. *Table 4-5, Analytical Results for Surface Soil Samples....*

'E' flag should be changed to 'J'.

Response:
Acknowledged. The E flag will be changed to a J on the table.

50. *Table 4-6, Analytical Results for Subsurface Soils....*

Tetrachloroethene (PCE) value in MWFP-3 is shown as '1 EJ'. This sample should have been re-analyzed at a dilution. If the note is accurate (i.e., PCE was not detected in the dilution analysis) there is an analytical problem which has not been discussed - either the dilution factor in the re-analysis was too high; or there was an analytical problem in the dilution analysis (as the data in Appendix P clearly show that PCE is present in this area of the site; so PCE should have been detected).

Response:
The data should show a data validator qualified value of 1.0J mg/kg. The table will be revised.

Plates

PL-1 The approximate location of the sluiceway on Plate 1 is difficult to see. Please clarify the approximate location on the sluiceway.

Response:
Acknowledged. Plate 1 will be revised to better identify the location of the sluiceway, show wetland delineation flags, and improve the clarity of the topographic contours.

PL-2 The wetland delineation flags should be connected to clearly show the delineated wetland areas.

Response:
Acknowledged. See response to PL-1.

PL-3 Elevation contours are difficult to decipher. Please darken the contours lines and expand the noted elevation numbers.

Response:
Acknowledged. See response to PL-1.

Figures

F-1. General. Several of the figures contain sampling points that are not labeled. A detailed review of the drawings should be performed, and anomalous sampling points removed or labeled prior to the final submission of the reports.

Response:
Acknowledged. Figures will be reviewed and any unlabeled data points will be remove or named as appropriate

F-2. Figure 2-5A. This figure should be entitled. "Monitoring and Gas Well Locations".

Response:
The figure title will be revised accordingly.

F-3. Figure 2-5B. Please show the approximate location of the former Finished Product Warehouse and Storage Areas.

Response:
The locations of buildings are shown on the figure in Appendix A. As stated in response to specific comment #7, the figure will be revised to improve the quality of presentation.

F-4. Figures 3-1A and 3-1B. Bedrock outcrops should be identified on these two figures.

Response:
See response to comment #18.

F-5. ***Figures 3-3, 3-4 and 3-5. Above the "(Canadaway Formation)", please include the type of bedrock (i.e., shale).***

Response:
The figures will be revised to include the type of bedrock.

F-6. ***Figure 3-5A, through Figure 3-8B. If surface water elevations were obtained on the same day of the groundwater elevation measurements, then, elevations of surface water and measurement locations should be presented on the figures. If the rationale of the groundwater and surface water interaction cannot be determined, then both the overburden and bedrock contours should be inferred when drawn to the creek. Also, the 774 feet groundwater contour line (Figure 3-7B) should be inferred, as no overburden groundwater exists to the southwest (based on the boring log data from FPMW-1).***

Response:
Acknowledged. The figures will be revised appropriately.

Appendix A - Historic Site Manufacturing Process Features

A-1. ***The line between the FMPA and ILA does not accurately reflect former site use. The printing is too light to enable the building or structure names to be discerned. The source(s) of the drawing should be noted.***

Response:
Acknowledged. The figure will be revised per response to specific comment #7.

Appendix B - Historic Analytical Data

General - although there are some problems with the historical (Recra Phase I and Phase II; O'Brien & Gere 1989 RI; 1996 Weston Investigation) data (discussed below), these data should be discussed in the RI report. The extent to which the more recent (RI) data are confirmed by these data, or are inconsistent with these data, should be discussed and explained.

Response:
Acknowledged. The historical data will be used where appropriate in the RI report.

Appendix B-1 (Recra Phase I results).The data show that there are high concentrations of arsenic and chromium in some water and soil samples. However, there are discrepancies between the data in this report (Phase I Report by Recra Research, 1981) and what appears to be the same data as cited in other reports.

Response:
Acknowledged. The validity of the non-EPA Weston data has been questioned previously and is only included for completeness of the RI Report.

Appendix B-2 (Phase 2 Results). The (1981) data on page '89' of B-2 appear to be the same as data (same sample date; same numerical values) in the Phase I Report; except that the sample IDs are different, and the matrix and is some cases the units are different (in the Phase I report, these numbers are for 'water samples' and are in mg/L or μg/L depending on analyte; in B-2 the data are all soil samples in units of μg/g [equivalent to mg/kg]). Most of the high metals concentrations in the Phase II data appear to be from samples from the Markhams site, not the Gowanda site.

Response:
Acknowledged. The value of these data is limited. The Markhams site was investigated concurrently by RECRA during the Phase II so some Markhams data is included in the data summaries.

Appendix B-3 (O'Brien & Gere 1989 Results). Although the note on Table 4 states that the sample locations are shown on Figure 2, a sample could not be located with numbers higher than 46 on Figure 2. The figure that is in the Appendix does not match the figure 2 that is in the 1989 RI by O'Brien & Gere. The figure in the RI omits the location of sample 60 -68. The data for 60 -68 is presented in the table and indicates that there are impacts in this wetland.

The sample locations (e.g., where was sample G-50 [Table 1], which had chromium at 44,000 mg/kg, collected) could not be identified. Tables 7 shows high arsenic concentrations (over 100 µg/L) in several samples, and Table 8 shows dissolved arsenic at concentrations greater than 25 µg/L in several samples (MW-2D, MW-4D, MW-6). Table 11 shows hexavalent chromium detected in leachate composites and a seep composite at concentrations around 100 µg/L (ranging from 90 to 116 µg/L).

Response:
Acknowledged. The data tables from the 1989 OBG RI are provided for information purposes only. The quality of the data was discussed in the work plan and will be reiterated in the revised RI report.

Appendix B-4 (Weston 1996 Results). Table 3-3 shows very high chromium concentrations (greater than 1,000 mg/kg, with a maximum of 37,000 mg/kg) in 'Landfill Waste' samples. Arsenic concentrations over 25 µg/l were detected in all wells (and usually in both the filtered and unfiltered analyses) except MW-05 (see Table 3-6; December 1996 data). Chromium concentrations were over 100 µg/L in both the total and filtered samples from MS-2S; MW-3S; and MS-4S. Hexavalent chromium was detected in three of the groundwater samples: MW-02S, MW-3, and MW-04S at levels of 15, 60, and 16 µg/l, respectively.

Response:
EPA low flow sampling procedures followed during the RI produces more reliable metals data than sampling using bailers and filtering the samples as was done during the Weston investigation.

Appendix C

C-1. Please include an introduction to this appendix. The introduction should include the dates of the investigation(s), and the goals of the geophysical programs.

Response:
An introduction and goals of the geophysical investigations are presented in Section 2.1.1. The date of the EM-31 survey will be included in Section 2.1.1. Reporting introductory information in the Appendix would be redundant.

C-2. The appendix states that it is likely that a significant component of the conductivity variations observed with the surface EM data set is due to the presence of railroad ballast material. According to the RI report several test pits were completed in the

area in where the EM survey was performed. The text portion of the RI should include a summary on the correlation of EM survey data and test pit data. According to Figure A, areas of the highest conductivity were not investigated (with test pits).

Response:
Additional information will be included in the RI text correlating the finding of the EM-31 results and the test pits.

Appendices E

Overall we are in agreement with the information presented within the boring logs and well completion details. However, some minor inconsistencies have been noted (i.e., TAMS noted the N value at Well MW-5D [12-14' bgs] was >100, not 59, at well MWFP-3D, TAMS noted the recovery to run to be 89% [not 80%], etc.). These inconsistencies do not reflect the overall interpretation of the geologic and hydrogeologic conditions at the site. Please review and revise the boring logs and well completion details, and resubmit as necessary.

Response:
The field logs will be reviewed and any necessary revisions to the boring logs will be made accordingly.

Appendix H - Hydraulic Conductivity Testing Data

H-1. In general, we are in agreement with the second straight lines selected for the slug test data interpretation. However, the second straight lines chosen for three monitoring wells (MW-7S, MWFP-3D, and MWFP-3S) are questionable. In wells MWFP-3D and MWFP-3S the second straight line should be less steep, and at well MW-7S the second straight line should be steeper. Please review the hydraulic conductivity data from these wells, and resubmit hydraulic conductivity estimates. Also, please update Table 3-5 and the relevant sections of the text.

Response:
The straight lines chosen to represent the hydraulic conductivity estimates in monitoring wells MWFP-3S and MWFP-3D were applied after 90% of recovery had occurred in each well. Application of a less-steep line would incorporate data from the last 10 percent of recovery, and would not be representative of the true hydraulic properties of the surrounding material.

Monitoring well MW-7S only recovered to within approximately 60% of the original water level. The slope of the straight line was applied to data collected after 2 hours had passed. Applying the straight line curve to the early-time data (t< 8 min.) would most likely incorporate data reflective of filter-pack recharge, as the sand filter surrounding the monitoring well screen drains, and is not reflective of true formation hydraulic conductivity.

H-2. ***It was noted that for the shallow and deep bedrock wells that the confined aquifer model was utilized. Based on observed site geology there is no rationale for using the confined aquifer model. Please proved an explanation for using this model for the bedrock wells.***

Response:
The confined aquifer model was utilized in the hydraulic conductivity estimates for both shallow and deep bedrock due to the fact that fractured bedrock geology behaves as a confined flow system at the scale of a slug test. Bedrock fracture aperture and fracture interconnectedness confines groundwater at this localized scale and application of the confined model is appropriate.

Appendix L -Village of Gowanda Zoning Map

The map should include the location of the Peter Cooper Inactive Landfill Area and the Former Manufacturing Area.

Response:
The map will be revised to show the two areas.

Appendix M - Floodplain Map

The map should include the location of the Peter Cooper Inactive Landfill Area and the Former Manufacturing Area.

Response:
The map will be revised to show the two areas.

Appendix N -Darcy Flux to Creek

The flux calculations indicate that the groundwater from the site to the creek is approximately 3,055 ft^3/day. If one more significant digit is used for the gradient value, then the flux rate increases to approximately 3,535 ft^3/day (or 26,444 gallons/day). Please check the significant figures and results, and revise accordingly.

Response:
The variability of the parameter values used to calculate the flux rate is large. Performing a sensitivity analysis would show that the difference in calculating the flux using the upper and lower limits of a reasonable range of parameter values would produce a range of values that are larger than the 480 ft^3/day difference obtained by carrying out the analysis to one more significant digit. Revising the calculation would have no consequence on the use of the flux rate in the analysis presented in the RI.

Appendix P - Assessment of VOCs in Soils at MWFP-3

P-1 ***As noted previously, none of the samples with positive field reading for organic vapors were analyzed. Therefore it could not be determined if all the VOCs present at the site have been identified; nor if the highest site concentrations have been determined (e.g., are VOC concentrations at B-13 higher than those at MWFP-3?). Despite the fact that only samples with no field reading of organic vapors were analyzed, high concentrations of chlorinated organics (over 1000 µg/kg PCE) were detected. It is possible that the full extent of VOCs at the site has not yet been fully delineated.***

Response:
Soil at Boring B-7 exhibited a positive PID headspace reading and was also laboratory analyzed. The results indicated only low levels (below PRGs) of a small number of VOCs. As discussed in response to Specific Comment 27, additional soil samples from borings exhibiting elevated PID readings may have exhibited different concentrations of VOCs than MWFP-3, however it is unlikely that this data would change the outcome of the RI or subsequent evaluations in the FS. Furthermore, while it is possible that soils at some borings exhibiting non-detectable headspace VOC measurements may exhibit detectable VOCs when subjected to chemical analysis, soils with significant chlorinated VOC content would be expected to yield positive headspace results more often than not. The absence of positive headspace measurements at 11 additional borings surrounding MWFP-3 indicates that the impacted area is isolated to the approximate area shown on Figure 2 in Appendix P.

P-2 ***Table 2 at the beginning of this appendix has an error on the m+p-xylene concentration in B-9; the validated Form I shows the concentration to be 5000 µg/kg (5.0 mg/kg), not 0.035 as shown on the table. The wrong data was plotted for B-9, (see data sheets) ie. tetrachloroethene and toluene.***

Response:
Acknowledged. The corrected (validated) results will be presented in the revised report.

P-3 ***Figure 2 -The shaded area does not include results from B9. The actual sample results for B9 indicate that there is impacts in this area. If this table is meant to just include a representation of PID results, then an additional figure should be included with the actual analytical results.***

Response:
Figure 2 in Appendix P represents headspace results. An additional Figure showing VOC concentrations is not likely to be useful, as the samples analyzed were generally outside the perimeter of anticipated impacts and, as expected, yielded non-detectable or low VOC results.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

RECEIVED NOV - - 2003

OCT 29 2003

EXPRESS MAIL --

Mr. Tomas Forbes, P.E.
Benchmark Environmental Engineering & Science
50 Fountain Plaza, Suite 1350
Buffalo, NY 14202

Re: Comments on the responses to the Remedial Investigation and the Human Health Risk Assessment Reports, Peter Cooper Landfill Site, Gowanda, New York

Dear Mr. Forbes:

Enclosed are comments from the U.S. Environmental Protection Agency (EPA) on the responses to EPA's comments on the Remedial Investigation and the Human Health Risk Assessment Reports prepared by Geomatrix Consultants, Inc. for the Peter Cooper Landfill Site, Gowanda, New York. Overall, the responses to EPA's comments were adequately addressed and require minor revisions.

In accordance with the Administrative Order for the Site, please incorporate the comments into the final RI and Human Health Risk Assessement Reports and provide EPA with copies of both documents within 30 days of receipt of this letter.

Should you have any questions or comments on the enclosed comments please do not hesitate to contact Sherrel Henry of my staff at (212) 637-4273.

Your cooperation is appreciated.

Sincerely yours,

Kevin Lynch, Section Chief
Western New York Remediation Section

Enclosures

301821

cc: M. Moore, NYSDEC
J. Wittenborn, Collier Shannon
M. Graham, Phillips Lytle
S. Davis, Huber Lawrence
J. Mayo, CDM

ENCLOSURE

RI Comment Number 25 and HHRA Comment Number 40

The use of regional (eastern US) background should be the last resort for evaluating soil contamination. TAGM 4046 (Appendix A Table 4) NYSDEC Recommended Soil Cleanup Objectives along with USEPA Region 9 PRGs should be used for comparison of the inorganic soil data. The lowest (most stringent) value of the NYSDEC Recommended Soil Cleanup Objectives, EPA Region 9 PRGs, and regional values should be used to evaluate the inorganic soil data. The Reports should be revised to include the relevant screening criteria cited above.

In addition, as stated in your response to HHRA comment 40, EPA agrees that background data from the Markhams site should be considered and is preferable to using the Eastern US background data. However, soil samples collected at depth from the Gowanda site should not be used.

The memorandum prepared by the EPA's ORD Lab in Las Vegas evaluating the arsenic data using appropriate statistical techniques is attached.

RI comment Number 40

Impact to groundwater screening criteria (EPA Soils, NY State soil cleanup levels to protect groundwater, and Region 9 PRGs) are applicable to the evaluation of soil contamination at the site. These values provide estimates based on partition theory and should not be considered speculative. The guidance values are widely used and generally accepted guidance values for evaluating impacts to groundwater resources based on soil contaminant levels (i.e., "To Be Considered" [TBCs] criteria). The response to EPA's comment assumes that 30 years is sufficient time for the contaminant soil/water partitioning to reach steady state. The assumption also implies that future groundwater contaminant levels won't change. Neither the RI nor the response to the comment provides any basis to support this assumption. Impact to groundwater screening criteria should be included as screening criteria for soils in the final RI Report.

Evaluation of Arsenic Site Data for Peter Cooper - Gowanda Site
Gowanda, New York

prepared by: Dr. Anita Singh, Lockheed Martin
May 27, 2003

In early May 2003, Dr. M. Olsen of Region 2 requested the assistance of Tech Support Center, NERL, Las Vegas, Nevada in comparing site arsenic concentrations with those of the background arsenic concentrations for the Peter Cooper Site. Arsenic is a contaminant of potential concern (COPC) for the Peter Cooper Site. The Peter Cooper Site has two main parts: the inactive landfill and a manufacturing plant. Soil surface and subsurface samples have been collected from both parts of the site. In a report prepared by Geomatrix Inc, it is stated that background level of arsenic concentration in eastern United States ranges from 3 to 12 mg/kg. For the purpose of the present report, it is assumed that the background level arsenic threshold concentration (e.g., maximum concentration limit=MCL) for the Peter Cooper Site is about 12 mg/kg. If the site arsenic concentrations (e.g., 95% upper prediction limit=95% UPL) are greater than 12 mg/kg, then obviously they are also greater than any number below 12 mg/kg. If arsenic site data are consistent with the background arsenic concentrations, then the 95% site UPL should fall below the upper range (=12 mg/kg) of the background concentrations. If the site arsenic 95% UPL exceeds 12, then the site arsenic concentrations may be considered to be impacted by the site-related activities.

An Excel data file, Gowanda.xls was provided by Dr. Olsen. This data file has surface and subsurface soil data collected from the inactive landfill and the manufacturing plant. Some sediment (=3) and seep water samples (=3) are also included in this data file. However, 3 samples are not enough to perform any statistical analysis. In this report, only surface and subsurface soil samples collected from the landfill and the manufacturing plant have been considered The main objective of the present request is to evaluate whether arsenic concentrations from the site are consistent (belong to the same population) with the background arsenic concentrations. This can be achieved in more than one way (depending upon data availability) by using a hypothesis testing approach and/or upper prediction and tolerance limits. In this letter report, the procedure based upon the 95% UPLs as described in EPA 1992 (pages 51-59) has been used to perform this evaluation.

Since the site-specific background data are not available, for the purpose of the present study, it is assumed that the background level threshold arsenic concentration for the Peter Cooper Site is 12 mg/kg. Individual site observations or the 95% upper prediction limit (or the 95% upper tolerance limit) are then compared with the background threshold value of 12 mg/kg. It is observed that most of the surface (manufacturing plant data) and subsurface data sets (both landfill and manufacturing plant data) follow lognormal distributions. The prediction limit and tolerance limit approaches as described in EPA 1992 have been used to compare site concentrations with background level concentration of 12 mg/kg. The upper prediction limits have been computed using log-transformed data which are then compared with the background value of the natural logarithm of 12 mg/kg ($\ln 12 = 2.48$). If site concentrations are consistent with the background value of 2.48, then 95% upper prediction limit (UPL) based upon the site data (on log-transformed data) should fall below 2.48. If the site 95% UPL based upon the site data falls below the background threshold value, then it can be considered that the site and background concentrations are from the same population. If the site 95% UPL is above the background threshold value of 2.48, then there is some evidence of contamination due to the site related activities.

For the present study, the subsurface soil arsenic data set also includes (as shown in spread sheets of the Gowanda.xls file provided by Dr. Olsen) the surface soil data. The 95% UPLs (parametric and non-parametric) have been computed separately for the landfill and the manufacturing plant. It is noted that all of the 95% UPLs for surface and subsurface soils (with and without outliers) are greater than ln(12)=2.48. It is also noted that for each of the four data sets, the maximum observed value (to be used when the data are not normal or lognormal) as given in Table 2 exceeds the background threshold value. The maximum (Max) value is used as an estimate of the upper prediction limit or upper tolerance limit (EPA 1992, pages 54-59) when data are non-parametric (e.g., neither normal nor lognormal). These statistics based upon the observed site surface and subsurface soil data are summarized in Tables 1 and 2 as follows, where n represents the number of observations used in the computation of a 95% UPL. All relevant statistics (generated by the Scout software package) including distributional conclusions are given in Appendix A. Kolmogorov-Smirnov test statistic has been used to determine the data distributions.

Table 1. 95% UPLs (on log-transformed data) for Arsenic in Surface and Subsurface Soil

	Landfill Surface	Landfill Subsurface	Plant Surface	Plant Subsurface
All data	4.84 (n=20)	4.69 (n=31)	4.82 (n=10)	3.96 (n=22)
Without outliers	3.21 (n=18)	3.83 (n=29)	3.93 (n=9)	3.43 (n=21)

Table 2. Non-parametric UPLs (Maximum observed value) for Arsenic in Surface and Subsurface Soil

	Landfill Surface	Landfill Subsurface	Plant Surface	Plant Subsurface
All data	6.82 (n=20)	6.82 (n=31)	5.12 (n=10)	5.12 (n=22)
Without outliers	3.66 (n=18)	4.10 (n=29)	4.06 (n=9)	4.06 (n=21)

Since all computed site 95% UPLs (and also the maximum values as given in Table 2) are greater than the background value of 2.48, it is concluded that site arsenic concentrations in surface soil and subsurface soil are not consistent with the background arsenic concentrations. From the statistics as summarized in Tables 1 and 2, it can be concluded that the site arsenic concentrations are higher (even after removing high outlying values) than the background arsenic concentrations.

References

EPA (1992). Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities. Addendum to Interim Final Guidance. Office of Solid Waste. Permits and State Programs Division. July 1992.

Appendix A

Background Threshold Value = 12 mg/kg

Log(Background Threshold Value) = 2.4849

Title : Landfill Surface Soil Samples - Full Data Set (n=20)
File=Fill-surface.dat
Data are not normal or lognormal

Prediction Interval

Method = Classical
Mean = 2.6289
Standard Deviation = 1.2459
T-Value = 1.7291
DOF = 19.0000
Lower Limit = 0.4214
Upper Limit = 4.8364
0.90 Two Sided Limits
Max value = ln(919)=6.82

Title : Landfill Surface Soil Samples without two outliers - 919 and 128 (n=18)
File: Fill-surface.dat
Data are not normal or lognormal

Prediction Intervals

Method = Classical
Mean = 2.2724
Standard Deviation = 0.5241
T-Value = 1.7396
DOF = 17.0000
Lower Limit = 1.3357
Upper Limit = 3.2090
0.90 Two Sided Limits
Max value = ln(38.8)=3.66

Title : Landfill Sub-surface Soil Samples (includes surface samples) - Full data set (n=31)
File: Fill-subsurface.dat
Data are not normal or lognormal

Prediction Intervals

Method = Classical
Mean = 2.8180
Standard Deviation = 1.0851
T-Value = 1.6973
DOF = 30.0000
Lower Limit = 0.9469
Upper Limit = 4.6892
0.90 Two Sided Limits
Max value=ln(919) = 6.82

Title : Landfill Sub-surface Soil Samples (includes surface samples)- without outliers 919 and 128
File: Fill-subsurface.dat

Data set follows a lognormal distribution (n=29)

Prediction Intervals

Method = Classical
Mean = 2.6098
Standard Deviation = 0.7042
T-Value = 1.7011
DOF = 28.0000
Lower Limit = 1.3913
Upper Limit = 3.8282
0.90 Two Sided Limits
Max value = ln(60.5) =4.10

Title : Plant Surface Soil - Full data set of size 10.
File: Plant-surface.dat

Data set follows a lognormal distribution (n=10)

Prediction Intervals

Method = Classical
Mean = 2.8603
Standard Deviation = 1.0180
T-Value = 1.8331
DOF = 9.0000
Lower Limit = 0.9031
Upper Limit = 4.8175
0.90 Two Sided Limits
Max value= ln(168)=5.12

Title : Plant Surface Soil without outlier168
File: Plant-surface.dat

Data set follows a lognormal distribution (n=9)

Prediction Intervals

Method = Classical
Mean = 2.6088
Standard Deviation = 0.6739
T-Value = 1.8595
DOF = 8.0000
Lower Limit = 1.2878
Upper Limit = 3.9298
0.90 Two Sided Limits
Max value = ln(57.9) = 4.06

Title : Plant Subsurface Soil -- Full Data set includes surface samples
File: Plant-subsurface.dat

Combined data set follows a lognormal distribution (n= 22)

Prediction Intervals

Method = Classical
Mean = 2.4952
Standard Deviation = 0.8300
T-Value = 1.7207
DOF = 21.0000
Lower Limit = 1.0348
Upper Limit = 3.9555
0.90 Two Sided Limits
Max value = ln(168) = 5.12

Title : Plant Subsurface Soil - Data set without outlier 168 includes surface samples
File: Plant-subsurface.dat

Data set follows a lognormal distribution (n=21)

Prediction Intervals

Method = Classical
Mean = 2.3700
Standard Deviation = 0.6011
T-Value = 1.7247
DOF = 20.0000
Lower Limit = 1.3088
Upper Limit = 3.4312
0.90 Two Sided Limits
Max value = ln(57.9) = 4.06

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