WARZYN

PROJECT
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VOLUME II of III

TECHNICAL MEMORANDUM NO. 1
INVESTIGATION RESULTS AND ANALYSIS REPORT

REMEDIAL INVESTIGATION/FEASIBILITY STUDY
H.O.D. LANDFILL
ANTIOCH, ILLINOIS

OCTOBER 1993

PREPARED FOR:
WASTE MANAGEMENT OF ILLINOIS, INC.
WESTCHESTER, ILLINOIS

• • •

PREPARED BY:
WARZYN INC.
ADDISON, ILLINOIS

TABLE OF CONTENTS

VOLUME I

1

INTRODUCTION....1-1
1.1 Purpose of Report....1-1
1.2 Background....1-1
1.2.1 Site Description....1-1
1.2.2 Location....1-2
1.3 Scope....1-3
1.4 Report Organization....1-3

2

REMEDIAL INVESTIGATION ACTIVITIES....2-1
2.1 Site Mapping and Surveying....2-1
2.2 Source Characterization....2-2
2.2.1 Landfill Cap Evaluation....2-2
2.2.2 Leachate Collection System Effectiveness....2-5
2.2.3 On-Site Surficial Soil/Sediment Sampling....2-5
2.2.4 Leachate Piezometer/Gas Well Installation....2-6
2.2.5 Perimeter Landfill Gas Probe Installation....2-7
2.2.6 Downhole Geophysical Logging....2-7
2.2.7 Leachate Sampling....2-8
2.2.8 Landfill Gas Sampling....2-8
2.2.9 Landfill Soil Borings....2-9
2.2.10 Evaluation of Off-Site Sources....2-9
2.3 Hydrogeologic Investigation....2-10
2.3.1 Evaluation of Existing Wells....2-10
2.3.2 Monitoring Well Installation....2-10
2.3.3 Downhole Geophysical Logging....2-12
2.3.4 In-Situ Hydraulic Conductivity Testing....2-13
2.3.5 Groundwater Level Measurements....2-13
2.4 Hydrologic Evaluation....2-14
2.4.1 Surface Water Flow Measurements....2-14
2.3.2 Surface Water Level Measurements....2-14

2.5 Soil/Sediment Evaluation....2-14
2.6 Air Evaluation....2-15
2.7 Human Population Evaluation....2-15
2.8 Ecological Evaluation....2-15
2.9 Potential Migration Pathway/Contaminant Characterization....2-16
2.9.1 Groundwater....2-16
2.9.2 Private and Municipal Water Supply Wells....2-17
2.9.3 Surface Water Sampling....2-18
2.9.4 Sediment and Soil Sampling....2-18

3

SITE PHYSICAL CHARACTERISTICS....3-1
3.1 Landfill Characteristics....3-1
3.1.1 Landfill Cover Physical Observations and Cover Evaluation....3-1
3.1.2 Landfill Structure/Refuse Characteristics....3-3
3.1.3 On-Site Landfill Gas Assessment....3-4
3.2 Climate....3-5
3.3 Physiography....3-5
3.4 Surface Hydrology....3-5
3.5 Surface Soils....3-7
3.6 Regional Hydrogeologic Setting....3-8
3.6.1 Regional Geology....3-8
3.6.2 Regional Hydrogeology....3-10
3.7 Site Hydrogeologic Setting....3-11
3.7.1 Site Geology....3-11
3.7.2 Site Specific Hydrogeology....3-14

4

NATURE AND EXTENT OF CONTAMINATION....4-1
4.1 Summary....4-1
4.2 Sampling and Analysis....4-2
4.3 Site Source Areas and Potential Contaminant Pathways....4-3
4.4 Contaminant Groupings....4-4
4.4.1 Volatile Organic Compounds....4-5
4.4.2 Semivolatile Organic Compounds....4-6
4.5 Compound Concentration Comparisons....4-6
4.5.1 Applicable Regulations....4-6
4.5.2 Background Evaluation....4-6
4.6 Source Characterization....4-9
4.6.1 Landfill Gas....4-9
4.6.2 Leachate....4-9

4.7 Media Characterization....4-11
4.7.1 Surface Soils....4-11
4.7.2 Groundwater....4-12
4.7.3 Village of Antioch Water Supply Wells....4-17
4.7.4 Private Residence Wells....4-18
4.7.5 Surface Water....4-19

5

CONTAMINANT FATE AND TRANSPORT....5-1
5.1 Summary of Findings....5-1
5.2 Physical/Chemical Attenuation Mechanisms....5-2
5.2.1 Dilution/Attenuation....5-2
5.2.2 Adsorption/Desorption....5-2
5.2.3 Biodegradation....5-4
5.2.4 Oxidation/Reduction....5-4
5.2.5 Volatilization....5-5
5.2.6 Precipitation....5-5
5.2.7 Hydrolysis....5-5
5.3 Potential Migration Pathways....5-5
5.3.1 Groundwater/Private Wells....5-5
5.3.2 Surface Water....5-7
5.3.3 Surface Soils....5-7
5.3.4 Air (Landfill Gas)....5-7

6

CONCLUSIONS....6-1

7

REFERENCES....7-1

LIST OF TABLES

Table 1-1	List of Acronyms and Abbreviations
Table 3-1	Soil Testing Results from Landfill Cap Evaluation
Table 3-2	Results of Boutwell Conductivity Testing of Clay Cap
Table 3-3	Landfill Cap Thickness and Vertical Extent of Refuse
Table 3-4	Landfill Gas Perimeter Probe Field Screening Results
Table 3-5	Sequoit Creek Staff Gage and Stand Pipe Water Levels
Table 3-6	Sequoit Creek Flow Measurements
Table 3-7	Geotechnical Laboratory Results
Table 3-8	Summary of Soil Testing Results - Previous Investigations
Table 3-9	Groundwater Elevations
Table 3-10	In-Situ Hydraulic Conductivity Results
Table 3-11	Summary of Slug Test Data Analysis Conducted by U.S. EPA FIT
Table 3-12	Vertical Groundwater Gradients
Table 3-13	Leachate Elevations
Table 4-1	Regulatory Limits
Table 4-2	Summary of Background Metals and Indicator Results
Table 4-3	Summary of Landfill Gas Results
Table 4-4	Summary of Volatile Organic Compounds in Groundwater, Surface Water, Surface Soils, and Leachate
Table 4-5	Summary of Historical Monitoring Well VOC Data
Table 4-6	Summary of Semivolatile Organic Compounds in Groundwater, Surface Water, Surface Soils, and Leachate
Table 4-7	Summary of Metals in Groundwater, Surface Water, Surface Soils, and Leachate
Table 4-8	Summary of Groundwater/Leachate Quality Indicator Results
Table 4-9	Summary of Chemical Constituents Detected at Village of Antioch Water Supply Wells and Private Residence Wells
Table 4-10	Summary of Historical Data for VOCs Detected in Village of Antioch Water Supply Well No. 4
Table 5-1	Summary of Physical and Chemical Properties of Compounds Detected at H.O.D. Landfill

LIST OF FIGURES

Figure 1	Site Location Map
Figure 2	Village Water Supply Well Location Map
Figure 3	Private Water Supply Well Sampling Locations
Figure 4	Wetlands Inventory Map
Figure 5	Stratigraphic Column For Northeastern Illinois
Figure 6	Pleistocene Stratigraphic Column For Chicago Area
Figure 7	Sequoit Acres Industrial Park Map
Figure 8	Filled Areas In Industrial Park Map
Figure 9	Surficial Soils Map
Figure 10	Surface Water and Surface Soil Sampling Location Map
Figure 11	Leachate Piezometers/Gas Well Location Map
Figure 12	Geologic Cross Section Location Map
Figure 13	Geologic Cross Section A-A'
Figure 14	Geologic Cross Section B-B'
Figure 15	Geologic Cross Section C-C'

LIST OF DRAWINGS

Drawing 10010201-F1	Site Features Map
Drawing 10010201-F2	Monitoring Well, Soil Boring, And Leachate Piezometer Location Map
Drawing 10010201-F3	Regional Geologic Cross Section
Drawing 10010201-F4	Surficial Sand Isopach Map
Drawing 10010201-F5	Clay-Rich Diamict Isopach Map
Drawing 10010201-F6	Surficial Sand Water Table Map (June 8 and 9, 1993)
Drawing 10010201-F7	Piezometric Surface Map (June 8 and 9, 1993)
Drawing 10010201-F9	Groundwater VOC Concentrations

VOLUME II

LIST OF APPENDICES

Appendix A	Test Pit Logs
Appendix B	Leachate Piezometer/Landfill Gas Well Boring Logs and Well Construction Details
Appendix C	Perimeter Gas Probe Boring Logs and Probe Construction Details
Appendix D	Geophysical Logs
Appendix E	Landfill Boring Logs
Appendix F	Geotechnical Laboratory Data
Appendix G	Summary of Environmental History of Sequoit Acres Industrial Park Through 1989
Appendix H	Groundwater Monitoring Well Boring Logs and Well Construction Details
Appendix I	Monitoring Well Development Data
Appendix J	Results of In-Field Hydraulic Conductivity Testing
Appendix K	Groundwater Sampling Field Parameter Results
Appendix L	Meteorological Data

VOLUME III

Appendix M Village and Private Residence Water Supply Well Logs

- M1 Municipal Well Construction Information
- M2 Private Well Logs

Appendix N Results of Landfill Cap Evaluation

- N1 Geotechnical Analytical Results
- N2 Boutwell Test Data

Appendix O Village of Antioch Water Supply Well Pumping Records

Appendix P Analytical Laboratory Results

- P1 Data Quality Summary, Data Qualifier Definitions, and Analytical Data Results
- P2 Landfill Gas VOCs
- P3 Leachate VOCs
- P4 Leachate SVOCs
- P5 Leachate Pesticides/PCBs
- P6 Leachate Indicators and Metals
- P7 Leachate Tentatively Identified Compounds (TICs)
- P8 Surface Soils VOCs
- P9 Surface Soils SVOCs
- P10 Surface Soils Pesticides/PCBs
- P11 Surface Soils Metals
- P12 Surface Soils Tentatively Identified Compounds (TICs)
- P13 Groundwater VOCs
- P14 Groundwater SVOCs
- P15 Groundwater Pesticides/PCBs
- P16 Groundwater Indicators and Metals
- P17 Groundwater Tentatively Identified Compounds (TICs)
- P18 Private Water Supply VOCs
- P19 Private Water Supply SVOCs
- P20 Private Water Supply Pesticides/PCBs
- P21 Private Water Supply Metals
- P22 Surface Water VOCs
- P23 Surface Water SVOCs
- P24 Surface Water Pesticides/PCBs
- P25 Surface Water Indicators and Metals
- P26 Surface Water Tentatively Identified Compounds (TICs)

A

TEST PIT LOGS

Test Pit 1

A- 0 to 2 inches; very dark gray (10YR 3/1) silt loam (ML); moderate fine granular structure; many fine roots; clear smooth boundary.

B- 2 to 12 inches; light brownish gray (10YR 6/2) clay (CL); weak coarse angular blocky structure; many fine roots; clear wavy boundary.

C- 12 to 24 inches; gray (10YR 5/1) silty clay (CL); weak very coarse angular blocky structure; few fine roots; clear wavy boundary.

D- 24 to 31 inches; gray (10YR 5/1) silty clay (CL); massive structure; no roots; abrupt wavy boundary.

E- 31 to 43 inches; gray (10YR 5/1) and brownish yellow (10YR 6/6) silt loam (ML); few fine distinct mottles; structureless; few fine roots; clear wavy boundary.

F- 43 to 50 inches; very dark gray (10YR 3/1) loam (ML); weak medium angular blocky structure; no roots; abrupt wavy boundary.

G- 50 to 53 inches; white chalky material with pottery fragments; abrupt wavy boundary.

H- 53 to 80 inches; dark brown grading to black clay loam (ML); structureless; abrupt wavy boundary.

REFUSE 80+ inches

Vegetative cover-100 percent, grasses
Root penetration-24 inches
No fissures or deformities

Test Pit 2

A- 0 to 14 inches; black (10YR 2/1) silty clay loam (ML-CL); moderate fine granular structure; many fine roots; clear wavy boundary.

B- 14 to 23 inches; gray (10YR 5/1) and yellowish brown (10YR 5/6) silty clay (CL); weak medium angular blocky structure; common fine roots; clear wavy boundary.

C- 23 to 34 inches; gray (10YR 5/1) and yellowish brown (10YR 5/6) silty clay (CL); no structure; few fine roots; clear wavy boundary.

D- 34 to 40 inches; brownish yellow (10YR 6/6) loam (ML); few fine distinct gray (10YR 6/1) and yellowish red (5YR 5/8) mottles; massive structure; no roots; clear wavy boundary.

E- 40 to 50 inches; very dark gray (10YR 3/1) loam (ML); no structure; common fine roots; clear wavy boundary.

F- 50 to 70 inches; gray (10YR 5/1) silt loam (ML); massive structure; no roots; abrupt wavy boundary.

REFUSE 70+ inches

Vegetative cover-100 percent, grasses
Root penetration-34 inches
No fissures or deformities

Test Pit 3

A- 0 to 8 inches; very dark gray (5Y 3/1) silty clay loam (ML-MC); structureless; many fine roots; clear wavy boundary.

B- 8 to 15 inches; very dark gray (10YR 3/1) loam (ML); moderate fine granular structure; many fine roots; clear wavy boundary.

C- 15 to 26 inches; gray (10YR 5/1) clay loam (MC-ML) and clay (CL); moderate and weak medium platy structure; common fine roots; clear wavy boundary.

D- 26 to 36 inches; gray (10YR 5/1) and yellowish brown (10YR 5/6) clay (CL); structureless; no roots; clear wavy boundary.

E- 36 to 43 inches; very dark gray (10YR 3/1) silt loam (ML); weak fine granular structure; common fine roots; clear wavy boundary.

F- 43 to 56 inches; pale brown (10YR 6/3) clay (CL) with many medium distinct gray (10YR 5/1) mottles; massive structure; no roots; abrupt wavy boundary.

G- 56 to 87 inches; black (10YR 2/1) silt loam (ML); structureless; no roots; abrupt wavy boundary.

REFUSE 87+ inches.

Vegetative cover- 50 to 100 percent; grasses, Queen Anne's Lace
Root penetration-26 inches
No fissures or deformities

Test Pit 4

A- 0 to 3 inches; very dark gray (10YR 3/1) silt loam (ML); moderate fine granular structure; common fine roots; gradual wavy boundary.

B- 3 to 17 inches; brown (10YR 5/3) silt loam (ML) and silty clay loam (ML-CL); common medium distinct yellowish brown (10YR 5/6) and gray (10YR 5/1) mottles; weak and moderate, fine and medium, angular blocky structure; few fine roots; gradual wavy boundary.

C- 17 to 30 inches; gray (10YR 5/1) silty clay (CL); few fine distinct yellowish red (5YR 5/8) mottles; weak very coarse angular blocky structure; few fine roots; common distinct brown (10YR 5/3) clay films on faces of peds; gradual wavy boundary.

D- 30 to 41 inches; gray (10YR 5/1) and brown (10YR 5/3) silty clay (CL); few fine yellowish brown (10YR 5/6) mottles; weak coarse angular blocky structure; common fine roots; gradual wavy boundary; about 3 percent gravel.

E- 41 to 55 inches; gray (10YR 5/1) and brown (10YR 5/3) silty clay (CL); few fine yellowish brown (10YR 5/6) mottles; structureless; no roots; clear wavy boundary; about 3 percent gravel.

F- 55 to 62 inches; black (10YR 2/1) silt loam (ML), structureless, no roots; abrupt wavy boundary.

REFUSE 62+ inches

Vegetative cover-100 percent, grasses
Root penetration-41 inches
No fissures or deformities

Test Pit 5

A- 0 to 8 inches; dark gray (10YR 4/1) silt loam (ML); moderate fine granular structure; many fine roots; clear smooth boundary.

B - 8 to 17 inches; gray (10YR 5/1) silty clay (CL); moderate medium angular blocky and strong fine angular blocky structure; common fine roots; clear wavy boundary.

C- 17 to 20 inches; brown (10YR 5/3) and gray (10YR 5/1) silty clay (CL); weak fine and medium angular blocky structure; few fine roots; clear wavy boundary.

D- 20 to 26 inches; gray (10YR 5/1) silt loam (ML); weak medium blocky structure; few fine roots; about 3 percent coarse sand particles; gradual wavy boundary.

E- 26 to 31 inches; gray (10YR 5/1) silt loam (ML); weak medium platy structure few fine roots; common distinct yellowish brown (10YR 5/6) clay films on faces of peds; clear wavy boundary.

F- 31 to 40 inches; very dark gray (10YR 3/1) loam (ML); structureless; no roots; abrupt wavy boundary.

G- 40 to 49 inches; white chalky material with pottery fragments; abrupt wavy boundary.

REFUSE 49+ inches.

Vegetative cover-75 percent, grasses
Root penetration-31 inches
No fissures or deformities

Test Pit 6

A- 0 to 7 inches; very dark gray (7.5YR 3/1) loam (ML); moderate fine granular structure; common fine roots; clear wavy boundary.

B- 7 to 20 inches; brown (10YR 5/3) and gray (10YR 5/1) clay loam (ML-CL); few medium distinct reddish yellow (7.5YR 6/6) mottles; weak fine subangular blocky structure; few fine roots; clear wavy boundary.

C- 20 to 41 inches; light yellowish brown (10YR 6/4) silty clay loam (ML-CL); few medium faint brownish yellow (10YR 6/6) and few medium distinct light gray (10YR 7/1) mottles; weak fine and medium subangular blocky structure; no roots; clear wavy boundary.

D- 41 to 65 inches; gray (10YR 5/1) silty clay (CL); weak and moderate medium and coarse angular blocky structure; no roots; abrupt wavy boundary.

REFUSE 65+ inches.

Vegetative cover-5 to 75 percent; grasses, clover, chicory, Queen Anne's Lace
Root penetration-20 inches
No fissures or deformities

Test Pit 7

A- 0 to 8 inches; black (2.5Y 2.5/1) silt loam (ML); moderate fine granular structure; common fine roots; abrupt wavy boundary.

B- 8 to 35 inches; brown (10YR 4/3) clay loam (ML-CL); few medium faint strong brown (7.5YR 5/6) and many coarse distinct gray (7.5YR 5/1) mottles; moderate medium subangular blocky structure; few fine roots; clear wavy boundary.

C- 35 to 47 inches; brown (10YR 5/3) clay (CL); common medium distinct strong brown (7.5YR 5/6) mottles; massive structure; no roots; clear wavy boundary.

D- 47 to 56 inches; light yellowish brown (2.5Y 6/4) and gray (7.5YR 6/1) silt loam (ML); massive structure; no roots; clear wavy boundary.

E- 56 to 60 inches; black (N2.5/)clay (CL); common coarse distinct strong brown (7.5YR 5/6) mottles; massive structure; no roots; abrupt wavy boundary.

REFUSE 60+ inches.

Vegetative cover-100 percent, grasses
Root penetration-35 inches
No fissures or deformities

Test Pit 8

A- 0 to 10 inches; black (10YR 2/1) silt loam (ML); moderate fine granular structure; common fine roots; clear wavy boundary.

B- 10 to 33 inches; stratified brown and dark grayish brown sand (SP), loam (ML), sandy loam (SM), silty clay (CL), and clay (CL); moderate medium angular blocky and moderate fine granular structure; few fine roots; clear wavy boundary.

C- 33 to 56 inches; yellow (2.5Y 7/6) and light gray (2.5Y 7/1) clay (CL), silty clay (CL), and silty clay loam (ML-CL); structureless; no roots; common distinct brownish yellow (10YR 6/6) clay films on faces of peds; clear wavy boundary.

D- 56 to 82 inches; gray (10YR 5/1) silty clay (CL); massive structure; no roots; abrupt wavy boundary.

REFUSE 82+ inches.

Vegetative cover-100 percent, grasses
Root penetration-33 inches
No fissures or deformities

Test Pit 9

A- 0 to 6 inches; very dark gray (10YR 3/1) loam (ML); moderate fine granular structure; common fine roots; clear wavy boundary.

B- 6 to 14 inches; yellowish brown (10YR 5/6) loamy sand (SM); weak medium angular blocky structure; few fine roots; clear wavy boundary.

C- 14 to 21 inches; gray (10YR 5/1) silty clay (CL); strong small and medium angular blocky structure; few fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; gradual wavy boundary.

D- 21 to 29 inches; gray (10YR 5/1) silty clay (CL); strong medium angular blocky structure; no roots; common faint dark yellowish brown (10YR 4/4 clay films on faces of peds; about 3 percent gravel; clear wavy boundary.

E- 29 to 84 inches; gray (10YR 5/1) silty clay (CL); massive structure; no roots; about 3 percent gravel; abrupt wavy boundary.

REFUSE 84+ inches.

Vegetative cover-100 percent, grasses
Root penetration-21 inches
No fissures or deformities

Test Pit 10

A- 0-9 inches; black (10YR 2/1) silt loam (ML); moderate fine granular structure; many fine roots; clear wavy boundary.

B- 9 to 22 inches; gray (10YR 5/1) silty clay (CL); few medium faint brownish yellow (10YR 6/6) mottles; moderate medium angular blocky structure; few fine roots; gradual wavy boundary.

C- 22 to 30 inches; gray (10YR 5/1) silty clay (CL); few medium faint brownish yellow (10YR 6/6) mottles; weak medium columnar structure; few fine roots; common faint brown (10YR 5/3) clay films on faces of peds; clear wavy boundary.

D- 30 to 62 inches; gray (10YR 5/1) silty clay (CL); massive structure; no roots; common faint light brownish gray (10YR 6/2) clay films on faces of peds; abrupt wavy boundary.

REFUSE 62+ inches.

Vegetative cover-100 percent; grasses.
Queen Anne's Lace
Root penetration-30 inches
No fissures or deformities

CCH/rcs/jrs/DAP
[chi 804 25]

B

LEACHATE PIEZOMETER/LANDFILL GAS WELL BORING LOGS AND WELL CONSTRUCTION DETAILS

SOIL BOREHOLE LOG

SITE NAME AND LOCATION: H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 10 1/4" ID HSA

BORING NO.: LP1

SHEET 1 OF 1

SAMPLING METHOD: 2" ID SPLIT SPOON

				DRILLING START TIME	DRILLING FINISH TIME
WATER LEVEL					
TIME					
DATE				DATE	DATE
CASING DEPTH				4/27/93	4/27/93

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8, T 46 N, R 10 E/W

NORTHING 2116410.7 EASTING 1050909.7

DATUM ELEVATION 775.6

DRILL RIG CME 75

SURFACE CONDITIONS GRASS COVERED LANDFILL CAP

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				FILL: Brown Clay Cap								
771.6												
770.6				Black Clay Cap Material								
5				Refuse								
10	3 12 13 15	33	1	FILL: Refuse - Paper, Metal, Plastic, Cloth, Etc.	SS							-
15	5 7 4 2	100	2	Wet Black Muck and Garbage at Approximately 14' 15% LEL Pulling Center Bit Refuse - Metal Plastic, etc.	SS							-
20	9 9 9 10	4	3	Refuse Mostly Wood and Black Wet Material	SS							
752.6				Cuttings Changed Color From Black to Brown at Approximately 23 feet								
25	–	50	4	1" Fine to Coarse Sand Layer at 25', Brown Silty CLAY (CL), Silty Lenses Present 1/8 - 1/4" Trace Fine to Coarse Sand	SS							
748.6	3 4 6 5	46	5		SS							
746.6				Gray Clayey SILT (ML) Trace Fine to Coarse Sand								
30				End of Boring at 29 Feet Leachate Piezometer Set at 20.31 Ft PID = None Detected								
35												

LOGGED BY SJC

DRILLING CONTR E & F

DATE 9/17/93 CHK'D BY DAP

CHAS. MARKGRAF

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 10 1/4" ID HSA

BORING NO. LP2

SHEET 1 OF 2

SAMPLING METHOD: 3" OD SPLIT SPOON

			DRILLING START	DRILLING FINISH
WATER LEVEL			TIME	TIME
TIME				
DATE			DATE	DATE
CASING DEPTH			4/29/93	4/30/93

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8 , T 46 N, R 10 E/W

NORTHING 2116428.7 EASTING 1051349.0

DATUM ELEVATION 785.8

DRILL RIG CME 75

SURFACE CONDITIONS GRASS COVERED LANDFILL CAP

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
					Grass Surface Brown CLAY (CL) Trace to Some Gravel, Landfill Cap Material								
781.8													
5					Black Clay and Refuse *Blind Drill to 20 Feet*								
10													
15													
20	4 5 6 6	50		1	Refuse	SS							–
25	60/4 in.	20		2	Refuse	SS							–
30	100/14"	25		3	Refuse	SS							–
35	12 11 13 14	50		4	Refuse	SS							–
745.8													

LOGGED BY PMS

DRILLING CONTR E & F

DATE 9/17/93 CHK'D BY DAP

BRANDON POWERS

ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

SHEET 2 OF 2

BORING NO. LP2

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	15 11 13 14	50		5 Gray Silty CLAY (CL), Trace Gravel	SS							–
	7 10 13 15	100		6	SS							–
741.8				End of Boring at 44 Feet Leachate Piezometer Set at 35 Feet PID = None Detected								
45												
50												
55												
60												
65												
70												
75												
80												
85												
90												
95												

SOIL BOREHOLE LOG

SITE NAME AND LOCATION: H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 10 1/4" ID HSA

BORING NO.: LP3

SHEET 1 OF 1

SAMPLING METHOD: 2" OD SPLIT SPOON 3" OD

SPLIT SPOON (30 - 32 FT)

		DRILLING START TIME	DRILLING FINISH TIME
WATER LEVEL			
TIME			
DATE		DATE	DATE
CASING DEPTH		4/28/93	4/28/93

BORING LOCATION:

SE 1/4 of SE 1/4 of Section 8, T 46 N, R 10 E/W

NORTHING 2116428.7 EASTING 1050318.9

DATUM ELEVATION 778.1

DRILL RIG CME 75

SURFACE CONDITIONS GRASS COVERED LANDFILL CAP

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
					FILL: Blind Drill to 15 Feet Brown Cap Clay to Approximately 5 Feet then Black Clay and Little Refuse to Approximately 8 Feet then more Refuse and Little Clay to 10 Feet								
5 (773.1)					FILL: Black Clay and Refuse								
10					Refuse - Metal, Wood, Plastic, Paper, etc. and Black Clay								
15													
20	–	50		1	Black Wet Refuse - Paper and Wood 30 - 50% LEL from Auger Head and After Collected Sample	SS							–
25	–	4		2	Brown Clay and Black Refuse - Wood	SS							–
(749.6)													
30 (747.1)	5 10 19 18	66		3	Gray Clayey SILT (ML)	SS							–
					Fine to Coarse SAND and Fine GRAVEL (SP/GP), Clay Lens at Approximately 31.3' 15-50% LEL From Auger Head								
35 (743.2)	9 10 9 9	50		4		SS							–
(742.1)					Fine to Coarse SAND (SP) Grading to Fine to Medium Sand 5 - 15% LEL in Augers								
40					End of Boring at 37 Feet Leachate Piezometer Set at 25.5 Feet PID = None Detected								

LOGGED BY SJC

DRILLING CONTR E & F

DATE 9/18/93 CHK'D BY DAP

CHAS. MARKGRAF

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 10 1/4" ID HSA

BORING NO. LP4

SHEET 1 OF 2

SAMPLING METHOD: 3" SPLIT SPOON

			DRILLING START	DRILLING FINISH
WATER LEVEL			TIME	TIME
TIME			12:30	14:00
DATE			DATE	DATE
CASING DEPTH			5/3/93	5/4/93

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8 , T 46 N, R 10 E/W

NORTHING 2116110.6 EASTING 1051338.6

DATUM ELEVATION 788.9

DRILL RIG CME 75

SURFACE CONDITIONS GRASS COVERED LANDFILL CAP

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
					Grass Surface Brown/Gray Silty Clay, Cap Material								
784.9					Black Clay and Refuse								
5													
10													
15													
20													
25	10 13 21 22	50		1	Refuse	SS							–
	11 12 19 17			2	Refuse	SS							–
30	5 7 6 8	40		3		SS							–
	4 8 11 13	50		4	Refuse	SS							–
35													
	7 8 12 13	50		5		SS							–
748.9					Refuse								

LOGGED BY PMS

DRILLING CONTR E & F

DATE 9/17/93 CHK'D BY DAP

BRANDON POWERS

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

SHEET 2 OF 2

BORING NO. LP4

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				Gray Silty CLAY (CL)								
	5 8 11 14	100		6	SS							–
45	6 7 12 13	100		7	SS							–
742.9				End of Boring at 46 Feet Leachate Piezometer Set at 39 Feet								
50												
55												
60												
65												
70												
75												
80												
85												
90												
95												

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 10.25" ID HSA

SAMPLING METHOD: 3" SPLIT SPOON

BORING NO. LP5

SHEET 1 OF 2

	START	FINISH
DRILLING		
WATER LEVEL	TIME	TIME
TIME	7:30	12:00
DATE	DATE	DATE
CASING DEPTH	4/20/93	4/21/93
SURFACE CONDITIONS		

BORING LOCATION:

SE 1/4 of SE 1/4 of Section 8 , T 46 N, R 10 E/W

NORTHING 2116230.0 EASTING 1051719.6

DATUM ELEVATION 796.6

DRILL RIG CME 75

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				Grass Surface Lt. Brown Clay (CL) Some Silt and Gravel								
792.1				Dark Gray Silty Organic Clay with Refuse								
5												
10												
15												
20												
25												
30	5 10 12 7	50		1 Refuse	SS							–
35	100/6"	25		2	SS							–
	10 12 9 11	75		3	SS							–

LOGGED BY PMS

DRILLING CONTR E & F

DATE 9/17/93 CHK'D BY DAP

BRANDON POWERS

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

SHEET 2 OF 2

BORING NO. LP5

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	110/7"	70		4	SS							
45	100/20"	60		5	SS							
50	17 20 21 18	80		6 Gray Clay with Gravel and Refuse	SS							
745.6				Gray Coarse SAND and GRAVEL (SP/GP)								
744.6	8 15 5 4	100		7 Gray Silty CLAY (CL), Trace Fine to Coarse Sand	SS							
742.6				End of Boring at 54 Feet Leachate Piezometer Set at 50 Feet								
55												
60												
65												
70												
75												
80												
85												
90												
95												

SOIL BOREHOLE LOG

SITE NAME AND LOCATION: H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 10.25" ID HSA

BORING NO.: LP6

SHEET 1 OF 1

SAMPLING METHOD: 3" SPLIT SPOON

	DRILLING START	DRILLING FINISH
WATER LEVEL	TIME	TIME
TIME	16:00	12:00
DATE	DATE	DATE
CASING DEPTH	4/14/93	4/16/93

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8, T 46 N, R 10 E/W

NORTHING 2115990.2 EASTING 1051732.1

DATUM ELEVATION 794.6

DRILL RIG CME 75

SURFACE CONDITIONS

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				Grass Surface Light Brown Silty Clay (CL)								
790.1				Light Gray to Dark Gray Silty Organic Clay with Refuse								
5												
10												
15												
20												
	3 5 17 7	30		1	SS							–
25												
30	14 17 5 8	60		2 Refuse and Black Clay	SS							–
	21 7 3 2			3	SS							–
35	4 3 4 2			4	SS							–
	100/7"			5 Refuse	SS							–
40 754.6	8 13 19 12	15		6 Gray Silty CLAY (CL)	SS							–
752.6				End of Boring at 42 Feet Leachate Piezometer Set at 36.5 Feet								

LOGGED BY PMS

DRILLING CONTR E & F

DATE 9/18/93 CHK'D BY DAP

BRANDON POWERS

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 10.25" ID HSA

BORING NO. LP7

SHEET 1 OF 2

SAMPLING METHOD: 3" SPLIT SPOON

	DRILLING START	DRILLING FINISH
WATER LEVEL	TIME	TIME
TIME	18:00	12:30
DATE	DATE	DATE
CASING DEPTH	4/27/93	4/28/93
SURFACE CONDITIONS		

BORING LOCATION:
SW 1/4 of SW 1/4 of Section 9 , T 46 N, R 10 E/W

NORTHING 2116197.8 EASTING 1052105.4

DATUM ELEVATION 794.7

DRILL RIG CME 75

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				Grass Surface Brown Silty Clay, Trace Gravel								
5 789.7				Refuse								
10												
15												
20												
25												
30	100/7"	25		1	SS							-
35	5 6 18 20	30		2	SS							-

LOGGED BY PMS

DRILLING CONTR E & F

DATE 9/17/93 CHK'D BY DAP

BRANDON POWERS

ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

SHEET 2 OF 2

BORING NO. LP7

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	5 11 18 20	45		3		SS							
45	11 10 27 25	75		4		SS							
50	11 12 13 13	45		5		SS							
55	7 8 21 27	50		6		SS							
60	9 11 13 15	50		7		SS							
732.7					Refuse								
					Gray Silty CLAY to Clayey SILT (CL/ML), Trace Gravel								
65	8 10 12 11	50		8		SS							
727.7					End of Boring at 67 feet Leachate Piezometer Set at 61 Feet								
70													
75													
80													
85													
90													
95													

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 10.25" ID HSA

BORING NO. LP8

SHEET 1 OF 2

SAMPLING METHOD: 3" SPLIT SPOON

	START	FINISH
DRILLING TIME	14:00	17:00
DATE	4/23/93	4/27/93

WATER LEVEL
TIME
DATE
CASING DEPTH
SURFACE CONDITIONS

BORING LOCATION:
SW 1/4 of SW 1/4 of Section 9, T 46 N, R 10 E/W

NORTHING 2116218.6 EASTING 1052519.4

DATUM ELEVATION 793.5

DRILL RIG CME 75

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				Grass Surface Brown Silty Clay with Trace Gravel								
5												
786.5				Refuse with Black Clay								
10												
15												
20												
25												
30	8 8 22 17	50	1	Refuse	SS							–
35	17 19 10 21	55	2	Refuse	SS							–

LOGGED BY PMS

DRILLING CONTR E & F

DATE 9/17/93 CHK'D BY DAP

BRANDON POWERS

Template ID: WM1

ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

SHEET 2 OF 2

BORING NO. LP8

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	10 12 15 15	75		3 Refuse	SS							–
45	11 13 14 12	75		4 Refuse	SS							–
50	15 16 17 9	100		5 Refuse	SS							–
55	100/14"	55		6 Refuse	SS							–
60	5 7 7 13	80		7	SS							–
65	8 10 12 15	40		8 Refuse	SS							–
70 723.0	8 9 16 17	100		9 Gray Silty CLAY (CL), Trace Fine to Coarse Sand	SS							–
	7 8 11 14	100		10	SS							–
75 718.5				End of Boring at 75 Feet Leachate Piezometer Set at 70 Feet								
80												
85												
90												
95												

SOIL BOREHOLE LOG

SITE NAME AND LOCATION: H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 10.25" ID HSA

BORING NO. LP9

SHEET 1 OF 2

SAMPLING METHOD: 3" SPLIT SPOON

	DRILLING START	DRILLING FINISH
WATER LEVEL		
TIME	14:00	12:00
DATE	4/21/93	4/23/93
CASING DEPTH		

BORING LOCATION:
SW 1/4 of SW 1/4 of Section 9, T 46 N, R 10 E/W

NORTHING 2116220.4 EASTING 1052769.9

DATUM ELEVATION 785.8

DRILL RIG CME 75

SURFACE CONDITIONS

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				Grass Surface Light Brown Silty Clay with Trace Fine to Coarse Sand								
5												
777.8				Black Clay and Refuse								
10												
15												
20												
25												
30	11/10/ 60/1"	50		1 Refuse	SS							–
35	5 7 11 21	55		2 Refuse	SS							–
	5 7 8 22	50		3 Refuse	SS							–

LOGGED BY PMS

DRILLING CONTR E & F

DATE 9/17/93 CHK'D BY DAP

BRANDON POWERS

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

SHEET 2 OF 2

BORING NO. LP9

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	5 6 7 10	75		4	Refuse	SS							–
	100/4"	15		5	Refuse	SS							–
45	8 28 9 10	55		6	Refuse	SS							–
	8 10 16 18	50		7	Refuse	SS							–
50	4 6 6 11	30		8	Refuse	SS							–
	4 8 10 12	65		9	Refuse	SS							–
55	100/1"	100		10	Refuse	SS							–
	10 15 7 6	25		11	Refuse	SS							–
60	100/8"	33		12	Refuse	SS							–
65	5 7 8 8	50		13	Refuse	SS							–
717.3					Gray CLAY (CL), Trace Silt and Fine to Coarse Sand								
70	5 18 15 7	100		14		SS							–
713.8					End of Boring at 72 Feet Leachate Piezometer Set at 66.5 Feet								
75													
80													
85													
90													
95													

SOIL BOREHOLE LOG

SITE NAME AND LOCATION: H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 10 1/4" ID HSA

BORING NO. LP10

SHEET 1 OF 1

SAMPLING METHOD: 2" OD SPLIT SPOON 3" OD

SPLIT SPOON (30-32 FT)

	START	FINISH
DRILLING TIME		
DATE	4/27/93	4/27/93

WATER LEVEL

TIME

DATE

CASING DEPTH

SURFACE CONDITIONS: GRASS COVERED LANDFILL CAP

BORING LOCATION:

SE 1/4 of SE 1/4 of Section 8, T 46 N, R 10 E/W

NORTHING 2115810.4 EASTING 1050919.8

DATUM ELEVATION 781.1

DRILL RIG

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				FILL: Brown CLAY Cap Material								
5 776.1				FILL: Black Clay and Refuse								
10												
15												
20	–	4		1 Refuse	SS							
				Clay Cuttings at Approximately 23 - 24'								
25	3 3 4 5	4		2	SS							
754.1				Refuse - Pushed 2" Spoon then 3" Spoon to Try to Get Better Recovery, No Recovery on 3" Spoon								
30	6 6 8 8	58		3 Gray Silty CLAY (CL) Trace Fine to Coarse Sand	SS							
749.1				PID = None Detected								
35				End of Boring at 32 Feet Leachate Well Set at 23 Feet PID = None Detected								

LOGGED BY SJC

DRILLING CONTR E & F

DATE 9/17/93 CHK'D BY DAP

DAVID MASKE

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 10.25" ID HSA

BORING NO. LP11

SHEET 1 OF 1

SAMPLING METHOD: 2" SPLIT SPOON

DRILLING START TIME / FINISH TIME

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8, T 46 N, R 10 E/W

WATER LEVEL
TIME
DATE

NORTHING 2115807.1 EASTING 1051321.8

DATUM ELEVATION 787.8

CASING DEPTH

DATE 4/8/93 DATE 4/12/93

DRILL RIG CME 75

SURFACE CONDITIONS

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				Grassy Surface Black Silty Clay Topsoil								
				FILL: Light Brown Silty Clay, Trace Fine to Coarse Sand and Fine Gravel								
5												
778.8				Black Clayey Sandy Refuse								
10												
15												
20	3 15 17 19	24		1 Refuse	SS							
25	100/16"	0		2 Refuse	SS							
30	10 12 7 7	12		3 Black Clayey Soil and Refuse	SS							
754.8	7 10 4 10	18		4 Black Organic Clay and PEAT (OH)	SS							
35 752.8				End of Boring at 35 Feet Leachate Piezometer Set at 29.2 Feet								

LOGGED BY PMS

DATE 9/17/93 CHK'D BY DAP

DRILLING CONTR E & F

BRANDON POWERS

Template ID: WM1

ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 10.25" ID HSA

BORING NO. LP12

SHEET 1 OF 1

SAMPLING METHOD: 2" SPLIT SPOON

	START	FINISH
DRILLING	TIME	TIME
	DATE	DATE
	4/7/93	4/8/93

WATER LEVEL
TIME
DATE
CASING DEPTH
SURFACE CONDITIONS

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8 , T 46 N, R 10 E/W

NORTHING 2115515.5 EASTING 1051138.4

DATUM ELEVATION 782.6

DRILL RIG CME 75

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				Grass Surface Black Silty Clay Topsoil								
				Brown Silty Clay Cap, Trace Sand and Gravel								
778.1				Black Silty/Sandy Fill								
5				Refuse								
10												
15												
20												
25	3 7 8 8	10		10 Gray Silty Fine to Medium SAND (SM)	SS							
757.1												
755.6				End of Boring at 27 Feet Leachate Piezometer Set at 22.5 Feet								
30												
35												

LOGGED BY PMS

DATE 9/17/93 CHK'D BY DAP

DRILLING CONTR E & F

BRANDON POWERS

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 10.25" ID HSA

BORING NO. LP13

SHEET 1 OF 1

SAMPLING METHOD: 2" SPLIT SPOON

	START	FINISH
DRILLING TIME		
DATE	4/13/93	4/13/93

WATER LEVEL
TIME
DATE
CASING DEPTH
SURFACE CONDITIONS

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8, T 46 N, R 10 E/W

NORTHING 2115448.4 EASTING 1050899.8

DATUM ELEVATION 779.0

DRILL RIG CME 75

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				Grass Surface FILL: Black to Dark Brown Silty Clay Topsoil to 8"								
				Brown Fine to Coarse Clayey Sand to Sandy Clay								
5 774.0				Black Clay Mixed with Refuse								
10												
15												
762.0				Approximate Base of Refuse								
20	2 5 5 7	18		1	SS							
	2 5 4 7	18		2 Gray Fine to Coarse Silty SAND (SM), Trace to Some Clay	SS							
755.0				End of Boring at 24 Feet Leachate Piezometer Set at 17 Feet								
25												
30												
35												

LOGGED BY PMS

DATE 9/17/93 CHK'D BY DAP

DRILLING CONTR E & F

BRANDON POWERS

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 10.25" ID HSA

BORING NO. LP14

SHEET 1 OF 1

SAMPLING METHOD: 2" SPLIT SPOON

DRILLING START TIME / FINISH TIME

WATER LEVEL

TIME

DATE

CASING DEPTH

DATE 4/13/93 DATE 4/13/93

SURFACE CONDITIONS

BORING LOCATION:

SE 1/4 of SE 1/4 of Section 8 , T 46 N, R 10 E/W

NORTHING 2115474.5 EASTING 1051389.5

DATUM ELEVATION 781.7

DRILL RIG CME 75

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				Grass Surface Black Silty Clayey Topsoil Brown Silty/Sandy Clay								
777.2				Refuse								
5												
10												
15												
	5 12 11 13	6		1 Refuse	SS							
20	4 18 7 10	9		2	SS							
758.2	2 3 2 2	12		3 Base of Refuse	SS							
25	2 4 9 6	9		4 Light Gray Silty Fine SAND (SM)	SS							
754.7				Native Soil								
				End of Boring at 27 Feet Leachate Piezometer Set at 22.5 Feet								
30												
35												

LOGGED BY PMS

DATE 9/17/93 CHK'D BY DAP

DRILLING CONTR PMS

BRANDON POWERS

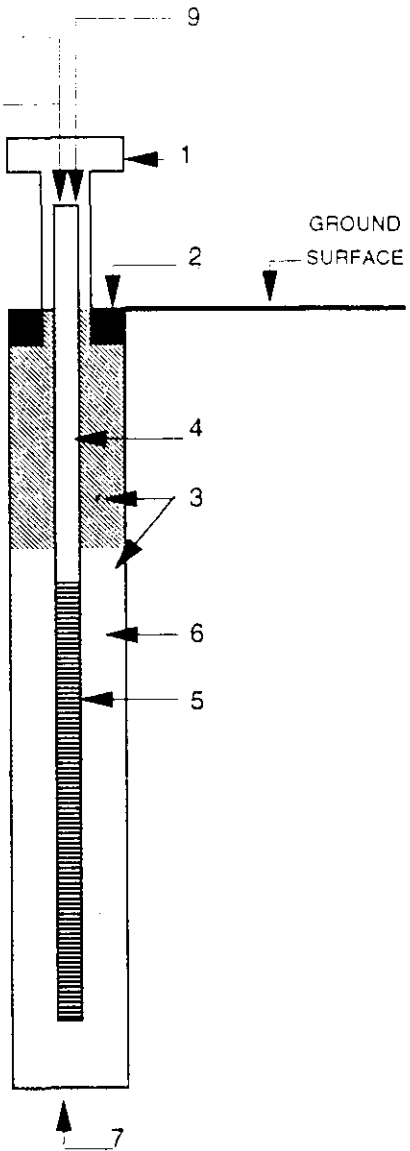
Template ID: WM1 ID: WM1

WARZYN

LEACHATE PIEZOMETER DETAIL
LEACHATE PIEZOMETER NO. LP1

Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	4/28/93
Contractor	E & F
Coordinates	2116410.7N, 1050909.7 E

ELEVATION	778.46 ft
STICK-UP	2.86 ft
GROUND SURFACE ELEVATION	775.6 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	6.5 ft
ELEVATION	769.1 ft
TOP OF PEA GRAVEL	7 ft
ELEVATION	768.6 ft
TOP OF SCREEN	9.87 ft
ELEVATION	765.73 ft
BOTTOM OF SCREEN	20.31 ft
ELEVATION	755.29 ft
END OF BORING	29 ft
ELEVATION	746.6 ft



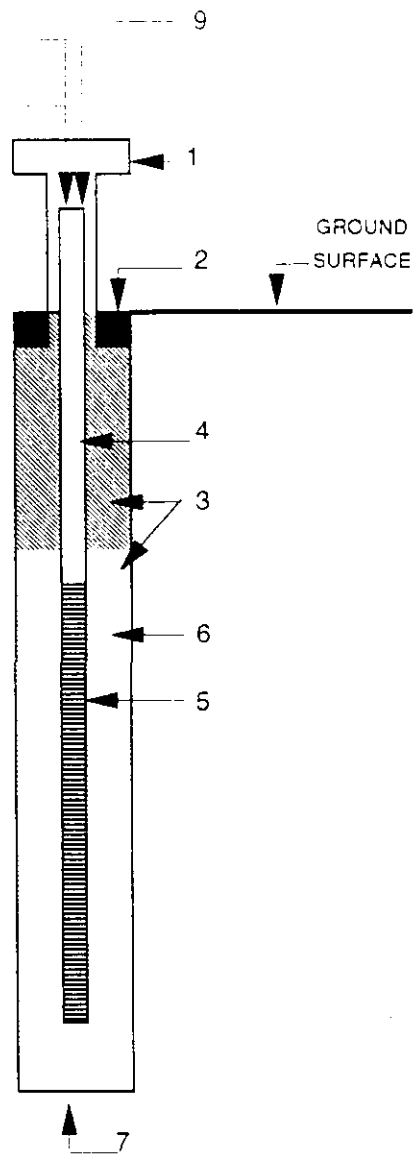
1. LOCKING STEEL PROTECTIVE CASING
   DIAMETER 8 IN
   LENGTH 7 FT
2. SURFACE SEAL
   BENTONITE HYDRATED CHIPS
   CONCRETE
3. HYDRATED BENTONITE CHIPS, AND FINE SILICA SAND
4. PVC PIPE
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
   SLOT SIZE 0.020 IN
   LENGTH 10.44 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM BENTONITE CHIPS
8. BOREHOLE DIAMETER 14 IN
9. PROBE TOP VENTED SLIP CAP

WARZYN

LEACHATE PIEZOMETER DETAIL
LEACHATE PIEZOMETER NO. LP2

Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	4/30/93
Contractor	E & F
Coordinates	2116428.7N, 1051349E

ELEVATION	787.8 ft
STICK-UP	2.3 ft
ROUND SURFACE ELEVATION	785.5 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	7.4 ft
ELEVATION	778.1 ft
TOP OF PEA GRAVEL	8.5 ft
ELEVATION	777 ft
TOP OF SCREEN	9.7 ft
ELEVATION	775.8 ft
BOTTOM OF SCREEN	35 ft
ELEVATION	750.5 ft
END OF BORING	42 ft
ELEVATION	743.5 ft



1. LOCKING STEEL PROTECTIVE CASING
   DIAMETER 8 IN
   LENGTH 7 FT
2. SURFACE SEAL
   BENTONITE HYDRATED GRANULAR/CHIPS
   CONCRETE
3. HYDRATED BENTONITE
   GRANULAR/CHIPS, FINE SILICA SAND
4. PVC PIPE
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
   SLOT SIZE 0.020 IN
   LENGTH 25.3 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM
   BENTONITE CHIPS/PEA GRAVEL
8. BOREHOLE
   DIAMETER 14 IN
9. PROBE TOP VENTED SLIP CAP

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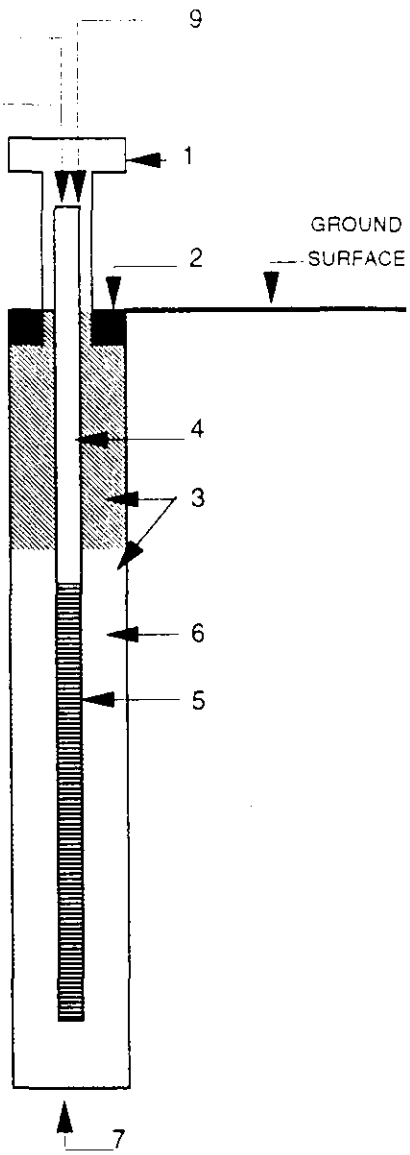
LEACHATE PIEZOMETER DETAIL
LEACHATE PIEZOMETER NO. LP3

Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	4/29/93
Contractor	E & F
Coordinates	2116428.7N, 1050918.9E

ELEVATION	780.89 ft
STICK-UP	2.79 ft
GROUND SURFACE ELEVATION	778.1 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	8 ft
ELEVATION	770.1 ft
TOP OF PEA GRAVEL	9 ft
ELEVATION	769.1 ft
TOP OF SCREEN	11 ft
ELEVATION	767.1 ft
BOTTOM OF SCREEN	25.5 ft
ELEVATION	752.6 ft
END OF BORING	37 ft
ELEVATION	741.1 ft



1. LOCKING STEEL PROTECTIVE CASING
   DIAMETER 8 IN
   LENGTH 7 FT
2. SURFACE SEAL
   BENTONITE HYDRATED CHIPS
   CONCRETE
3. HYDRATED BENTONITE
   CHIPS, FINE SILICA SAND
4. PVC PIPE
   DIAMETER 2 IN ID
   SCHEDULE 80 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 2 IN ID
   SCHEDULE 80 PVC
   SLOT SIZE 0.020 IN
   LENGTH 14.5 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM
   BENTONITE CHIPS/PEA GRAVEL
8. BOREHOLE
   DIAMETER 14 IN
9. PROBE TOP VENTED SLIP CAP

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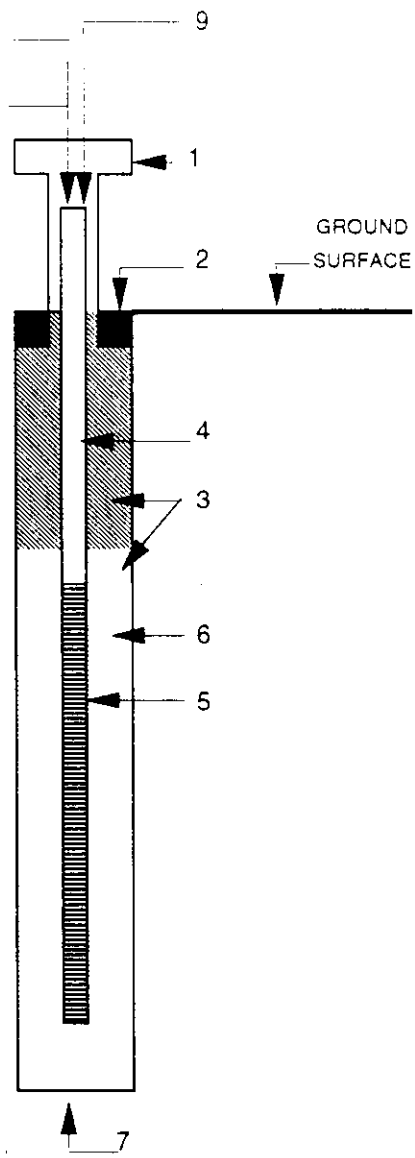
LEACHATE PIEZOMETER DETAIL
LEACHATE PIEZOMETER NO. LP4

Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	5/4/93
Contractor	E & F
Coordinates	2116110.6N, 1051338.6E

ELEVATION	790.84 ft
STICK-UP	1.94 ft
GROUND SURFACE ELEVATION	788.9 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	7.3 ft
ELEVATION	781.6 ft
TOP OF PEA GRAVEL	8.6 ft
ELEVATION	780.3 ft
TOP OF SCREEN	9.9 ft
ELEVATION	779 ft
BOTTOM OF SCREEN	39 ft
ELEVATION	749.9 ft
END OF BORING	44 ft
ELEVATION	744.9 ft



1. LOCKING STEEL PROTECTIVE CASING
   DIAMETER 8 IN
   LENGTH 7 FT
2. SURFACE SEAL
   BENTONITE HYD. CHIPS/GRANULAR
   CONCRETE
3. HYDRATED BENTONITE CHIPS/GRANULAR, FINE SILICA SAND
4. PVC PIPE
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
   SLOT SIZE 0.020 IN
   LENGTH 29.1 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM BENTONITE CHIPS, PEA GRAVEL
8. BOREHOLE
   DIAMETER 14 IN
9. PROBE TOP VENTED SLIP CAP

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LEACHATE PIEZOMETER DETAIL
LEACHATE PIEZOMETER NO. LP5

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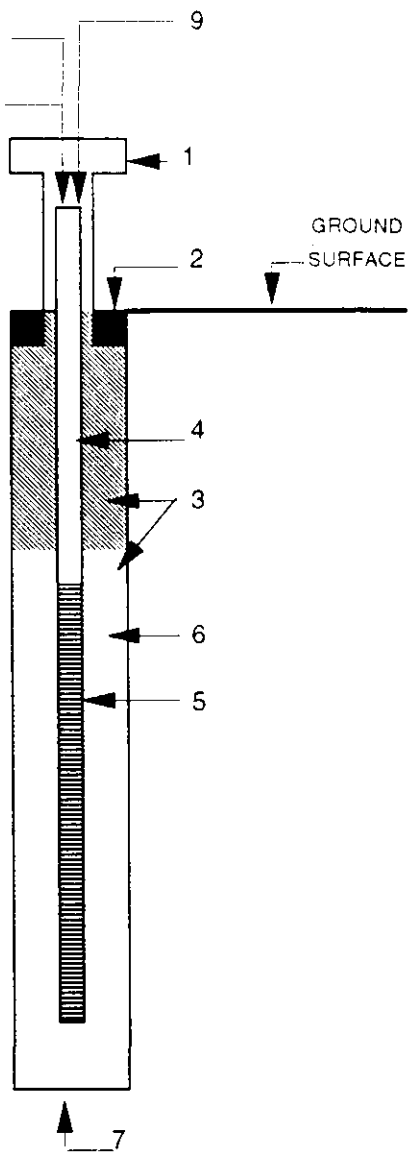
Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	4/21/93
Contractor	E & F
Coordinates	2116230N, 1051719.6E

ELEVATION	800.13 ft
STICK-UP	3.53 ft
GROUND SURFACE ELEVATION	796.6 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	8 ft
ELEVATION	788.6 ft
TOP OF PEA GRAVEL	9 ft
ELEVATION	787.6 ft
TOP OF SCREEN	10.5 ft
ELEVATION	786.1 ft
BOTTOM OF SCREEN	50 ft
ELEVATION	746.6 ft
END OF BORING	52 ft
ELEVATION	744.6 ft



1. LOCKING STEEL PROTECTIVE CASING
   DIAMETER 8 IN
   LENGTH 7 FT
2. SURFACE SEAL
   BENTONITE HYD. CHIPS/GRANULAR
   CONCRETE
3. HYDRATED BENTONITE CHIPS/GRANULAR
4. PVC PIPE
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
   SLOT SIZE 0.020 IN
   LENGTH 39.5 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM BENTONITE CHIPS, PEA GRAVEL
8. BOREHOLE DIAMETER 14 IN
9. PROBE TOP VENTED SLIP CAP

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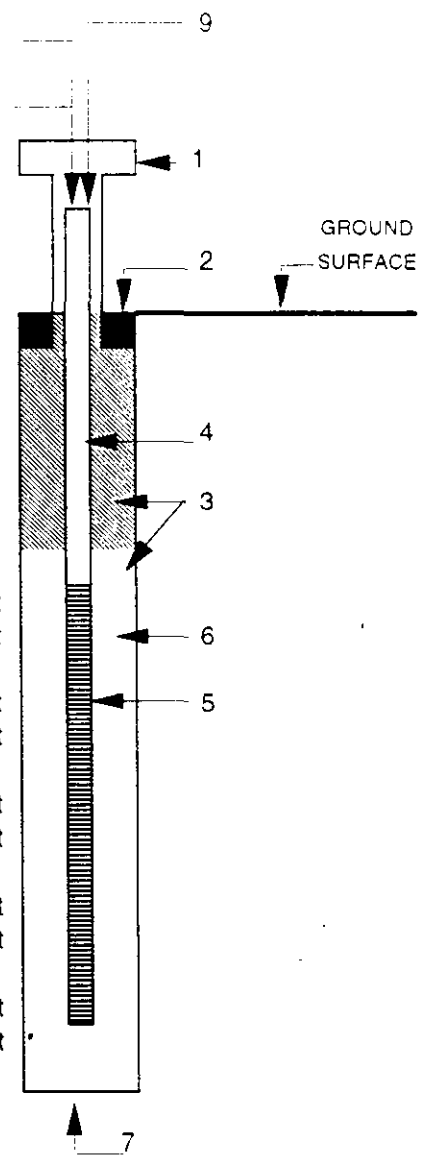
LEACHATE PIEZOMETER DETAIL
LEACHATE PIEZOMETER NO. LP6

Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	4/16/93
Contractor	E & F
Coordinates	2115990.2N, 1051732.1E

ELEVATION	797.32 ft
STICK-UP	2.72 ft
GROUND SURFACE ELEVATION	794.6 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	7 ft
ELEVATION	787.6 ft
TOP OF PEA GRAVEL	8 ft
ELEVATION	786.6 ft
TOP OF SCREEN	9.7 ft
ELEVATION	784.9 ft
BOTTOM OF SCREEN	36.5 ft
ELEVATION	758.1 ft
END OF BORING	42 ft
ELEVATION	752.6 ft



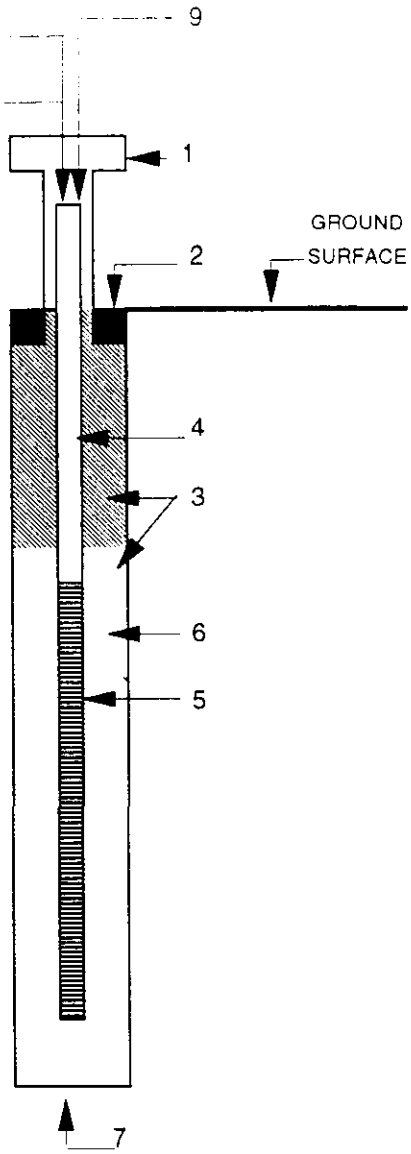
1. LOCKING STEEL PROTECTIVE CASING
   DIAMETER 8 IN
   LENGTH 7 FT
2. SURFACE SEAL
   BENTONITE HYD. CHIPS/GRANULAR
   CONCRETE
3. HYDRATED BENTONITE CHIPS/GRANULAR, FINE SILICA SAND
4. PVC PIPE
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
   SLOT SIZE 0.020 IN
   LENGTH 26.8 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM WASHED PEA GRAVEL
8. BOREHOLE
   DIAMETER 14 IN
9. PROBE TOP VENTED SLIP CAP

WARZYN

LEACHATE PIEZOMETER DETAIL
LEACHATE PIEZOMETER NO. LP7

Project	HOD LANDFILL
Location	ANTIOCH, LANDFILL
Job No.	10010201
Date Constructed	4/29/93
Contractor	E & F
Coordinates	2116197.8N, 1052105.4E

ELEVATION	797.39 ft
STICK-UP	2.69 ft
GROUND SURFACE ELEVATION	794.7 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	7.5 ft
ELEVATION	787.2 ft
TOP OF PEA GRAVEL	8.5 ft
ELEVATION	786.2 ft
TOP OF SCREEN	9.5 ft
ELEVATION	785.2 ft
BOTTOM OF SCREEN	61 ft
ELEVATION	733.7 ft
END OF BORING	67 ft
ELEVATION	727.7 ft



1. LOCKING STEEL PROTECTIVE CASING
   DIAMETER 8 IN
   LENGTH 7 FT
2. SURFACE SEAL
   BENTONITE HYD. GRANULAR/CHIPS
   CONCRETE
3. HYDRATED BENTONITE
   GRANULAR/CHIPS, FINE SILICA SAND
4. PVC PIPE
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
   SLOT SIZE 0.020 IN
   LENGTH 51.5 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM
   BETNONITE CHIPS/PEA GRAVEL
8. BOREHOLE
   DIAMETER 14 IN
9. PROBE TOP VENTED SLIP CAP

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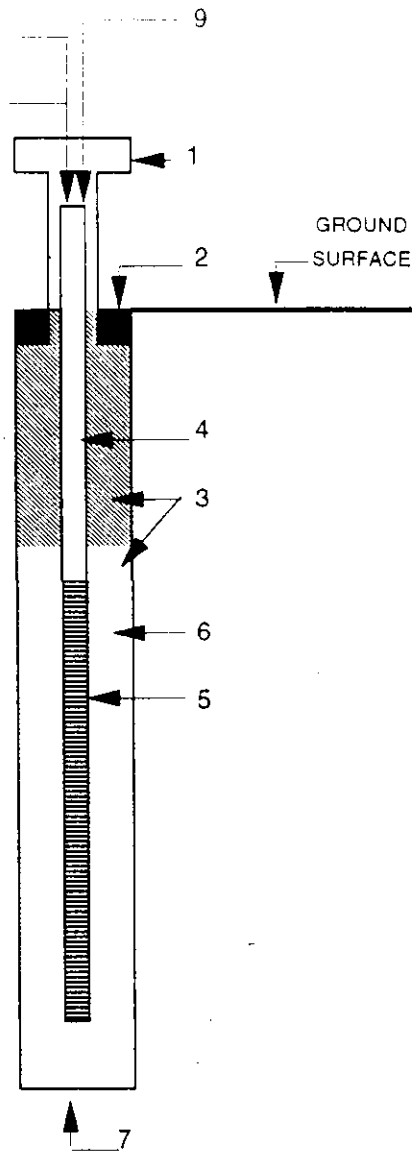
LEACHATE PIEZOMETER DETAIL
LEACHATE PIEZOMETER NO. LP8

Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	4/27/93
Contractor	E & F
Coordinates	2116218.6N, 1052519.4E

ELEVATION	796.35 ft
STICK-UP	2.85 ft
GROUND SURFACE ELEVATION	793.5 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	8 ft
ELEVATION	185.5 ft
TOP OF PEA GRAVEL	9 ft
ELEVATION	784.5 ft
TOP OF SCREEN	10 ft
ELEVATION	783.5 ft
BOTTOM OF SCREEN	70 ft
ELEVATION	723.5 ft
END OF BORING	75 ft
ELEVATION	718.5 ft



1. LOCKING STEEL PROTECTIVE CASING
   DIAMETER 8 IN
   LENGTH 7 FT
2. SURFACE SEAL
   BENTONITE HYD. CHIPS/GRANULAR
   CONCRETE
3. HYDRATED BENTONITE
   CHIPS/GRANULAR, FINE SILICA SAND
4. PVC PIPE
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
   SLOT SIZE 0.020 IN
   LENGTH 60 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM
   BENTONITE CHIPS, PEA GRAVEL
8. BOREHOLE
   DIAMETER 14 IN
9. PROBE TOP VENTED SLIP CAP

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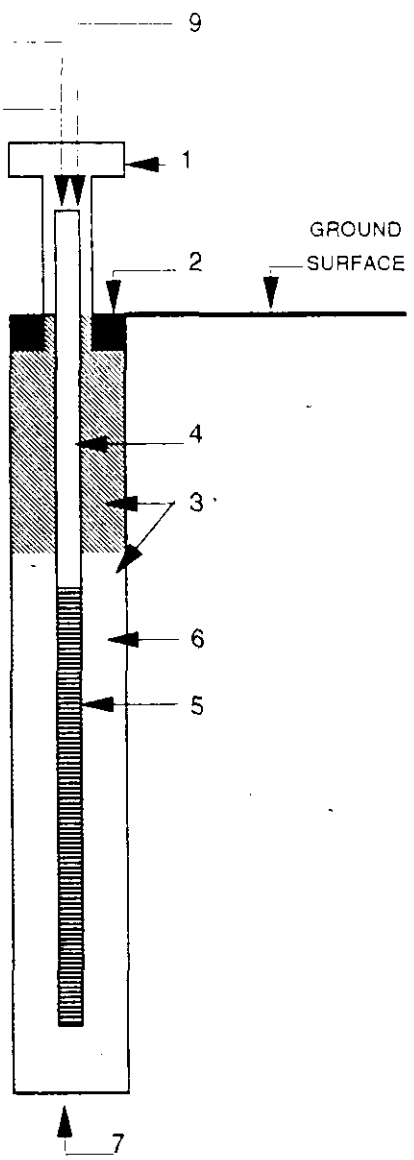
WARZYN

LEACHATE PIEZOMETER DETAIL
LEACHATE PIEZOMETER NO. LP9

Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	4/23/93
Contractor	E & F
Coordinates	2116220.4N, 1052769.9E

ELEVATION	789.16 ft
STICK-UP	3.36 ft
GROUND SURFACE ELEVATION	785.8 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	7.5 ft
ELEVATION	778.3 ft
TOP OF PEA GRAVEL	8.5 ft
ELEVATION	777.3 ft
TOP OF SCREEN	9.2 ft
ELEVATION	776.6 ft
BOTTOM OF SCREEN	66.5 ft
ELEVATION	719.3 ft
END OF BORING	72 ft
ELEVATION	713.8 ft



1. LOCKING STEEL PROTECTIVE CASING
   DIAMETER 8 IN
   LENGTH 7 FT
2. SURFACE SEAL
   BENTONITE HYD CHIPS/GRANULAR
   CONCRETE
3. HYDRATED BENTONITE CHIPS/GRANULAR, FINE SILICA SAND
4. PVC PIPE
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
   SLOT SIZE 0.020 IN
   LENGTH 57.3 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM BENTONITE CHIPS THEN PEA GRAVEL
8. BOREHOLE
   DIAMETER 14 IN
9. PROBE TOP VENTED SLIP CAP

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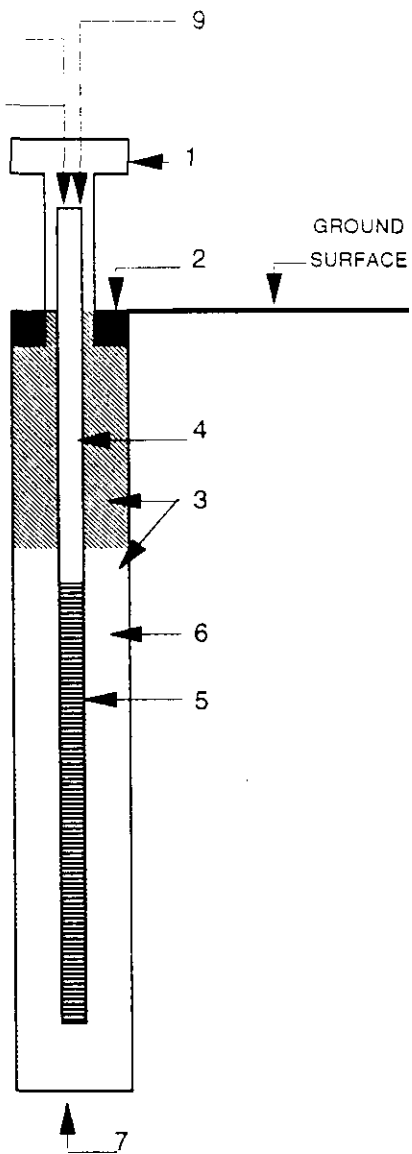
LEACHATE PIEZOMETER DETAIL
LEACHATE PIEZOMETER NO. LP10

Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	4/30/93
Contractor	E & F
Coordinates	2115810.4N, 1050919.8E

ELEVATION	783.92 ft
STICK-UP	2.82 ft
GROUND SURFACE ELEVATION	781.1 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	7.1 ft
ELEVATION	774 ft
TOP OF PEA GRAVEL	8.3 ft
ELEVATION	772.8 ft
TOP OF SCREEN	9.5 ft
ELEVATION	771.6 ft
BOTTOM OF SCREEN	23 ft
ELEVATION	758.1 ft
END OF BORING	32 ft
ELEVATION	749.1 ft



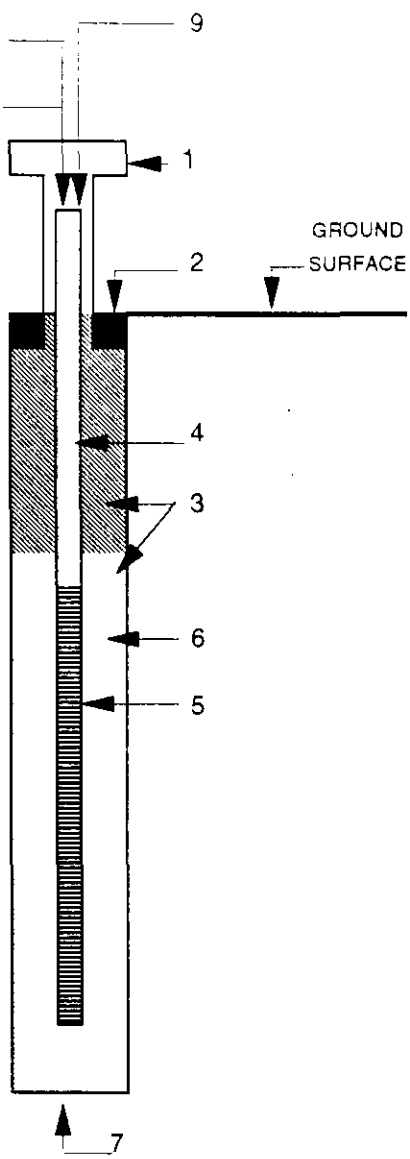
1. LOCKING STEEL PROTECTIVE CASING
   DIAMETER 8 IN
   LENGTH 7 FT
2. SURFACE SEAL
   BENTONITE HYD. GRANULAR/CHIPS
   CONCRETE
3. HYDRATED BENTONITE GRANULAR/CHIPS, AND FINE SILICA SAND
4. PVC PIPE
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
   SLOT SIZE 0.020 IN
   LENGTH 13.5 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM BENTONITE CHIPS
8. BOREHOLE
   DIAMETER 14 IN
9. PROBE TOP VENTED SLIP CAP

WARZYN

LEACHATE PIEZOMETER DETAIL
LEACHATE PIEZOMETER NO. LP11

Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	4/12/93
Contractor	E & F
Coordinates	2115807.1N, 1051321.8E

ELEVATION	790.61 ft
STICK-UP	2.81 ft
GROUND SURFACE ELEVATION	787.8 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	6.5 ft
ELEVATION	781.3 ft
TOP OF PEA GRAVEL	7.5 ft
ELEVATION	780.3 ft
TOP OF SCREEN	9.3 ft
ELEVATION	778.5 ft
BOTTOM OF SCREEN	29.2 ft
ELEVATION	758.6 ft
END OF BORING	33 ft
ELEVATION	754.8 ft



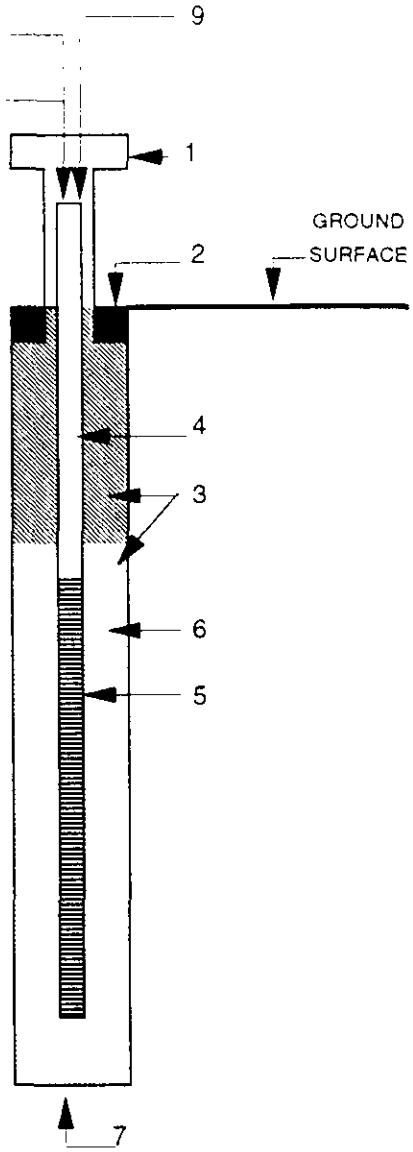
1. LOCKING STEEL PROTECTIVE CASING
   DIAMETER 8 IN
   LENGTH 7 FT
2. SURFACE SEAL
   BENTONITE HYD. CHIPS/GRANULAR
   CONCRETE
3. HYDRATED BENTONITE CHIPS/GRANULAR & FINE SILICA SAND
4. PVC PIPE
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
   SLOT SIZE 0.020 IN
   LENGTH 21.7 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM WASHED PEA GRAVEL
8. BOREHOLE
   DIAMETER 14 IN
9. PROBE TOP VENTED SLIP CAP

WARZYN

LEACHATE PIEZOMETER DETAIL
LEACHATE PIEZOMETER NO. LP12

Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	4/8/93
Contractor	E & F
Coordinates	2115515.5N, 1051138.4E

ELEVATION	784.85 ft
STICK-UP	2.25 ft
GROUND SURFACE ELEVATION	782.6 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	7 ft
ELEVATION	775.6 ft
TOP OF PEA GRAVEL	8 ft
ELEVATION	774.6 ft
TOP OF SCREEN	10 ft
ELEVATION	772.6 ft
BOTTOM OF SCREEN	22.5 ft
ELEVATION	760.1 ft
END OF BORING	25.5 ft
ELEVATION	757.1 ft



1. LOCKING STEEL PROTECTIVE CASING
   DIAMETER 8 IN
   LENGTH 7 FT
2. SURFACE SEAL
   BENTONITE HYD. GRANULAR/CHIPS
   CONCRETE
3. HYDRATED BENTONITE GRANULAR/CHIPS, AND FINE SILICA SAND
4. PVC PIPE
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
   SLOT SIZE 0.020 IN
   LENGTH 12.5 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM WASHED PEA GRAVEL
8. BOREHOLE
   DIAMETER 14 IN
9. PROBE TOP VENTED SLIP CAP

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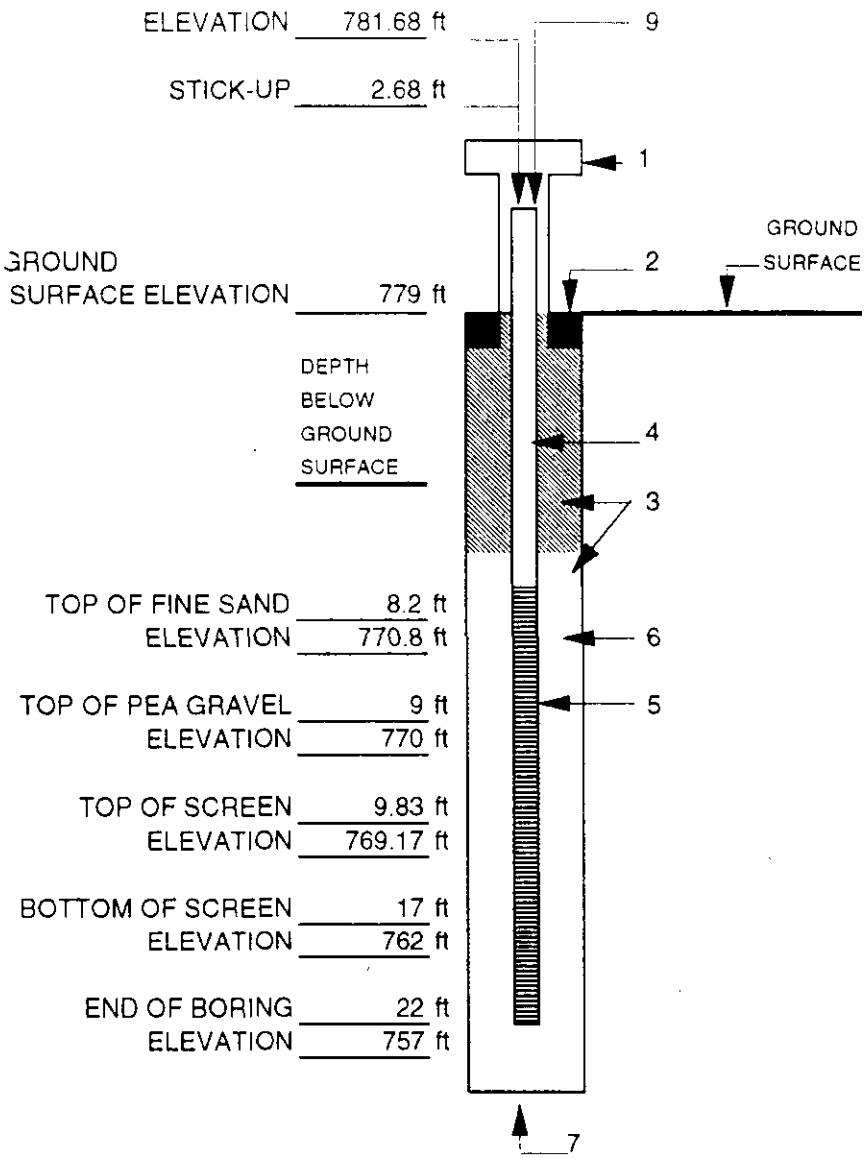
LEACHATE PIEZOMETER DETAIL
LEACHATE PIEZOMETER NO. LP13

Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	4/13/93
Contractor	E & F
Coordinates	2115448.4N, 1050899.8E



1. LOCKING STEEL PROTECTIVE CASING
   DIAMETER 8 IN
   LENGTH 7 FT
2. SURFACE SEAL
   BENTONITE HYD. CHIPS/GRANULAR
   CONCRETE
3. HYDRATED BENTONITE
   GRANULAR/CHIPS, FINE SILICA SAND
4. PVC PIPE
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
   SLOT SIZE 0.020 IN
   LENGTH 7.17 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM
   WASHED PEA GRAVEL
8. BOREHOLE
   DIAMETER 14 IN
9. PROBE TOP Vented Slip Cap

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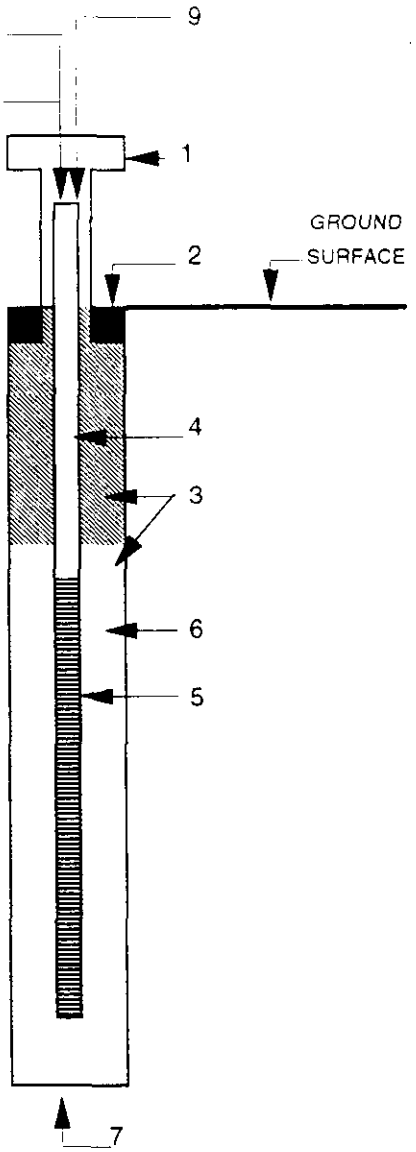
WARZYN

LEACHATE PIEZOMETER DETAIL
LEACHATE PIEZOMETER NO. LP14

Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	4/14/93
Contractor	E & F
Coordinates	2115474.5N, 1051389.5E

ELEVATION	784.27 ft
STICK-UP	2.57 ft
GROUND SURFACE ELEVATION	781.7 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	8 ft
ELEVATION	773.7 ft
TOP OF PEA GRAVEL	8.9 ft
ELEVATION	772.8 ft
TOP OF SCREEN	10.2 ft
ELEVATION	771.5 ft
BOTTOM OF SCREEN	22.5 ft
ELEVATION	759.2 ft
END OF BORING	25 ft
ELEVATION	756.7 ft



1. LOCKING STEEL PROTECTIVE CASING
   DIAMETER 8 IN
   LENGTH 7 FT
2. SURFACE SEAL
   BENTONITE HYD. CHIPS/GRANULAR
   CONCRETE
3. HYDRATED BENTONITE CHIPS/GRANULAR, FINE SILICA SAND
4. PVC PIPE
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 6 IN ID
   SCHEDULE 80 PVC
   SLOT SIZE 0.020 IN
   LENGTH 12.3 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM WASHED PEA GRAVEL
8. BOREHOLE DIAMETER 14 IN
9. PROBE TOP VENTED SLIP CAP

SJC/rs/DAP

I:\10010201\LP14.XLS

C

Perimeter Gas Probe Boring Logs and Probe Construction Details

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" IDHSA

BORING NO. GP3

SHEET 1 OF 1

SAMPLING METHOD: 5 FT CME SAMPLING TUBE

DRILLING START TIME / FINISH TIME

WATER LEVEL

TIME

DATE

CASING DEPTH

DATE 4/21/93 / DATE 4/21/93

BORING LOCATION:

SW 1/4 of SW 1/4 of Section 9 , T 46 N, R 10 E/W

NORTHING 2116615.5 EASTING 1052220.9

DATUM ELEVATION 770.8

DRILL RIG CME 750 ATV

SURFACE CONDITIONS GRASS COVERED SURFACE

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	–	63		1 Brown TOPSOIL, Roots Present, Clayey Little to Some Sand to 1 Foot over Brown Sandy Clay to Silty Clay, Little to Some, Fine to Medium Sand to 2 Feet over 6" Moist Sand Layer	SB							1->4.5
768.3				Hard Brown and Gray Streaked Silty CLAY (CL), Little Fine to Coarse Sand, Grades to Little Fine Gravel, Limonite Patches and Gray Streaks								
5	–	100		2 Hard Brown Silty CLAY (CL) Trace to Little Fine to Coarse Sand, Trace Fine Gravel, Gray Streaks Present	SB							>4.5
10	–	97		3	SB							>4.5-3.5
				PID None Detected								
758.8				Very Stiff to Hard Gray Silty CLAY (CL), Trace to Little Fine to Coarse Sand, Trace Gravel								
15	–	100		4 PID None Detected	SB							2.75->4.5
20 750.8				End of Boring at 20 Feet								
				Gas Probe Set at 19.85 Feet								
25												
30												
35												

LOGGED BY SJC

DRILLING CONTR E&F

DATE 9/22/93 CHK'D BY DAP

CHAS. MARKGRAF

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" IDHSA

BORING NO. GP4

SHEET 1 OF 1

SAMPLING METHOD: 5 FT CME SAMPLING TUBE 2" SPLIT SPOON

	DRILLING START	DRILLING FINISH
WATER LEVEL	TIME	TIME
TIME		
DATE	DATE	DATE
CASING DEPTH	4/15/93	4/15/93
SURFACE CONDITIONS		

BORING LOCATION:
SW 1/4 of SW 1/4 of Section 9 , T 46 N, R 10 E/W

NORTHING EASTING

DATUM ELEVATION

DRILL RIG CME 750 ATV

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	–	96		1 FILL: Organic Topsoil, Roots Present Brown Silty Clay Cap Material Brown Silty Clay Grades to Little Brown Clay	SB							0.5-4
5	–	75		2 Refuse, Cloth Material at 4 Feet Plastic Material at 5 Feet	SB							–
				End of Boring at 6 Feet Boring Backfilled with Bentonite Chips								
10												
15												
20												
25												
30												
35												

LOGGED BY SJC

DATE 9/22/93 CHK'D BY DAP

DRILLING CONTR CM

CHAS. MARKGRAF

ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" IDHSA

BORING NO. GP4A

SHEET 1 OF 1

SAMPLING METHOD: 5 FT CME SAMPLING TUBE

DRILLING START TIME / FINISH TIME

WATER LEVEL

TIME

DATE

CASING DEPTH

DATE 4/15/93 / DATE 4/15/93

BORING LOCATION:

SW 1/4 of SW 1/4 of Section 9 , T 46 N, R 10 E/W

NORTHING 2116248.1 EASTING 1053013.8

DATUM ELEVATION 776.4

DRILL RIG CME 750 ATV

SURFACE CONDITIONS GRASS COVERED

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
775.4	–	67		1 10" Topsoil Over 4" Brown Sandy Clay, 1/2" Sand Lense at 14"	SB							25->4.5
773.4				Very Stiff to Hard Gray CLAY (CH)								
771.4	–	100		2 Very Stiff Brown CLAY (CH), Trace Fine to Coarse Sand, Trace Silt	SB							>4.5
5				Very Stiff Brown Silty CLAY (CL), Little Fine to Coarse Sand, Trace to Little Fine Gravel, Trace Coarse Gravel								
10	–	97		3 3" Sandy Gravelly Clay Layer at 8 Feet, Grades to Very Stiff Brown and Gray Silty CLAY (CL) Little Fine to Coarse Sand, Trace to Little Gravel Very Stiff Gray Lean CLAY (CL), Trace to Some Silt, Little Fine to Coarse Sand, Trace to Little Fine Gravel, Trace Coarse Gravel 1" Sand Lense at 11 Feet	SB							3-4
761.9	–	95		4 3" Silt Layer at 14 Feet	SB							2.5-3.75
15				Very Stiff Gray Lean CLAY (CL) Trace to Some Silt, Little Fine to Coarse Sand and Fine Gravel, Shale Fragments Present								
20	–	95		5 Silt Lenses Present 1" Silt Layer at 21 Feet	SB							2.5-3.75
752.8	–	67		6 1" Sand and Gravel Layer at 23.5 Feet Very Stiff Gray Sandy Gravelly CLAY (CL) 2" Sand and Gravel Layer at 25.5 Feet	SB							–
25												
749.4				End of Boring at 27 Feet Gas Probe Set at 26 Feet								
30												
35												

LOGGED BY SJC

DRILLING CONTR E&F

DATE 9/17/93 CHK'D BY DAP

CHAS. MARKGRAF

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" IDHSA

BORING NO. GP5

SHEET 1 OF 1

SAMPLING METHOD: 5 FT CME SAMPLING TUBE

DRILLING START TIME / FINISH TIME

WATER LEVEL TIME

TIME

DATE / DATE / DATE

CASING DEPTH 4/16/93 4/16/93

BORING LOCATION:

SE 1/4 of SE 1/4 of Section 8 , T 46 N, R 10 E/W

NORTHING EASTING

DATUM ELEVATION

DRILL RIG CME 750 ATV

SURFACE CONDITIONS GRASS COVERED LANDFILL CAP

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	-	92		1 FILL: Brown Silt and Wet Organic Clay Topsoil Over Brown and Gray Silty Clay, Little to Some Fine to Coarse Sand, Trace Coarse Gravel Sandy Lenses from 2-4 Feet	SB							>4.5
5	-	83		2 FILL: Gray Clay	SB							-
				Refuse Material at 9 Feet								
10				End of Boring at 9 Feet Boring Backfilled with Bentonite Chips								
15												
20												
25												
30												
35												

LOGGED BY SJC

DRILLING CONTR E&F

DATE 9/17/93 CHK'D BY DAP

CHAS. MARKGRAF

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" IDHSA

BORING NO. GP5A

SHEET 1 OF 1

SAMPLING METHOD: 5 FT CME SAMPLING TUBE

DRILLING START TIME / FINISH TIME

WATER LEVEL TIME

DATE

CASING DEPTH

DATE 4/22/93 DATE 4/22/93

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8 , T 46 N, R 10 E/W

NORTHING 2115682.3 EASTING 1051583.3

DATUM ELEVATION 768.4

DRILL RIG CME 750 ATV

SURFACE CONDITIONS GRASS COVERED SURFACE

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	–	75		1 FILL: Brown Wet Topsoil with Grass Roots with Little to Some Fine to Coarse Sand, Trace Gravel	SB							1-2
	–	90		2 FILL: Grades to Hard Silty Clay with Little Fine to Coarse Sand, Trace Gravel, Brown Sandy Clay, Brush Fibers Observed in Brown Clay FILL: Gray and Black Clay to 6 Feet	SB							.75-2
5												
762.4				Fibrous PEAT (PT)								
761.4	–	52		3 Soft Gray CLAY (CH), Little Fine to Coarse Sand	SB							.25-1
10												
757.9				Stiff Brown and Gray Mottled Silty CLAY (CL)								
756.9	–	92		4 Stiff to Very Stiff Gray Silty CLAY (CL) Grades to Gray Clayey SILT to Silty CLAY (CL/ML), Little to Some Fine to Coarse Sand, Trace Fine Gravel to 13 Feet	SB							1.5-2.5
15												
753.4				Grades to Gray Silty CLAY (CL), Little Fine to Coarse Sand, Trace Fine Gravel								
751.9	–	98		5 Very Stiff Yellowish Brown and Gray Mottled Silty CLAY (CL) Grading to Clayey SILT, Silty CLAY (CL/ML), Trace to Little Fine to Coarse Sand, Trace Fine to Coarse Wet Gravel 3" Gray Silty Layer at 16.5 Feet	SB							1.5-2.75
20												
746.4				Stiff to Very Stiff Gray Clayey SILT, Silty CLAY (CL/ML) Grades to Gray Silty CLAY (CL)								
				End of Boring at 22 Feet Gas Probe Installed at 16.1 Feet								
25												
30												
35												

LOGGED BY SJC

DRILLING CONTR E&F

DATE 9/17/93 CHK'D BY DAP

CHAS. MARKGRAF

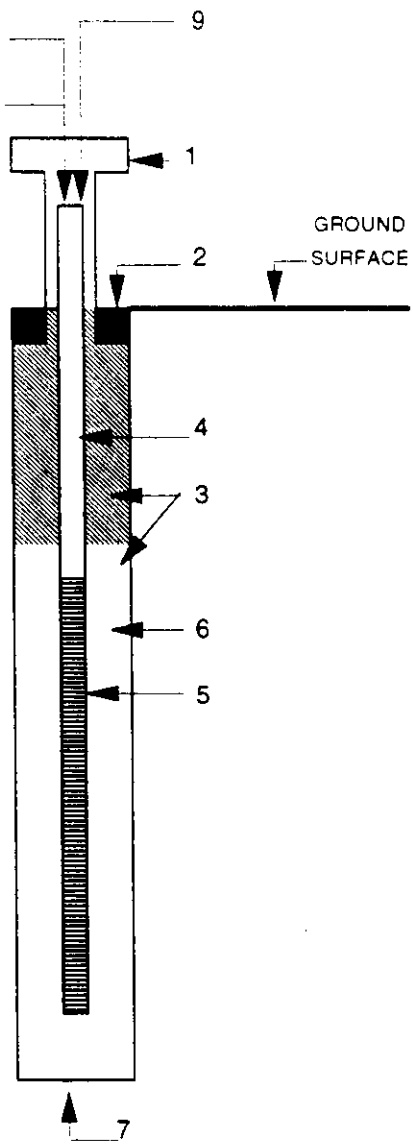
Template ID: WM1 ID: WM1

WARZYN

GAS MONITORING PROBE
GAS PROBE NO. GP3

Project	HOD Landfill
Location	Antioch, Illinois
Job No.	10010201
Date Constructed	4/21/93
Contractor	E & F Drilling
Coordinates	2116615.5N, 1052220.9E

ELEVATION	773.51 ft
STICK-UP	2.71 ft
GROUND SURFACE ELEVATION	770.8 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	N/A ft
ELEVATION	N/A ft
TOP OF PEA GRAVEL	3.6 ft
ELEVATION	767.2 ft
TOP OF SCREEN	5.03 ft
ELEVATION	765.77 ft
BOTTOM OF SCREEN	19.85 ft
ELEVATION	750.95 ft
END OF BORING	20 ft
ELEVATION	750.8 ft



1. LOCKING ALUMINUM PROTECTIVE CASING
   LENGTH 5 FT
2. SURFACE SEAL
   BENTONITE HYDRATED
   CONCRETE
3. HYDRATED BENTONITE
   GRANULAR TO SURFACE
4. PVC PIPE
   DIAMETER 2 IN ID
   SCHEDULE 40 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 2 IN ID
   SCHEDULE 40 PVC
   SLOT SIZE 0.020 IN.
   LENGTH 14.65'
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM
   N/A
8. BOREHOLE
   DIAMETER 8.5 IN.
9. PROBE TOP VENTED PUSH CAP

SICirs/DAP

J:\10010201\GP3.XLS

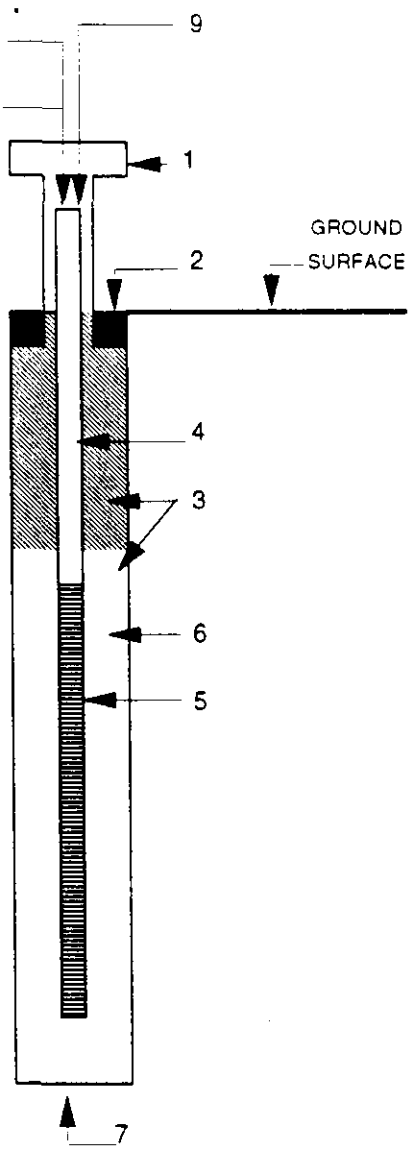
WARZYN

GAS MONITORING PROBE

GAS PROBE NO. GP4A

Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	4/15/93
Contractor	E & F
Coordinates	2116248.1N, 1053013.7E

ELEVATION	778.87	ft
STICK-UP	2.47	ft
GROUND SURFACE ELEVATION	776.4	ft
DEPTH BELOW GROUND SURFACE		
TOP OF FINE SAND	N/A	ft
ELEVATION	N/A	ft
TOP OF PEA GRAVEL	5	ft
ELEVATION	771.4	ft
TOP OF SCREEN	5.8	ft
ELEVATION	770.6	ft
BOTTOM OF SCREEN	26	ft
ELEVATION	750.4	ft
END OF BORING	27	ft
ELEVATION	749.4	ft

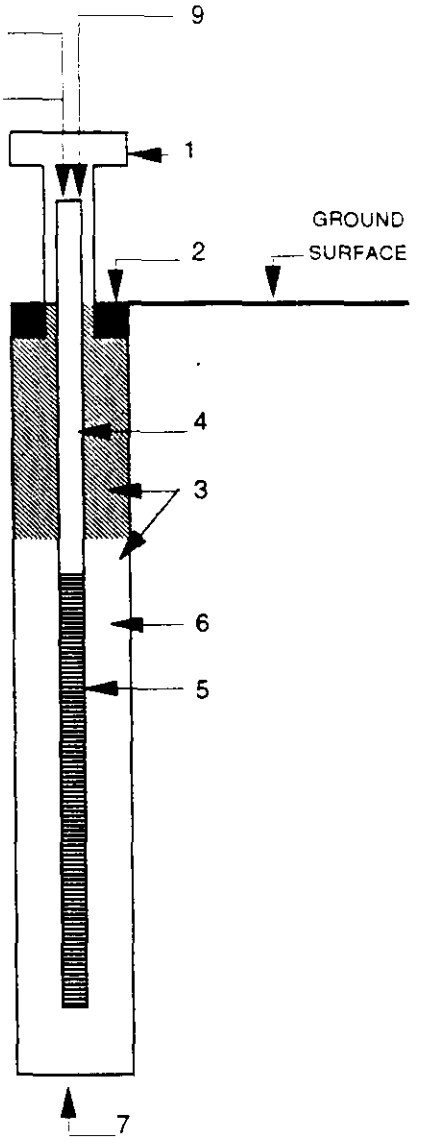


1. LOCKING STEEL PROTECTIVE CASING
   LENGTH 5 FT
2. SURFACE SEAL
   BENTONITE HYDRATED
   CONCRETE
3. HYDRATED BENTONITE CHIPS AND GRANULAR TO SURFACE
4. PVC PIPE
   DIAMETER 2 IN ID
   SCHEDULE 40 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 2 IN ID
   SCHEDULE 40 PVC
   SLOT SIZE 0.020 IN
   LENGTH 20.7 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM PEA GRAVEL
8. BOREHOLE DIAMETER 8.5 IN
9. PROBE TOP VENTED PUSH CAP

GAS MONITORING PROBE
GAS PROBE NO. GP5A

Project	HOD LANDFILL
Location	ANTIOCH, ILLINOIS
Job No.	10010201
Date Constructed	4/22/93
Contractor	E & F
Coordinates	2115682.3N, 1051583.3E

ELEVATION	770.8 ft
STICK-UP	2.4 ft
GROUND SURFACE ELEVATION	768.4 ft
DEPTH BELOW GROUND SURFACE	
TOP OF FINE SAND	N/A ft
ELEVATION	N/A ft
TOP OF PEA GRAVEL	6 ft
ELEVATION	762.4 ft
TOP OF SCREEN	6 ft
ELEVATION	762.4 ft
BOTTOM OF SCREEN	16.1 ft
ELEVATION	752.3 ft
END OF BORING	22 ft
ELEVATION	746.4 ft



1. LOCKING STEEL PROTECTIVE CASING
   LENGTH 5 FT
2. SURFACE SEAL
   BENTONITE HYDRATED GRANULAR
   CONCRETE
3. HYDRATED BENTONITE GRANULAR
4. PVC PIPE
   DIAMETER 2 IN ID
   SCHEDULE 40 PVC
5. SLOTTED PVC SCREEN
   DIAMETER 2 IN ID
   SCHEDULE 40 PVC
   SLOT SIZE 0.020 IN
   LENGTH 10.09 FT
6. PEA GRAVEL WASHED
7. BORING BACKFILL TO SCREEN BOTTOM BENTONITE TO 17 FT THEN PEA GRAVEL
8. BOREHOLE DIAMETER 8.5 IN
9. PROBE TOP VENTED SLIP CAP

SJC/rs/DAP

J:\1001-2\GP5A.XLS

D

GEOPHYSICAL LOGS

Wooddell Logging Inc.
Mattoon, Illinois
217 234-8525

Gamma-Den-Fltemp-Neut

COMPANY: WARZYN
WELL: LP01
FIELD: HOD Antioch, IL

LOCATION:
2116410.7
1050909.7

OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 775.6
LOG MEASURED FROM: GROUND LEVEL

DATE:	14 May 93			
RUN NUMBER:	ONE			
DRILLER:				
TYPE OF CASING	6" PVC			
SCREEN INTERVAL				
LOGGER:				
DEPTH	20.6'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL	0.00	0.00	0.00	0.00
TYPE FLUID IN HOLE	Leachate			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC				
TIME SINCE CIRC.STOP:				
RECORDED BY:	Drake & Wooddell			
OBSERVER:	Mr. Steve Chillson			

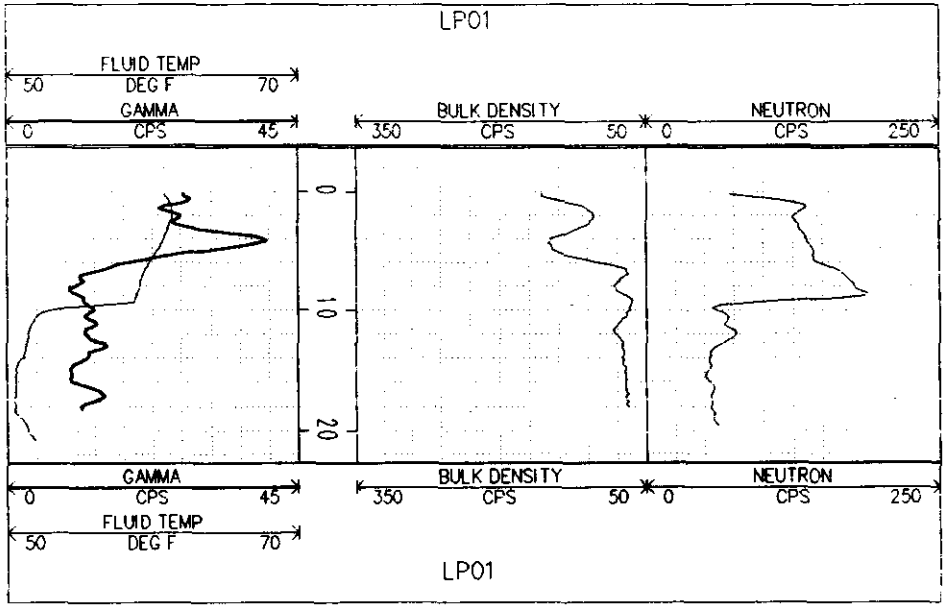
RUN #	GAMMA	FLTEMP	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G11/4	GO-T11/4	GO-BD21/8	COM-N11/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:

LP01

FLUID TEMP

COMMENTS:


LP01
FLUID TEMP
50 DEG F 70
GAMMA
0 CPS 45
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
0
10
20
GAMMA
0 CPS 45
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
FLUID TEMP
50 DEG F 70
LP01

WLI Wooddell Logging Inc.

Mattoon, Illinois
217 234-8525

Gamma–Den–Fltemp–Neut

COMPANY: WARZYN
WELL: LP02
FIELD: HOD Antioch, IL

LOCATION:
2116428.7
1051349.0

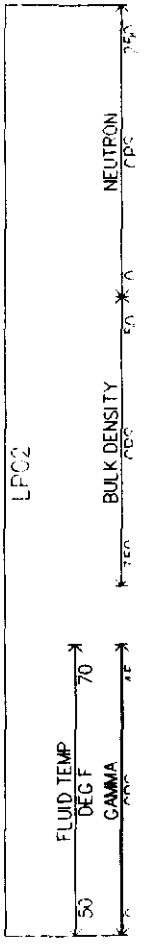
OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 785.5
LOG MEASURED FROM: GROUND LEVEL

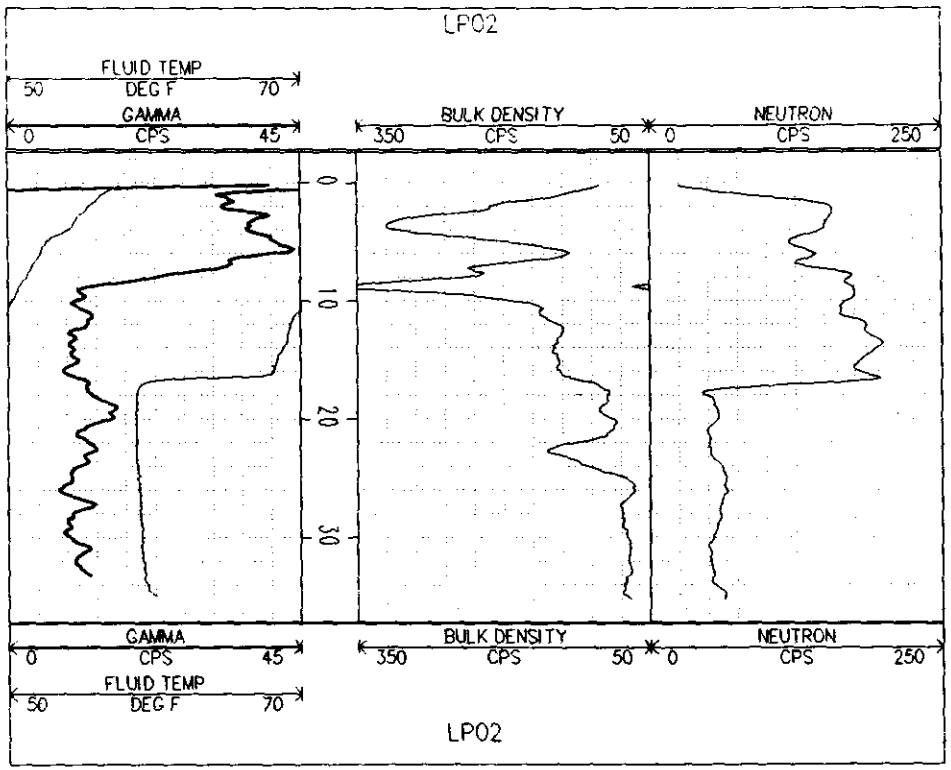
DATE	14 May 93			
RUN NUMBER	ONE			
DRILLER				
TYPE OF CASING	6" PVC			
SCREEN INTERVAL				
LOGGER				
DEPTH	35.0'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL	0.00	0.00	0.00	0.00
TYPE FLUID IN HOLE	Leachate			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC.				
TIME SINCE CIRC.STOP.				
RECORDED BY:	Drake & Wooddell			
OBSERVER	Mr. Steve Chillson			

RUN #	GAMMA	FLTEMP	B DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G11/4	CO-T11/4	CO-BD21/8	COM-N11/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:



COMMENTS:


LP02
FLUID TEMP
50 DEG F 70
GAMMA
0 CPS 45
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
0
10
20
30
GAMMA
0 CPS 45
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
FLUID TEMP
50 DEG F 70
LP02

WLI

Wooddell Logging Inc.

Mattoon, Illinois
217 234-8525

Gamma-Den-Fltemp-Neut

COMPANY: WARZYN
WELL: LP03
FIELD: HOD Antioch, IL

LOCATION:
2116082.7
1050918.9

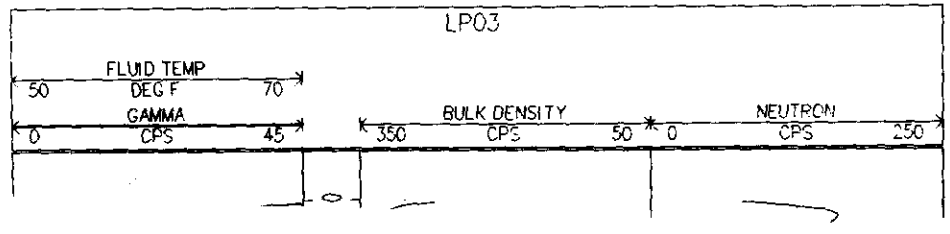
OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 778.1'
LOG MEASURED FROM: GROUND LEVEL

DATE	14 May 93				
RUN NUMBER	ONE				
DRILLER					
TYPE OF CASING	6" PVC				
SCREEN INTERVAL					
LOGGER					
DEPTH	25.4'				
CASING DEPTH					
BOT LOG INTERVAL					
TOP LOG INTERVAL	0.00	0.00	0.00	0.00	
TYPE FLUID IN HOLE	Leachate				
FLUID LEVEL					
SAMPLE SOURCE					
FLUID LVL/CIRC					
TIME SINCE CIRC STOP					
RECORDED BY	Drake & Wooddell				
OBSERVER	Mr. Steve Chilson				

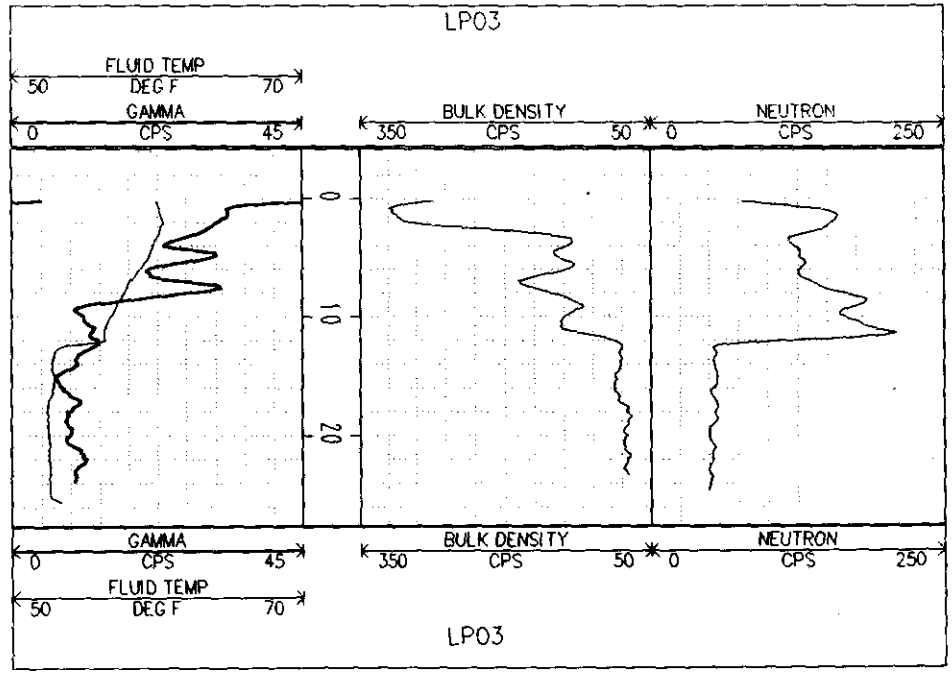
RUN #	GAMMA	FLTEMP	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G 1 1/4	GO-T 1 1/4	GO-BD 2 1/8	COM-N 1 1/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:



SAMPLE INTERVAL =

COMMENTS:



WLI Wooddell Logging Inc.

Mattoon, Illinois
217 234-8525

Gamma–Den–Fltemp–Neut

COMPANY: WARZYN

WELL: LP04

FIELD: HOD Antioch, IL

LOCATION:
2116110.6
1051338.6

OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 788.9
LOG MEASURED FROM: GROUND LEVEL

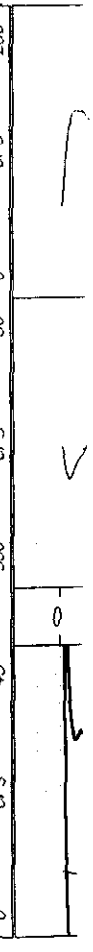
DA	20 May 93			
RU ER	ONE			
DRILLER:				
TYPE OF CASING	6" PVC			
SCREEN INTERVAL				
LOGGER:				
DEPTH	39.0'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL	0.00	0.00	0.00	0.00
TYPE FLUID IN HOLE	Leachate			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC.				
TIME SINCE CIRC.STOP.				
RECORDED BY:	Drake & Wooddell			
OBSERVER:	Mr. Steve Chillson			

RUN #	GAMMA	FLTEMP	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G 1 1/4	CO-T 1 1/4	CO-BD 2 1/8	COM-N 1 1/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

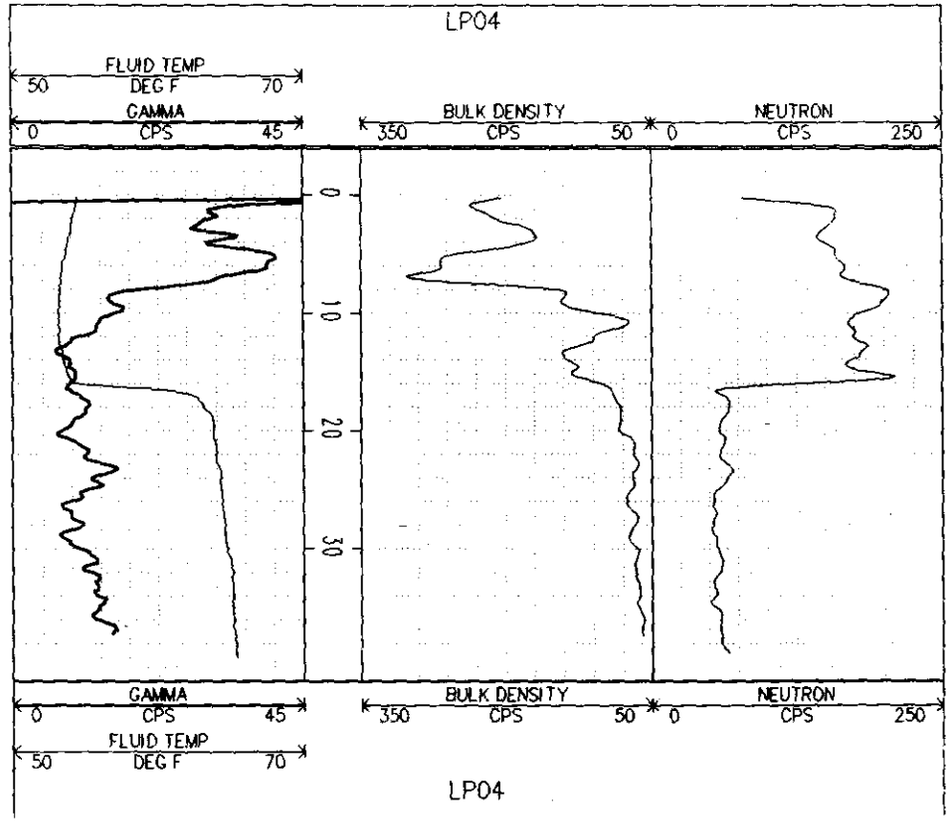
COMMENTS:

LP04

FLUID TEMP DEG F: 50 – 70
GAMMA CPS: 0 – 45
BULK DENSITY CPS: 350 – 50
NEUTRON CPS: 0 – 250



COMMENTS:


LP04
FLUID TEMP
50 DEG F 70
GAMMA
0 CPS 45
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
0
10
20
30
GAMMA
0 CPS 45
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
FLUID TEMP
50 DEG F 70
LP04

WLI Wooddell Logging Inc.
Mattoon, Illinois
217 234-8525

Gamma-Den-Fltemp-Neut

COMPANY: WARZYN
WELL: LP06
FIELD: HOD Antioch, IL

LOCATION:
2115990.2
1051732.1

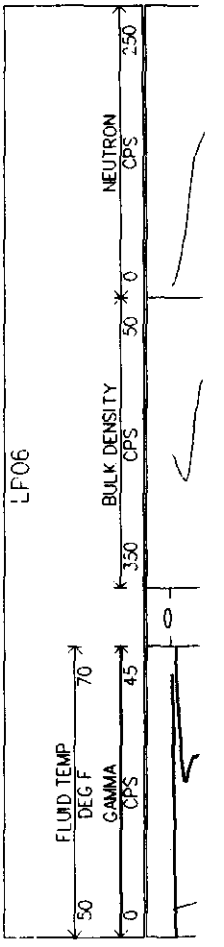
OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 794.6'
LOG MEASURED FROM: GROUND LEVEL

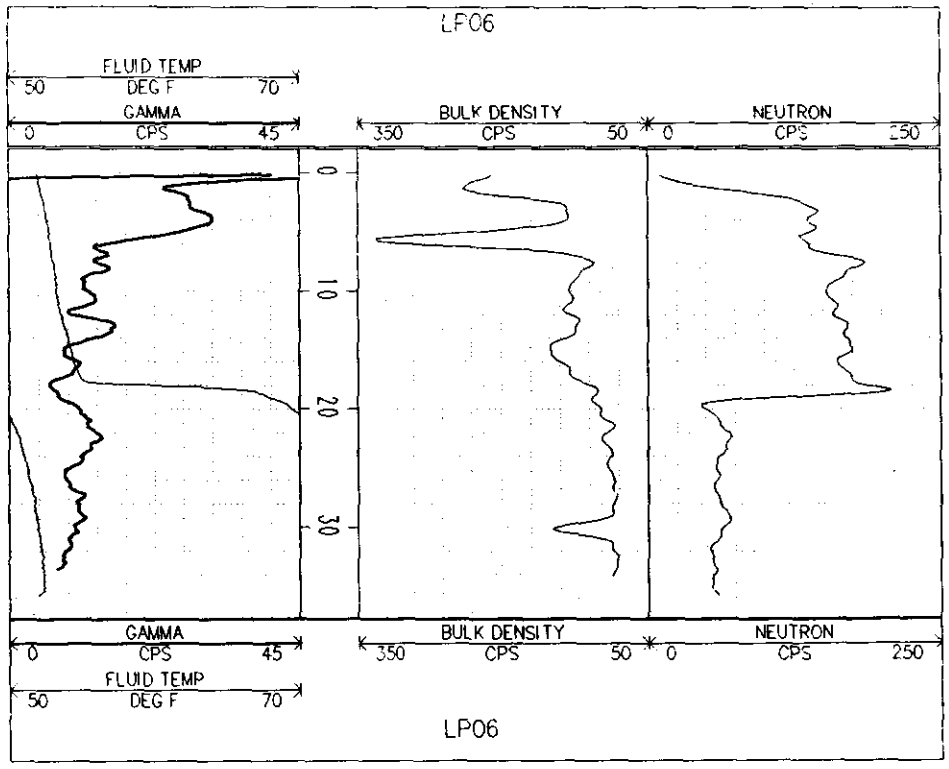
D	19 May 93			
RUN NUMBER	ONE			
DRILLER:				
TYPE OF CASING	6" PVC			
SCREEN INTERVAL				
LOGGER:				
DEPTH	35.6'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL	0.00	0.00	0.00	0.00
TYPE FLUID IN HOLE	Leachate			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC.				
TIME SINCE CIRC.STOP.				
RECORDED BY:	Drake & Wooddell			
OBSERVER:	Mr. Steve Chillson			

RUN #	GAMMA	FLTEMP	B. DENSITY	NEUTRON
PROBE TYPE / S/N	COM-G11/4	GO-T11/4	GO-BD21/8	COM-N11/4
MODULE TYPE / S/N	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:



COMMENTS:


LP06
FLUID TEMP
50 DEG F 70
GAMMA
0 CPS 45
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
0
10
20
30
GAMMA
0 CPS 45
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
FLUID TEMP
50 DEG F 70
LP06

WLI Wooddell Logging Inc.

Mattoon, Illinois
217 234-8525

Gamma-Den-Fltemp-Neut

COMPANY: WARZYN
WELL: LP10
FIELD: HOD Antioch, IL

LOCATION:
2115810.4
1050919.8

OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 781.1
LOG MEASURED FROM: GROUND LEVEL

DATE:	20 May 93			
RUN NUMBER:	ONE			
DRILLER:				
TYPE OF CASING	6" PVC			
SCREEN INTERVAL				
LOGGER:				
DEPTH	22.4'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL	0.00	0.00	0.00	0.00
TYPE FLUID IN HOLE	Leachate			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC.				
TIME SINCE CIRC.STOP.				
RECORDED BY:	Drake & Wooddell			
OBSERVER:	Mr. Steve Chillson			

RUN #	GAMMA	FLTEMP	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G 1 1/4	GO-T 1 1/4	GO-BD 2 1/8	COM-N 1 1/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:

LP10

FLUID TEMP DEG F 50 70

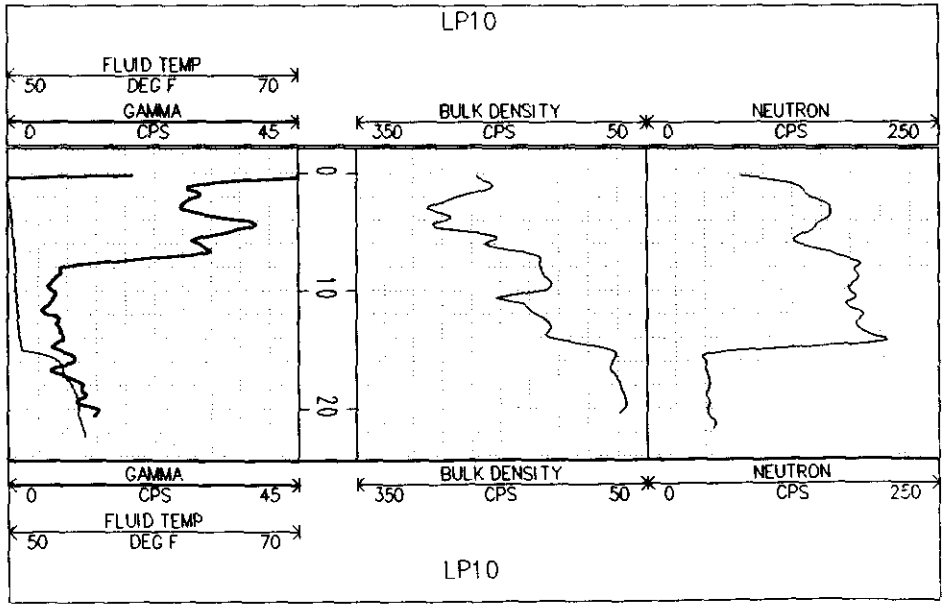
GAMMA

BULK DENSITY

NEUTRON

AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:



WLI Wooddell Logging Inc.

Mattoon, Illinois
217 234-8525

Gamma-Den-Fltemp-Neut

COMPANY: WARZYN
WELL: LP11
FIELD: HOD Antioch, IL

LOCATION:
2115807.1
1051321.8

OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 787.8'
LOG MEASURED FROM: GROUND LEVEL

DATE:	19 May 93			
RUN NUMBER:	ONE			
DRILLER:				
TYPE OF CASING	6" PVC			
SCREEN INTERVAL				
LOGGER:				
DEPTH	28.6'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL	0.00	0.00	0.00	0.00
TYPE FLUID IN HOLE	Leachate			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC.				
TIME SINCE CIRC.STOP.				
RECORDED BY:	Drake & Wooddell			
OBSERVER:	Mr. Steve Chillson			

RUN #	GAMMA	FLTEMP	B.DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G11/4	CO-T11/4	CO-BD21/8	COM-N11/4
MODULE TYPE / S.N.	CS01F22	CS01F00	CS22F22	CS10F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:

LP11

FLUID TEMP DEG F
50 70

WLI Wooddell Logging Inc.

Mattoon, Illinois
217 234-8525

Gamma-Den-Fltemp-Neut

COMPANY: WARZYN
WELL: LP12
FIELD: HOD Antioch, IL

LOCATION:
2115515.5
1051138.4

OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 782.6'
LOG MEASURED FROM: GROUND LEVEL

DATE	20 MAY 93			
RUN NUMBER	ONE			
DRILLER				
TYPE OF CASING	6" PVC			
SCREEN INTERVAL				
LOGGER				
DEPTH	22.8'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL	0.00	0.00	0.00	0.00
TYPE FLUID IN HOLE	Leachate			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC.				
TIME SINCE CIRC.STOP.				
RECORDED BY	Drake & Wooddell			
OBSERVER	Mr. Steve Chillson			

RUN #	GAMMA	FLTEMP	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	CON-G11/4	CO-T11/4	CO-BD21/8	CON-N11/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

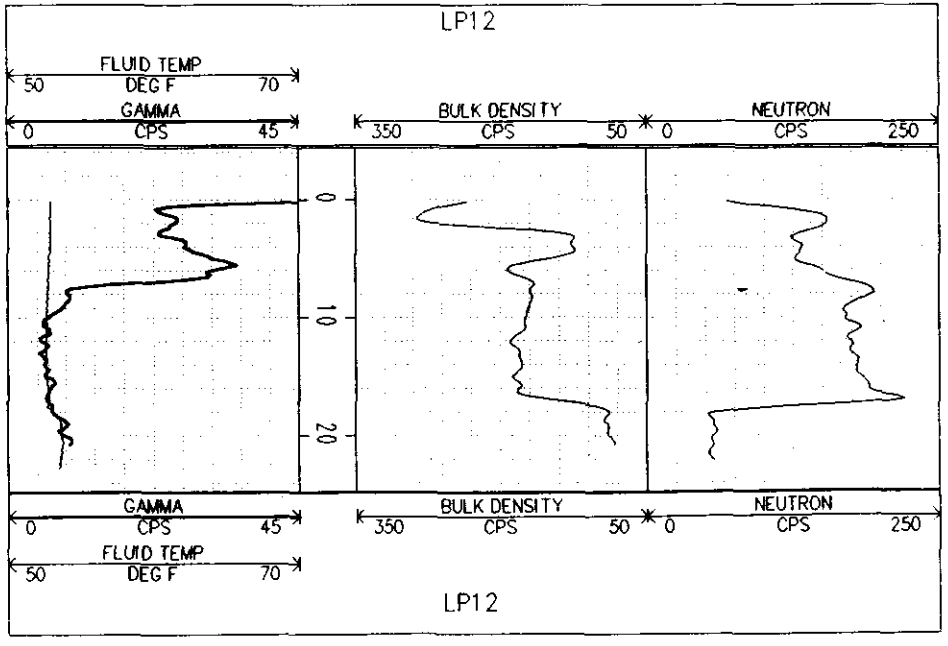
COMMENTS:

LP12

FLUID TEMP DEG F
50 70

LOGGING SPEED	10 ft./minute	7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:



WLI Wooddell Logging Inc.
Mattoon, Illinois
217 234-8525

Gamma-Den-Fltemp-Neut

COMPANY: WARZYN
WELL: LP13
FIELD: HOD Antioch, IL

LOCATION:
2115448.4
1050899.8

OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 779'
LOG MEASURED FROM: GROUND LEVEL

DATE:	20 May 93			
RUN NUMBER:	ONE			
DRILLER:				
TYPE OF CASING	6" PVC			
SCREEN INTERVAL				
LOGGER:				
DEPTH	16.6'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL	0.00	0.00	0.00	0.00
TYPE FLUID IN HOLE	Leachate			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC.				
TIME SINCE CIRC. STOP				
RECORDED BY:	Drake & Wooddell			
OBSERVER:	Mr. Steve Chillson			

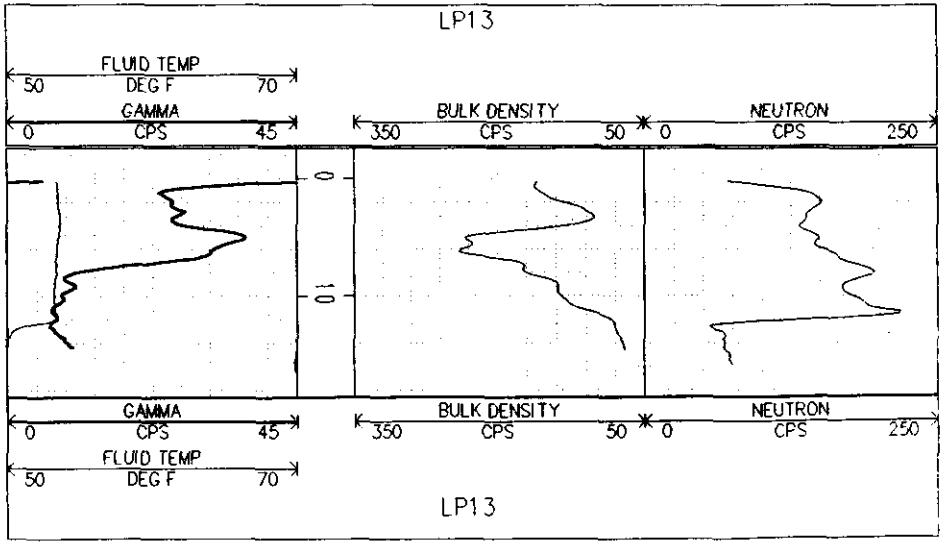
RUN #	GAMMA	FLTEMP	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G11/4	GO-T11/4	GO-BD21/8	COM-N11/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:

LP13

AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	2	0.2	0.2

COMMENTS:



WLI Wooddell Logging Inc.

Mattoon, Illinois
217 234-8525

Gamma–Den–Fltemp–Neut

COMPANY: WARZYN
WELL: LP1 4
FIELD: HOD Antioch, IL

LOCATION:
2115474.5
1051389.5

OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 781.7'
LOG MEASURED FROM: GROUND LEVEL

DATE:	20 May 93			
RUN NUMBER:	ONE			
DRILLER:				
TYPE OF CASING	6" PVC			
SCREEN INTERVAL				
LOGGER:				
DEPTH	21.0'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL	0.00	0.00	0.00	0.00
TYPE FLUID IN HOLE	Leachate			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL / CIRC.				
TIME SINCE CIRC.STOP.				
RECORDED BY:	Drake & Wooddell			
OBSERVER:	Mr. Steve Chillson			

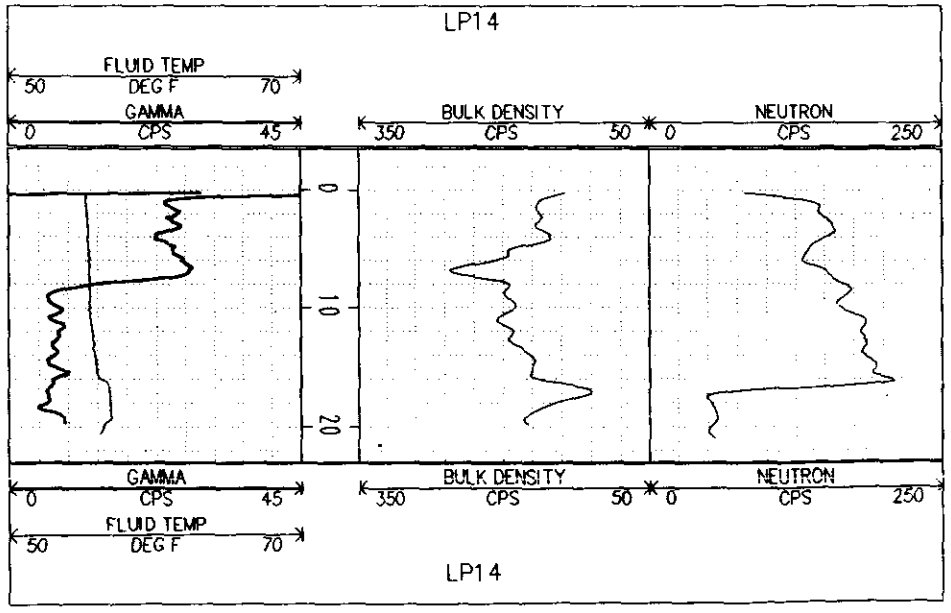
RUN #	GAMMA	FLTEMP	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G 1 1/4	CO-T 1 1/4	CO-BD 2 1/8	COM-N 1 1/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	~7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:

LP1 4

FLUID TEMP DEG F 50 → 70
GAMMA CPS 0 → 45
BULK DENSITY CPS 350 → 50
NEUTRON CPS 0 → 250

COMMENTS:


LP14
FLUID TEMP
50 DEG F 70
GAMMA
0 CPS 45
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
0
10
20
GAMMA
0 CPS 45
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
FLUID TEMP
50 DEG F 70
LP14

WLI Wooddell Logging Inc.

Mattoon, Illinois
217 234-8525

Gamma-Den-Fltemp-Neut

COMPANY: WARZYN
WELL: LP05
FIELD: HOD Antioch, IL

LOCATION:
2116230.0
1051719.6

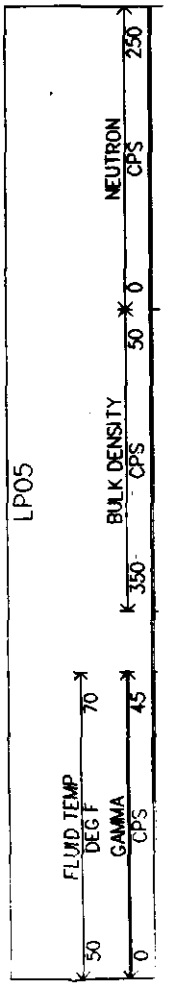
OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 796.6'
LOG MEASURED FROM: GROUND LEVEL

DATE	19 May 93			
RUN NUMBER	ONE			
DRILLER:				
TYPE OF CASING	6" PVC			
SCREEN INTERVAL				
LOGGER:				
DEPTH	50.0'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL	0.00	0.00	0.00	0.00
TYPE FLUID IN HOLE	Leachate			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC.				
TIME SINCE CIRC.STOP.				
RECORDED BY.	Drake & Wooddell			
OBSERVER	Mr. Steve Chillson			

RUN #	GAMMA	FLTEMP	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G11/4	GO-T11/4	GO-BD21/8	COM-N11/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:



ging Inc.

-Neut

h, IL

OTHER LOGS:

VEL

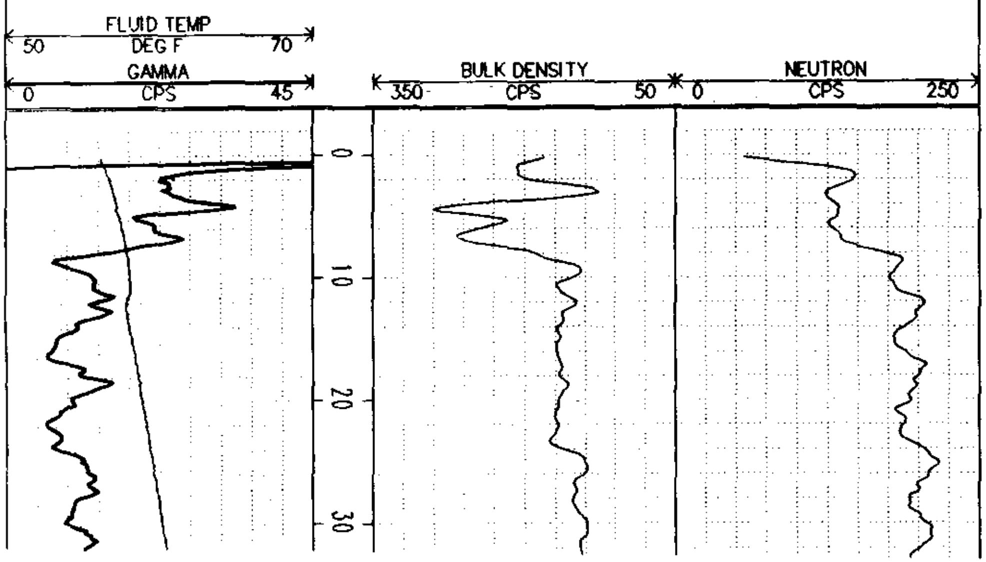
EL

0.00	0.00

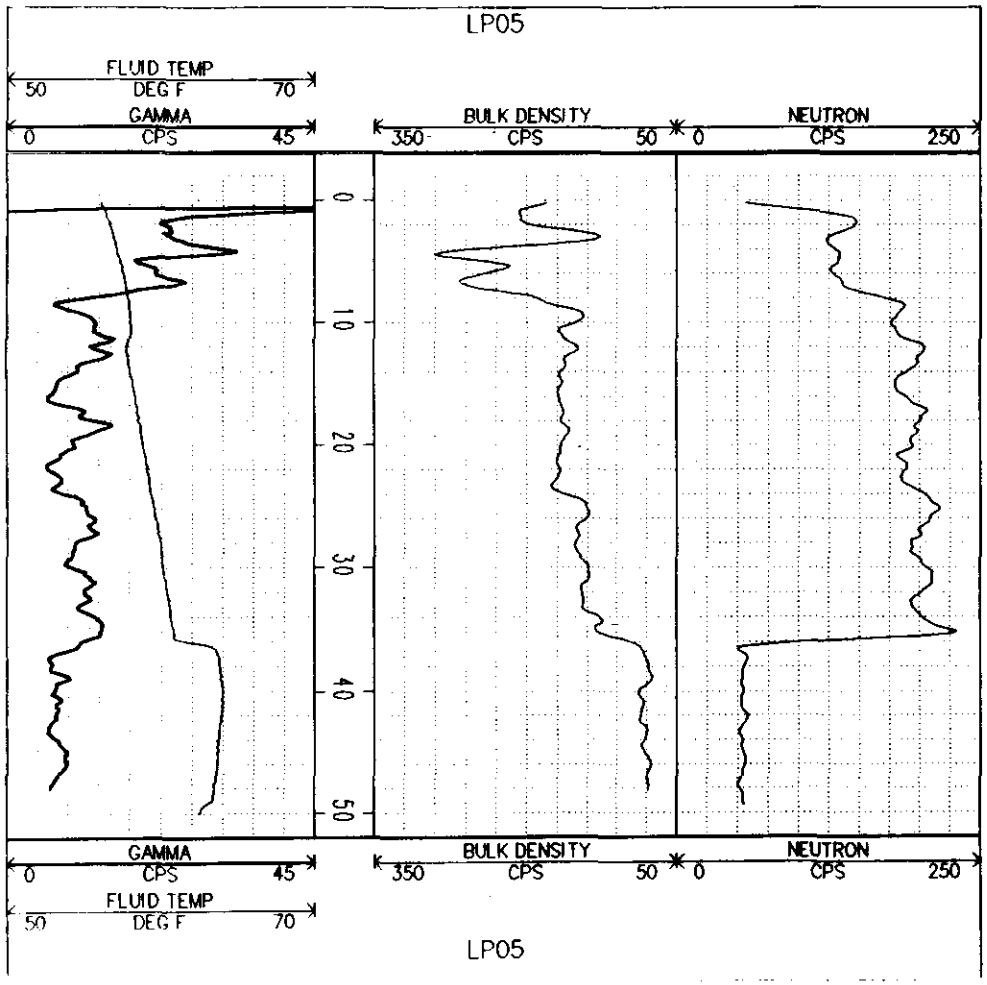
RUN #	GAMMA	FLTEMP	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G1 1/4	GO-T1 1/4	GO-BD 2 1/8	COM-N1 1/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:

LP05



COMMENTS:


LP05
FLUID TEMP
50 DEG F 70
GAMMA
0 CPS 45
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
0
10
20
30
40
50
GAMMA
0 CPS 45
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
FLUID TEMP
50 DEG F 70
LP05

WLI Wooddell Logging Inc.
Mattoon, Illinois
217 234-8525

Gamma-Den-Fltemp-Neut

COMPANY: WARZYN
WELL: LP07
FIELD: HOD Antioch, IL

LOCATION:
2116197.8
1052105.4

OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 794.7'
LOG MEASURED FROM: GROUND LEVEL

DATE:	19 May 93			
RUN NUMBER:	ONE			
DRILLER:				
TYPE OF CASING	6" PVC			
SCREEN INTERVAL				
LOGGER:				
DEPTH	58.4'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL	0.00	0.00	0.00	0.00
TYPE FLUID IN HOLE	Leachate			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC.				
TIME SINCE CIRC.STOP.				
RECORDED BY:	Drake & Wooddell			
OBSERVER:	Mr. Steve Chillson			

RUN #	GAMMA	FLTEMP	B.DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G11/4	GO-T11/4	GO-BD21/8	COM-N11/4
MODULE TYPE / S.N.	CS01F22	CS01F00	CS22F22	CS10F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:

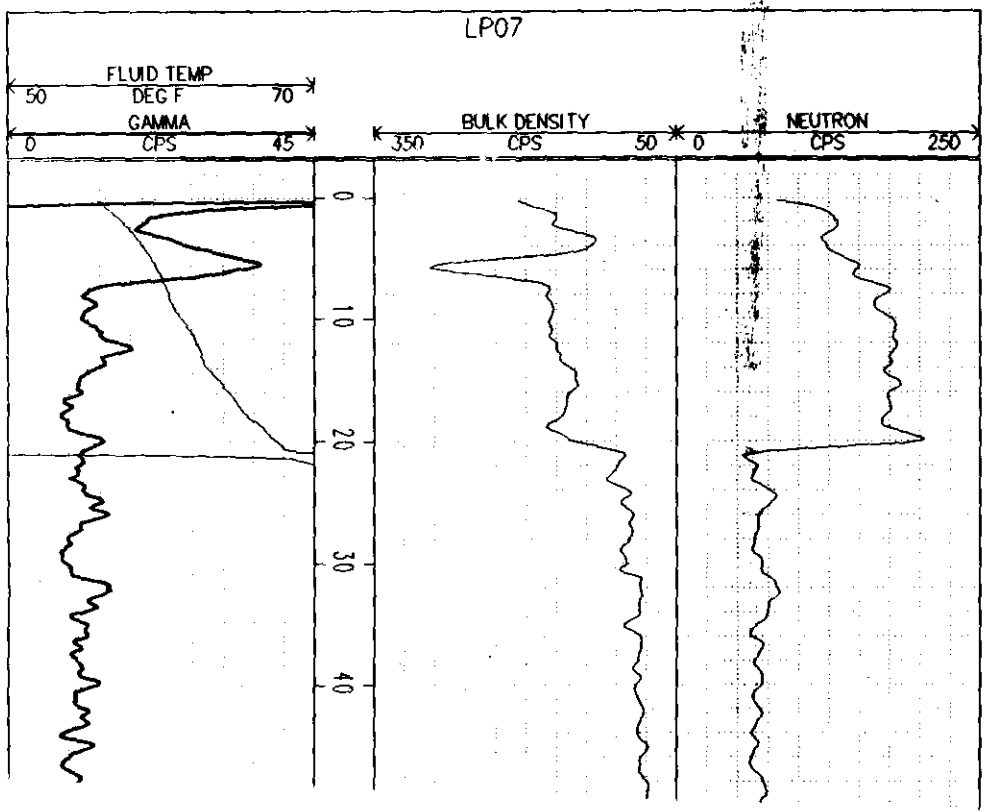
LP07

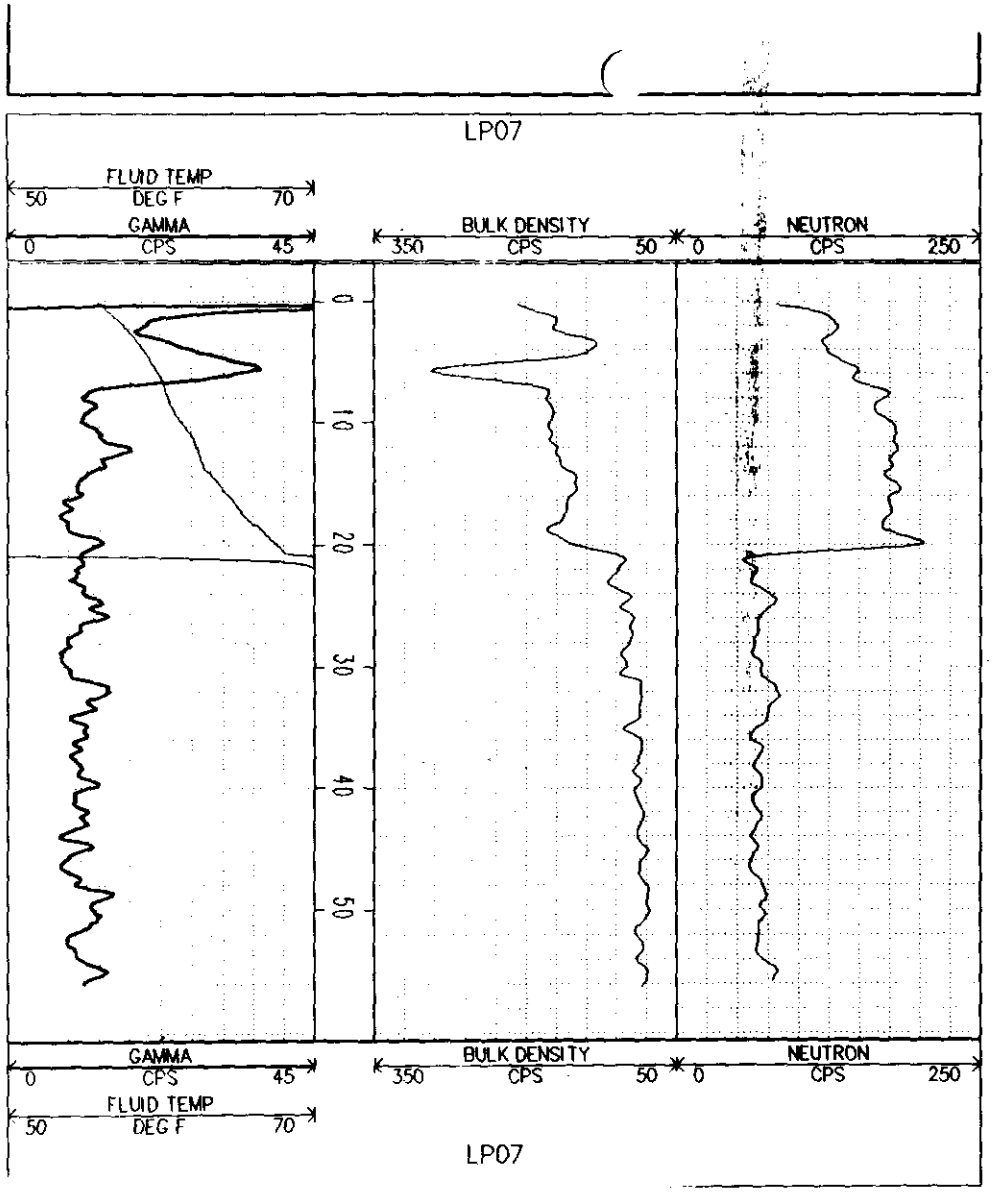
FLUID TEMP DEG F 70

NEUTRON

RUN #	GAMMA	FL TEMP	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G 1 1/4	GO-T 1 1/4	GO-BD 2 1/8	COM-N 1 1/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:




LP07
FLUID TEMP
50 DEG F 70
GAMMA
0 CPS 45
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
0
10
20
30
40
50
GAMMA
0 CPS 45
FLUID TEMP
50 DEG F 70
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
LP07

WLI **Wooddell Logging Inc.**

Mattoon, Illinois
217 234-8525

Gamma-Den-Fltemp-Neut

COMPANY: WARZYN
WELL: LP08
FIELD: HOD Antioch, IL

LOCATION:
2116218.6
1052519.4

OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 793.5'
LOG MEASURED FROM: GROUND LEVEL

DATE	19 May 93			
RUN NUMBER	ONE			
DRILLER:				
TYPE OF CASING	6" PVC			
SCREEN INTERVAL				
LOGGER:				
DEPTH	69.0'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL	0.00	0.00	0.00	0.00
TYPE FLUID IN HOLE	Leachate			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC				
TIME SINCE CIRC.STOP.				
RECORDED BY:	Drake & Wooddell			
OBSERVER:	Mr. Steve Chillson			

RUN #	GAMMA	FLTEMP	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G11/4	GO-T11/4	GO-BD21/8	COM-N11/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

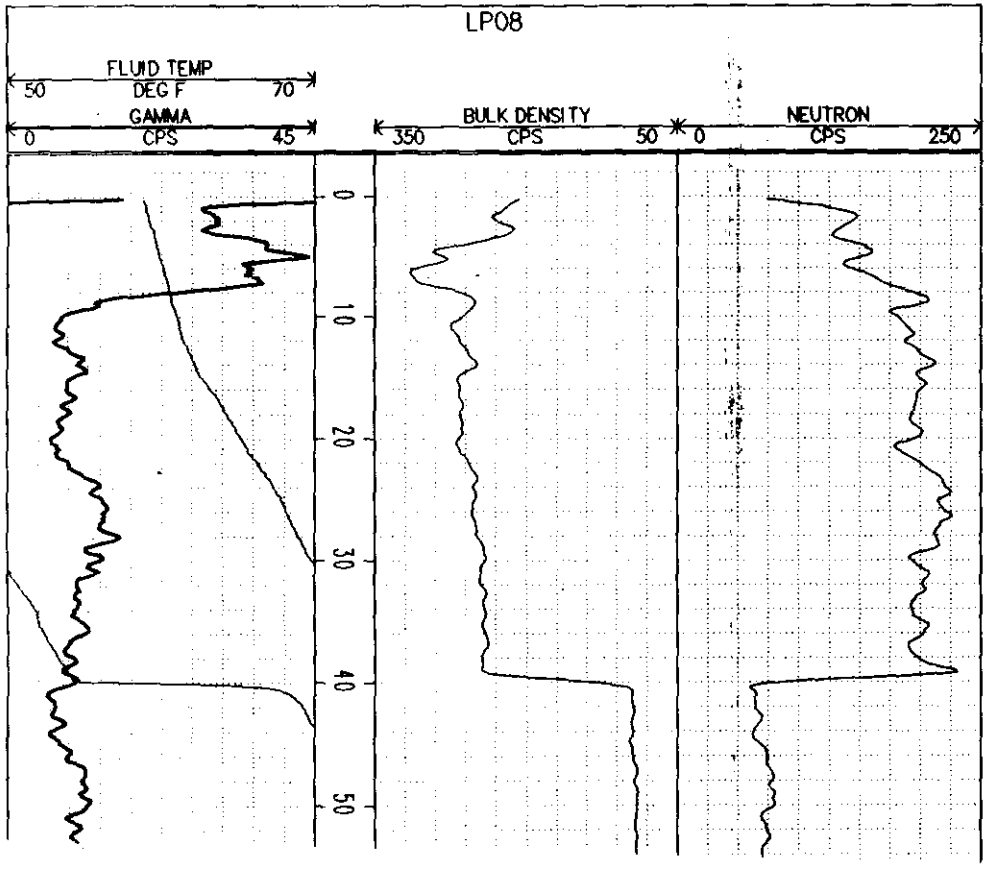
COMMENTS:

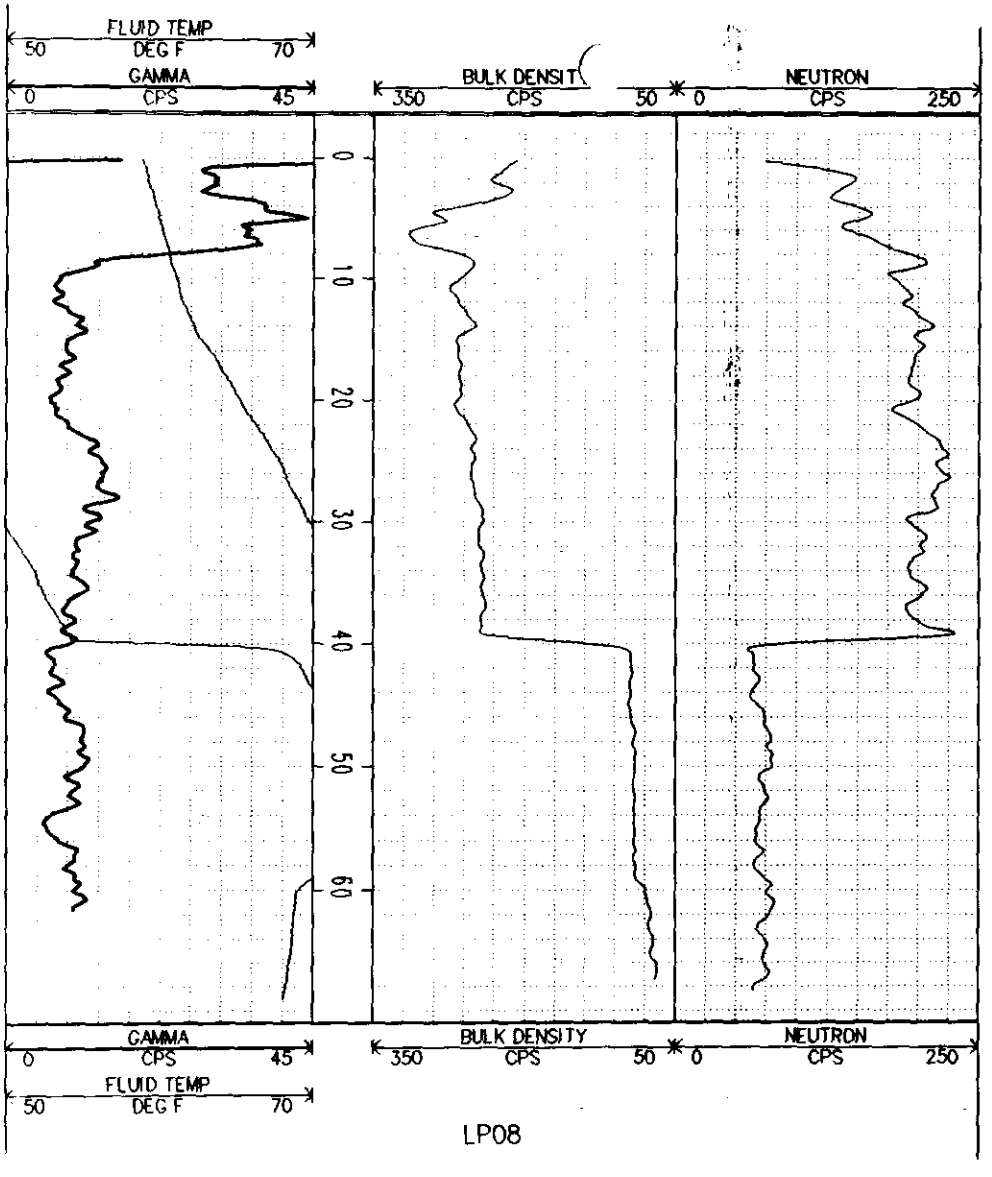
LP08

FLUID TEMP

RUN #	GAMMA	FL TEMP	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G 1 1/4	GO-T 1 1/4	GO-BD 2 1/8	COM-N 1 1/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:




FLUID TEMP
50 DEG F 70
GAMMA
0 CPS 45
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250
0
10
20
30
40
50
60
GAMMA
0 CPS 45
FLUID TEMP
50 DEG F 70
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250

LP08

WLI Wooddell Logging Inc.

Mattoon, Illinois
217 234-8525

Gamma-Den-Fltemp-Neut

COMPANY: WARZYN
WELL: LP09
FIELD: HOD Antioch, IL

LOCATION:
2116220.4
1052769.9

OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 785.8'
LOG MEASURED FROM: GROUND LEVEL

DATE	19 May 93			
RUN NUMBER	ONE			
DRILLER :				
TYPE OF CASING	6" PVC			
SCREEN INTERVAL				
LOGGER :				
DEPTH	64.6'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL	0.00	0.00	0.00	0.00
TYPE FLUID IN HOLE	Leachate			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC.				
TIME SINCE CIRC.STOP.				
RECORDED BY	Drake & Wooddell			
OBSERVER	Mr. Steve Chillson			

RUN #	GAMMA	FL TEMP	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G11/4	GO-T11/4	GO-BD21/8	COM-N11/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

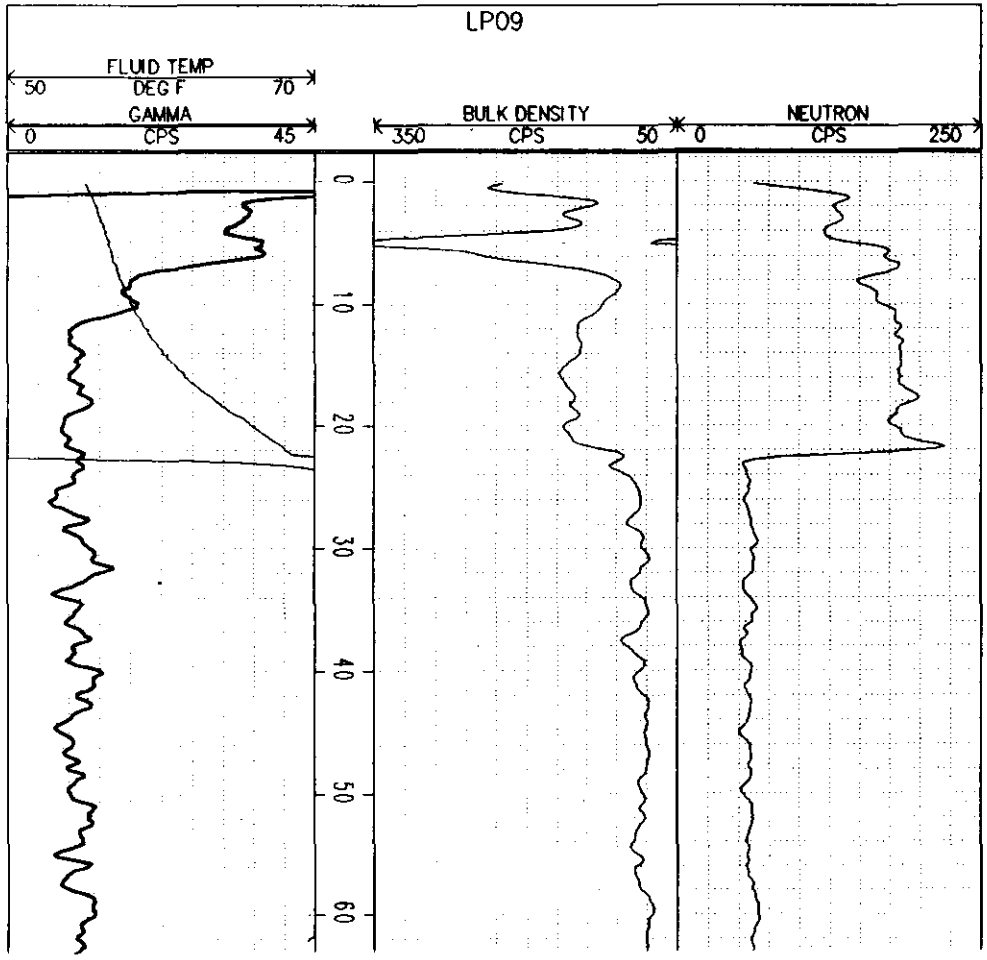
COMMENTS:

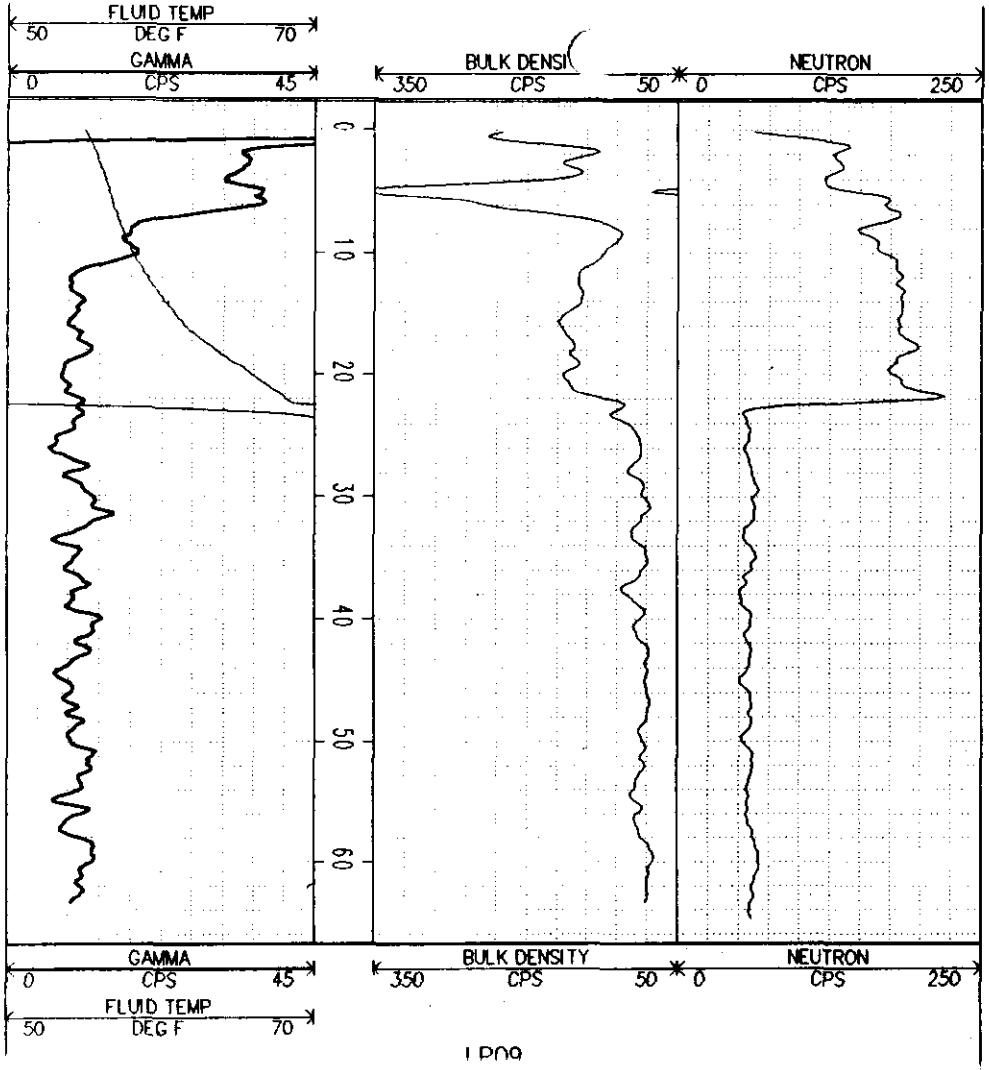
LP09

FLUID TEMP DEG F 50 → 70
GAMMA CPS 0 → 45
BULK DENSITY CPS 350 → 50
NEUTRON CPS 0 → 250

PROBE TYPE / S.N.	COM-G 1 1/4	GO-T 1 1/4	GO-BD 2 1/8	COM-N 1 1/4
MODULE TYPE / S.N.	CS01 F22	CS01 F00	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	-7 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2	0.2	0.2	0.2

COMMENTS:




FLUID TEMP
50 DEG F 70
GAMMA
0 CPS 45
BULK DENSI
350 CPS 50
NEUTRON
0 CPS 250
0
10
20
30
40
50
60
GAMMA
0 CPS 45
FLUID TEMP
50 DEG F 70
BULK DENSITY
350 CPS 50
NEUTRON
0 CPS 250

LP09

WLI

Wooddell Logging Inc.

Mattoon, Illinois
217 234-8525

Gamma—Density—Neutron

COMPANY: WARZYN
WELL: W2D
FIELD: HOD Antioch, IL

LOCATION:
2116648.2
1052499.9

OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 770.7'
LOG MEASURED FROM: GROUND LEVEL

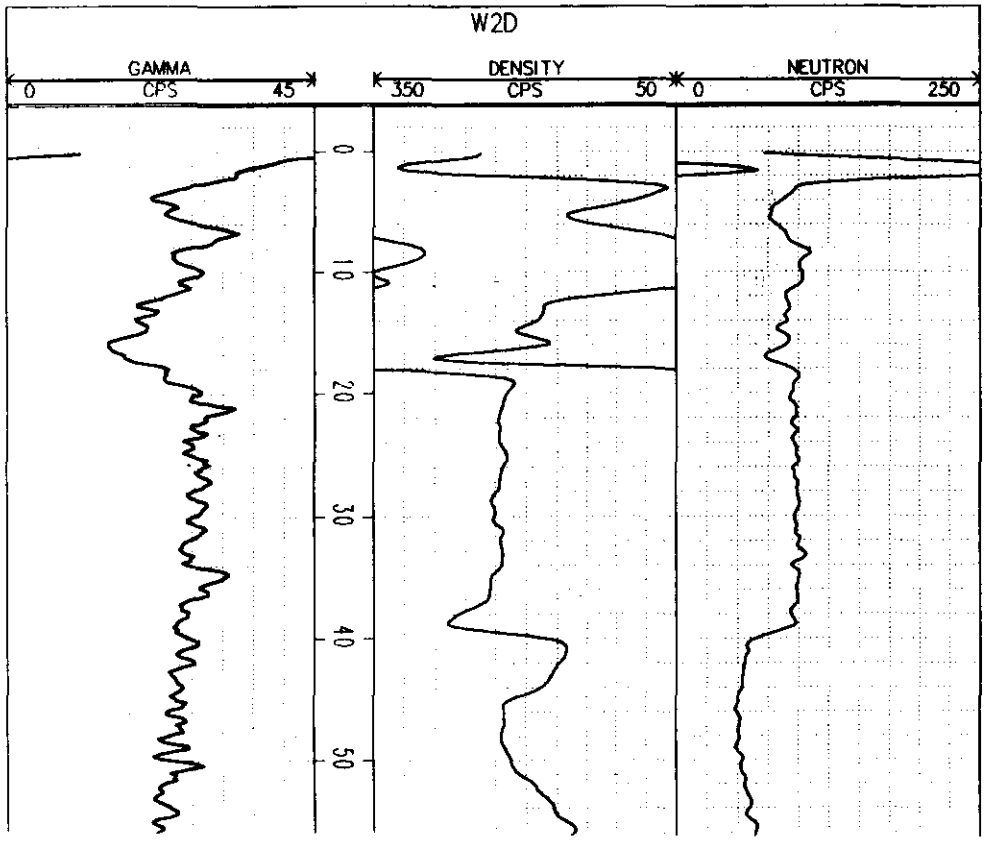
DATE:	04 June 93			
RUN NUMBER:	ONE			
DRILLER:				
BIT DIA TO	8 1/2" TO 88.33'			
SCREEN INTERVAL	83.3 TO 88.3'			
TYPE OF CASING	PVC			
SIZE OF CASING				
LOGGER:				
DEPTH	87.4'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL				
TYPE FLUID IN HOLE	Water			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC.				
TIME SINCE CIRC.STOP.				
RECORDED BY:	Drake & Wooddell			
OBSERVER:	Mr. Steve Chillson			

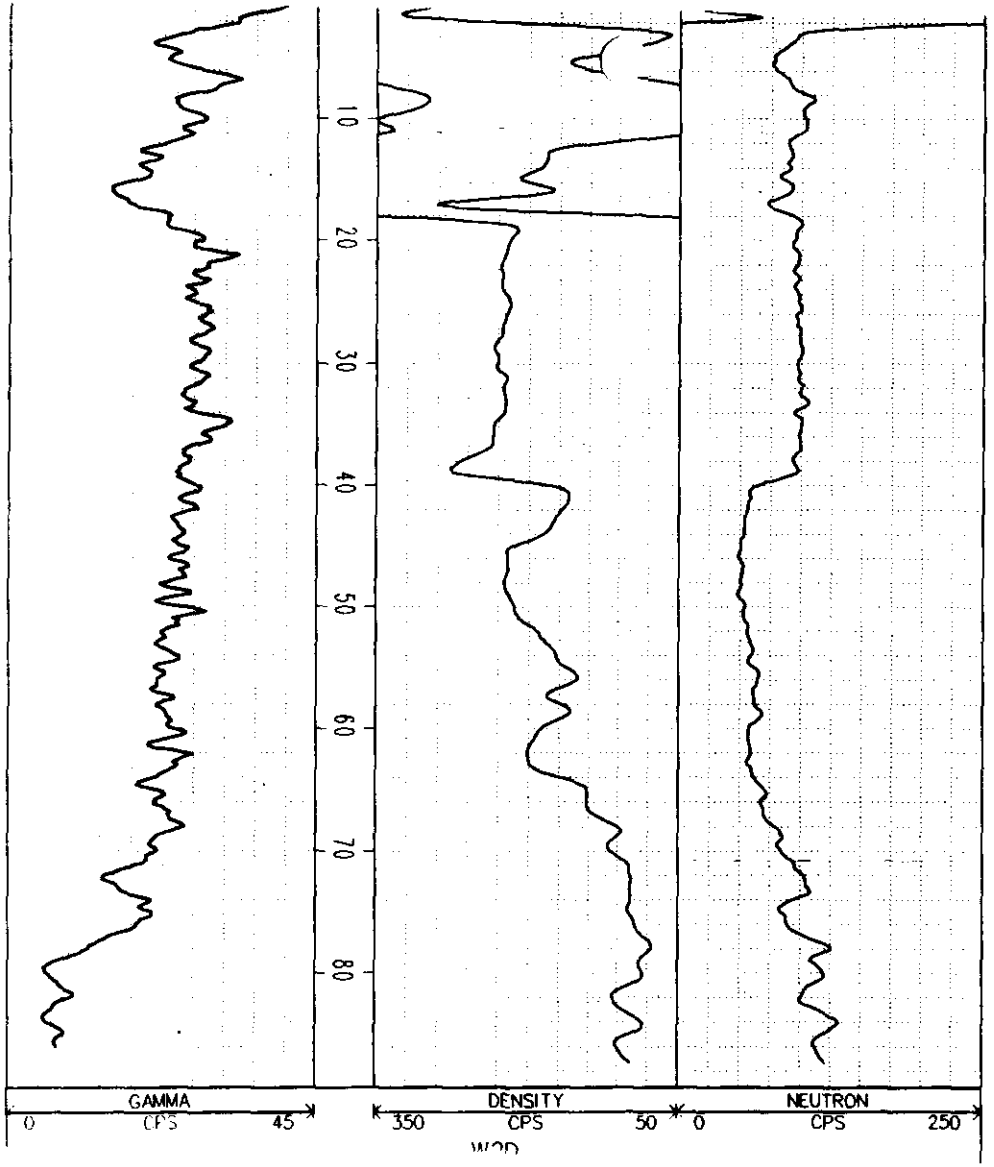
RUN #	PROBE TYPE / S.N.	MODULE TYPE / S.N.	LOGGING SPEED	AFTER SURVEY DEPTH ERROR	SAMPLE INTERVAL =
NEUTRON	COM-N1 1/4	CS10 F22	10 ft./minute		0.2
B. DENSITY	GO-BD 2 1/8	CS22 F22	10 ft./minute		0.2
GAMMA	COM-G1 1/4	CS01 F22	10 ft./minute		0.2

COMMENTS:

RUN #	GAMMA		B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G 1 1/4		GO-BD 2 1/8	COM-N 1 1/4
MODULE TYPE / S.N.	CS01 F22		CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute		10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2		0.2	0.2

COMMENTS:




GAMMA
0
CPS
45
10
20
30
40
50
60
70
80
DENSITY
350
CPS
50
NEUTRON
0
CPS
250

WLI Wooddell Logging Inc.

Mattoon, Illinois
217 234-8525

Gamma

COMPANY: WARZYN
WELL: W3D
FIELD: HOD Antioch, IL

LOCATION:
2115187.6
1051022.7

OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 763.7'
LOG MEASURED FROM: GROUND LEVEL

DATE:	03 June 93			
RUN NUMBER:	ONE			
DRILLER :				
BIT DIA. TO	8 1/2" TO 78'			
SCREEN INTERVAL	73.3' TO 77.6'			
TYPE OF CASING	PVC			
SIZE OF CASING				
LOGGER :				
DEPTH	75.4'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL				
TYPE FLUID IN HOLE	Water			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC.				
TIME SINCE CIRC.STOP.				
RECORDED BY:	Drake & Wooddell			
OBSERVER.	Mr. Steve Chillson			

RUN	GAMMA
PROBE TYPE / S.N.	COM-G11/4
MODULE TYPE / S.N.	CS01 F22
LOGGING SPEED	10 ft./minute
AFTER SURVEY DEPTH ERROR	
SAMPLE INTERVAL =	0.2

COMMENTS:

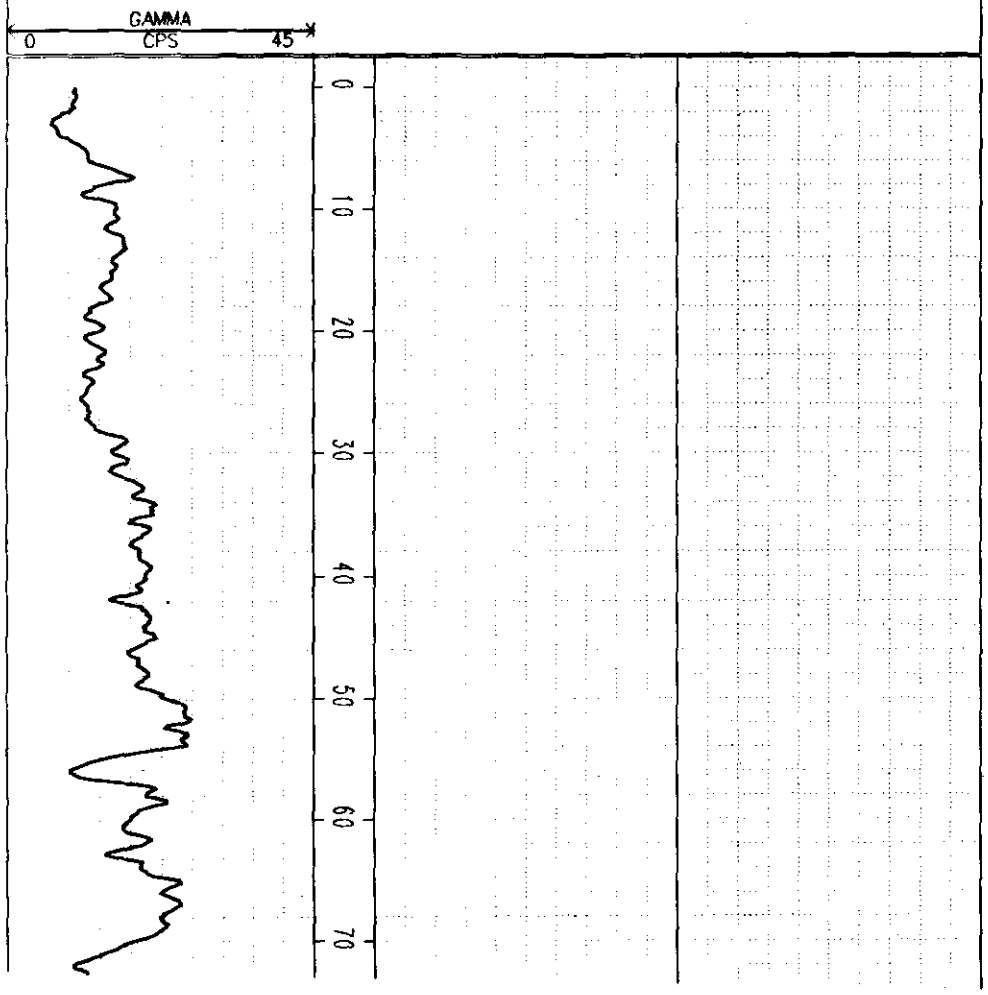
W3D

GAMMA CPS 0 4.5

0

AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2			
COMMENTS:				

W3D



0
GAMMA
CPS
45
70
60
50
40
30
20
10
W3D

WLI **Wooddell Logging Inc.**

Mattoon, Illinois
217 234-8525

Gamma-Density-Neutron

COMPANY: WARZYN
WELL: W7D
FIELD: HOD Antioch, IL

LOCATION:
2116326
1053153.3

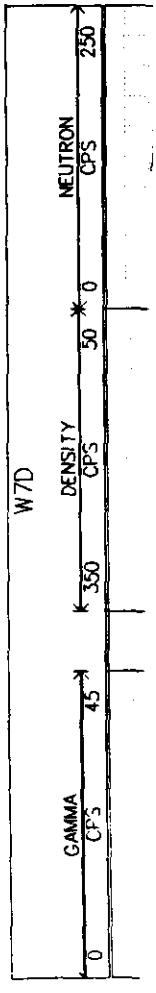
OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 780.2'
LOG MEASURED FROM: GROUND LEVEL

DATE	04 June 93			
RUN NUMBER	ONE			
DRILLER:				
BIT DIA. TO	8 1/2" TO 99.72			
SCREEN INTERVAL	95.4' TO 99.72			
TYPE OF CASING	PVC			
SIZE OF CASING				
LOGGER:				
DEPTH	98.2'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL				
TYPE FLUID IN HOLE	Water			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC.				
TIME SINCE CIRC.STOP.				
RECORDED BY	Drake & Wooddell			
OBSERVER	Mr. Steve Chillson			

RUN #	GAMMA	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G1 1/4	GO-BD 2 1/8	COM-N1 1/4
MODULE TYPE / S.N.	CS01 F22	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR			
SAMPLE INTERVAL =	0.2	0.2	0.2

COMMENTS:



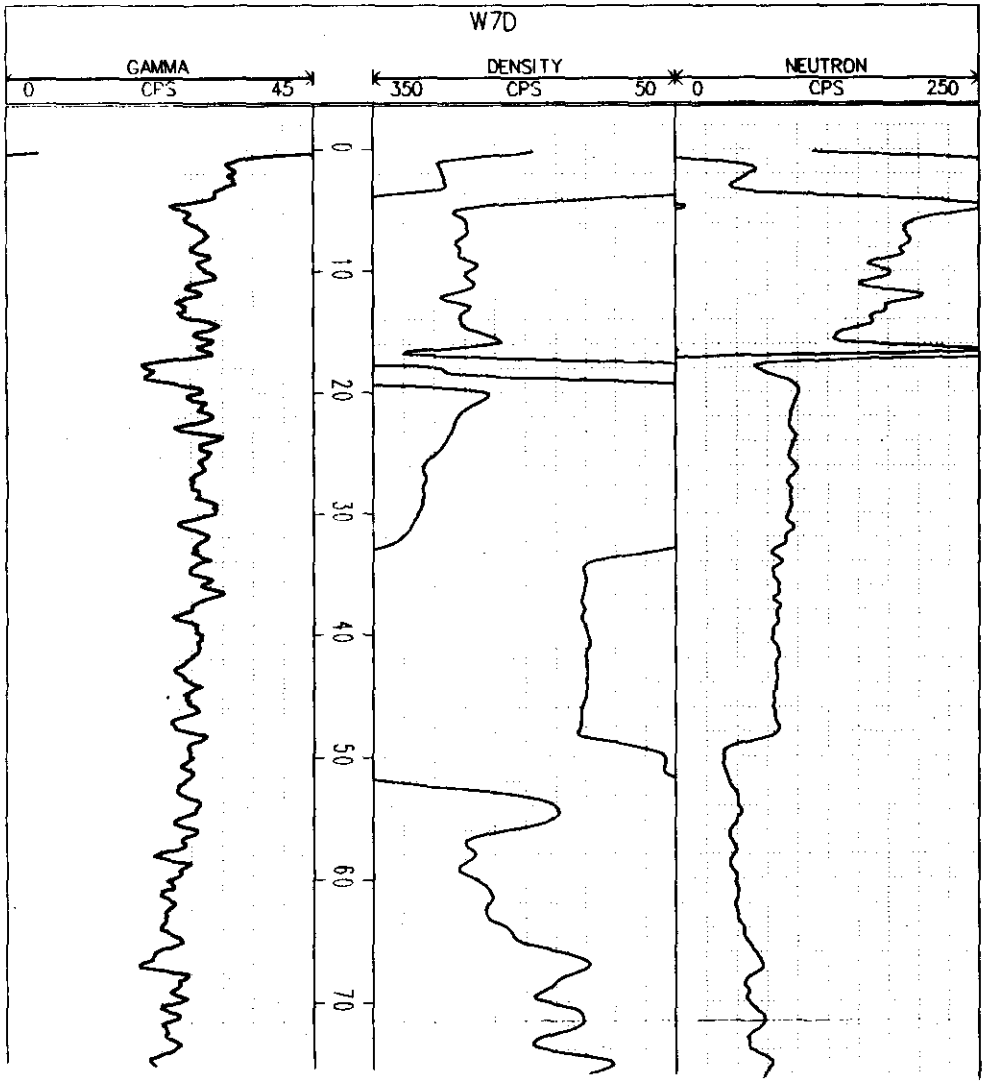
W7D

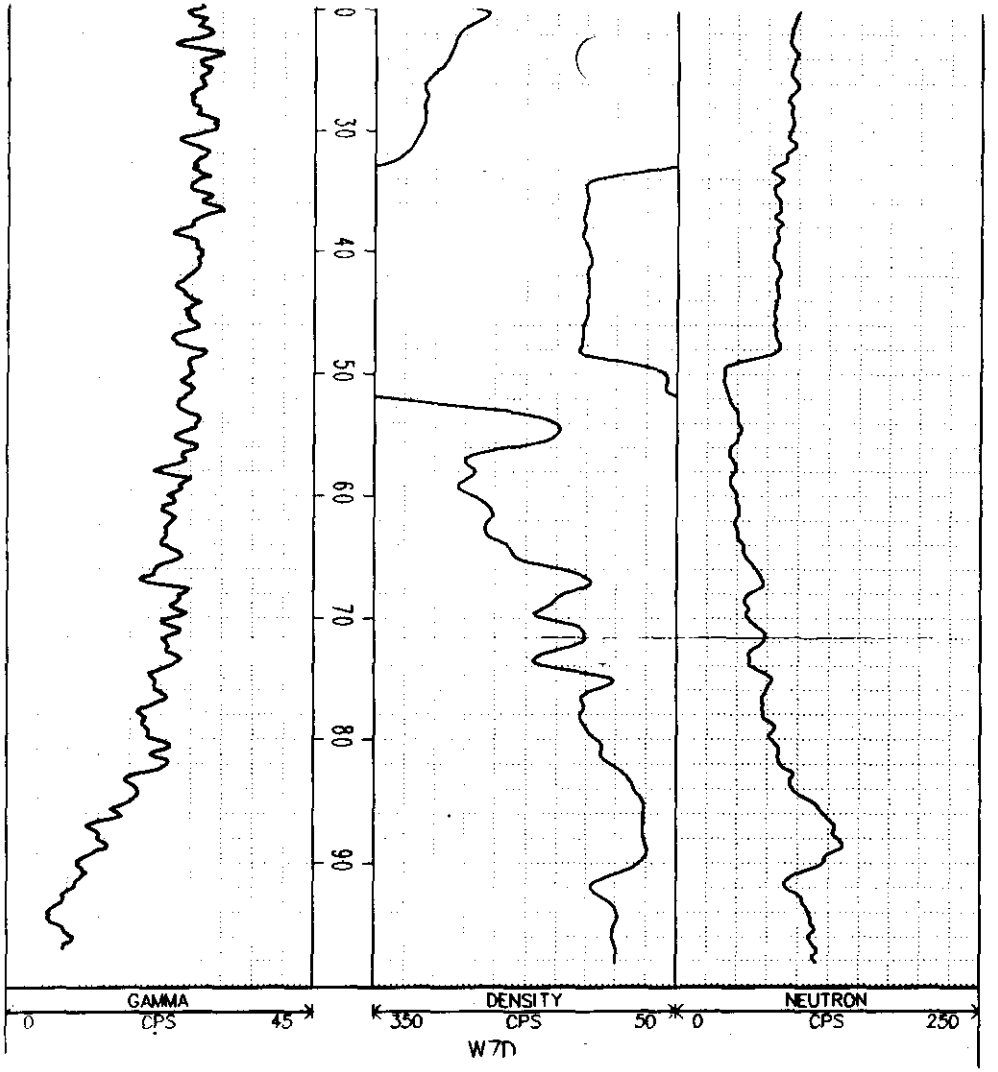
GAMMA CPS 0 45

DENSITY CPS 350 50

NEUTRON CPS 0 250

COMMENTS:


W7D
GAMMA
0 CPS 45
DENSITY
350 CPS 50
NEUTRON
0 CPS 250
0
10
20
30
40
50
60
70


0
30
40
50
60
70
80
90
GAMMA
0 CPS 45
DENSITY
350 CPS 50
NEUTRON
0 CPS 250
W7D

WLI Wooddell Logging Inc.
Mattoon, Illinois
217 234-8525

Gamma-Density-Neutron

COMPANY: WARZYN
WELL: US4D
FIELD: HOD Antioch, IL

LOCATION:
2115377.8
1050754.4

OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 770.5'
LOG MEASURED FROM: GROUND LEVEL

DATE:	04 June 93			
RUN NUMBER:	ONE			
DRILLER:				
BIT DIA. TO				
SCREEN INTERVAL				
TYPE OF CASING				
SIZE OF CASING				
LOGGER:				
DEPTH	102.4'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL				
TYPE FLUID IN HOLE	Water			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC.				
TIME SINCE CIRC.STOP.				
RECORDED BY:	Drake & Wooddell			
OBSERVER:	Mr. Steve Chillson			

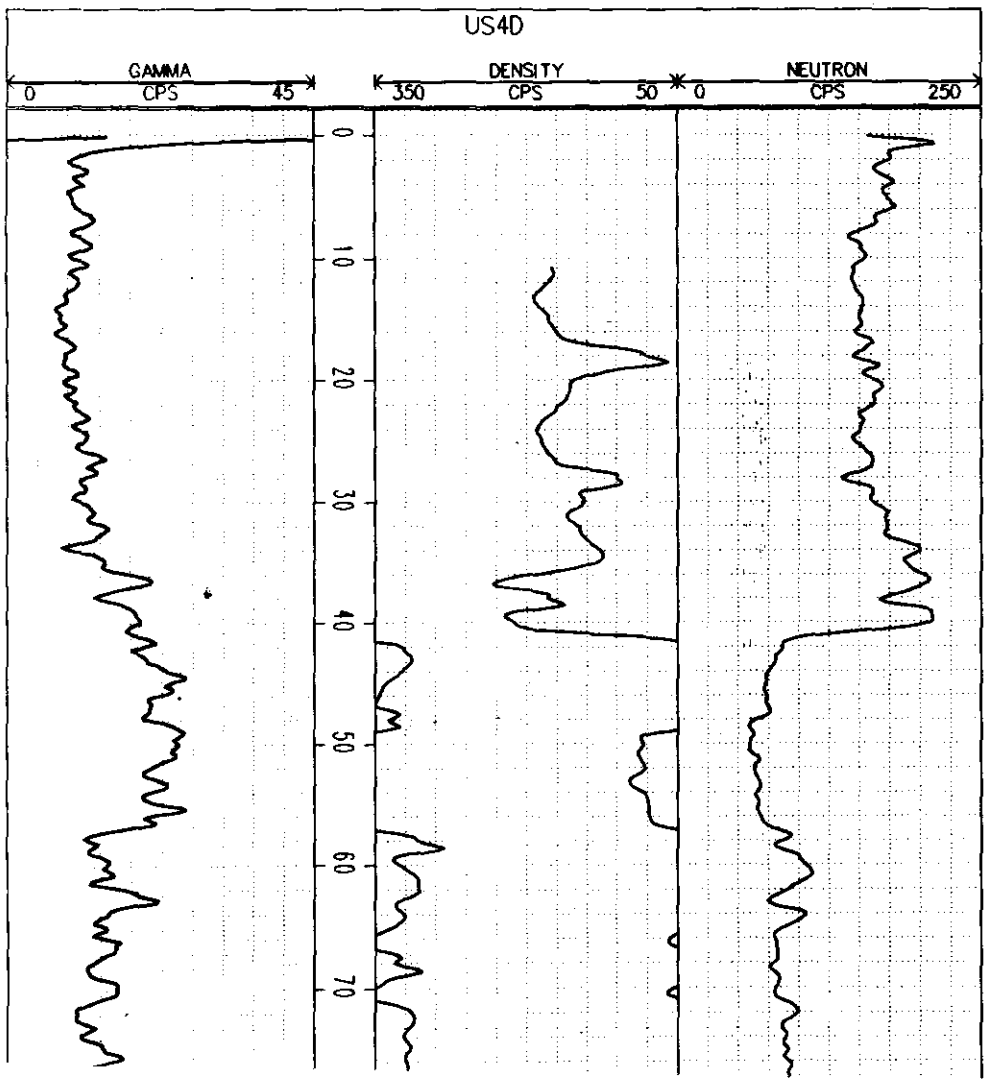
RUN #	GAMMA		B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G1 1/4		GO-BD 2 1/8	COM-N1 1/4
MODULE TYPE / S.N.	CS01 F22		CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute		10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2		0.2	0.2

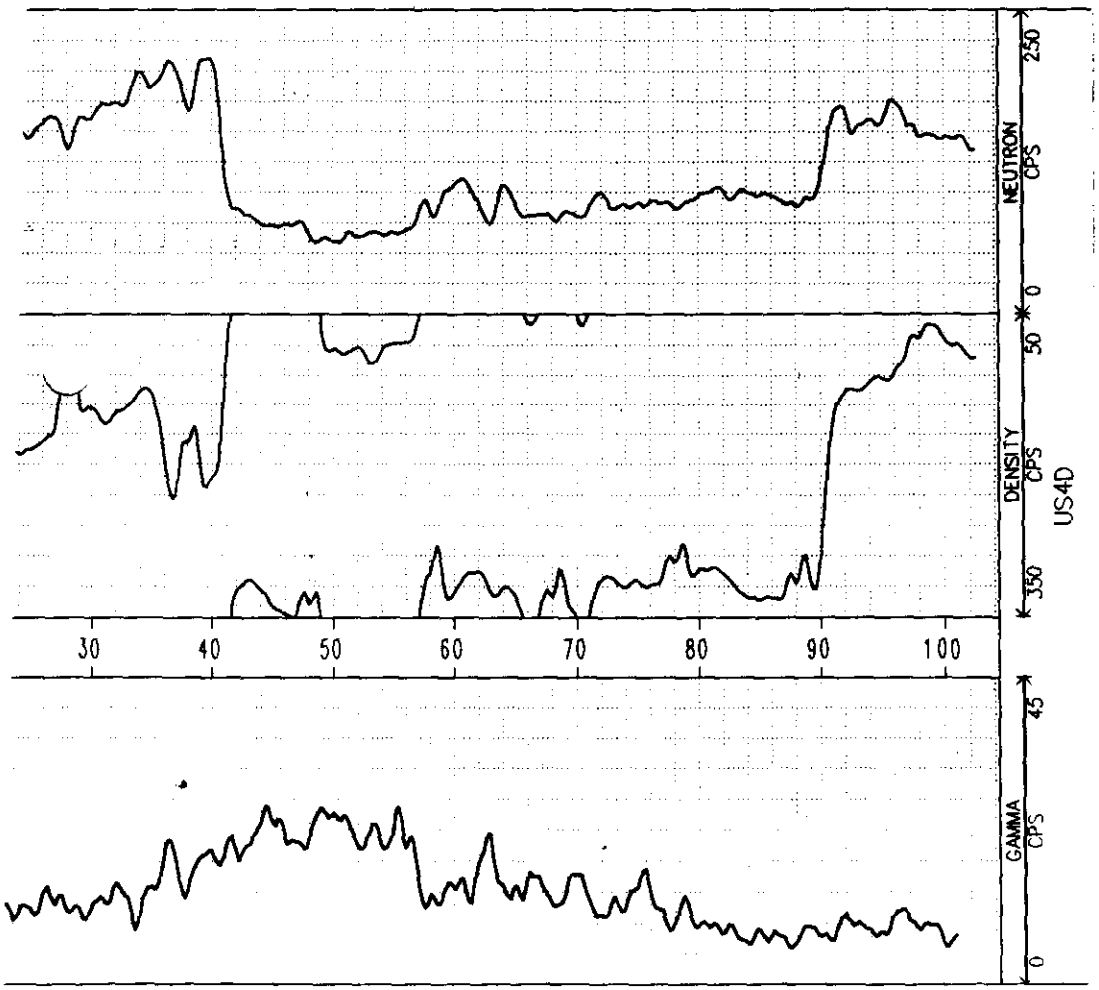
COMMENTS:

US4D

GAMMA CPS 0 45
DENSITY CPS 350 50
NEUTRON CPS 0 250

COMMENTS:


US4D
GAMMA
0 CPS 45
DENSITY
350 CPS 50
NEUTRON
0 CPS 250
0
10
20
30
40
50
60
70


NEUTRON
CPS
250
0
DENSITY
CPS
50
350
US4D
30
40
50
60
70
80
90
100
GAMMA
CPS
45
0

WLI Wooddell Logging Inc.
Mattoon, Illinois
217 234-8525

Gamma-Density-Neutron

COMPANY: WARZYN
WELL: US6D
FIELD: HOD Antioch, IL

LOCATION:
2115387.7
1051523.3

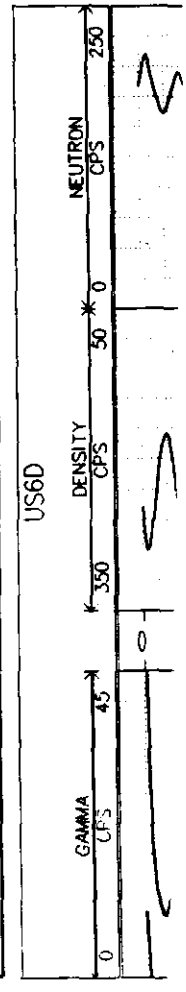
OTHER LOGS:

PERM. DATUM: GROUND LEVEL
ELEVATION: 767.1'
LOG MEASURED FROM: GROUND LEVEL

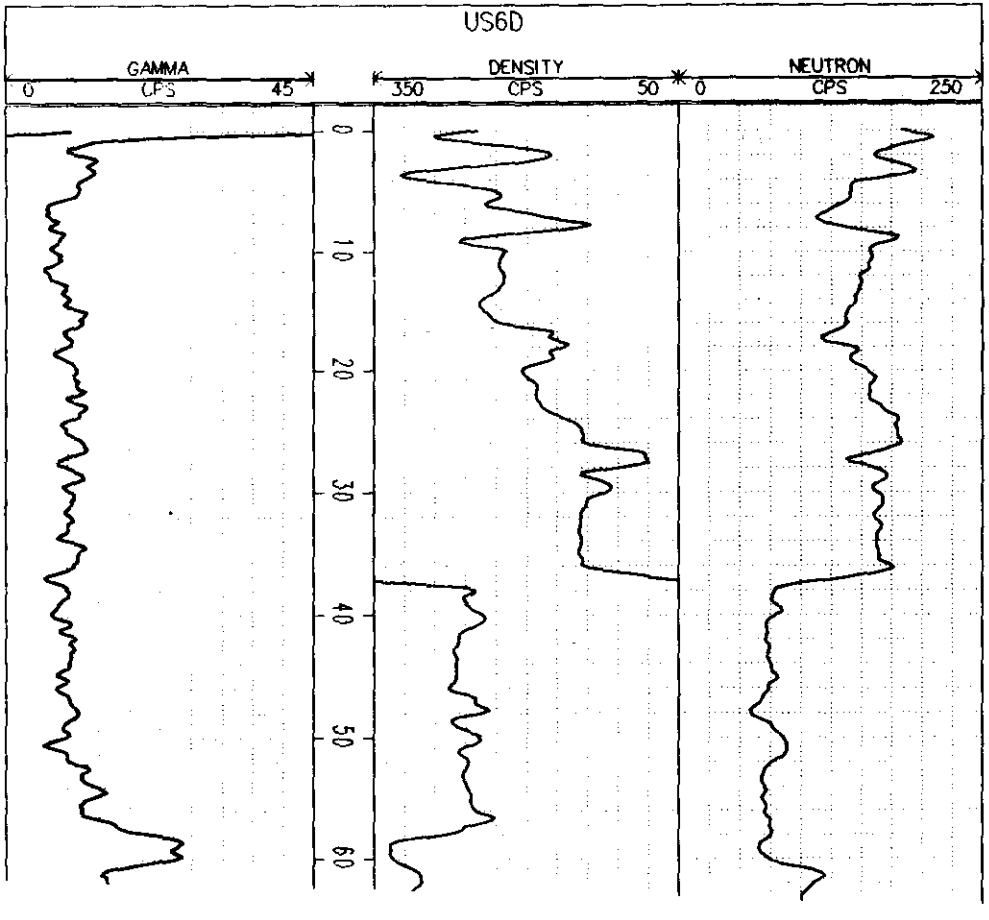
DATE:	04 June 93			
RUN NUMBER:	ONE			
DRILLER:				
BIT DIA. TO	8 1/2" TO 83.17'			
SCREEN INTERVAL	77.5' TO 83.17'			
TYPE OF CASING	STAINLESS			
SIZE OF CASING				
LOGGER:				
DEPTH	81.0'			
CASING DEPTH				
BOT LOG INTERVAL				
TOP LOG INTERVAL				
TYPE FLUID IN HOLE	Water			
FLUID LEVEL				
SAMPLE SOURCE				
FLUID LVL/CIRC				
TIME SINCE CIRC.STOP.				
RECORDED BY:	Drake & Wooddell			
OBSERVER:	Mr. Steve Chillson.			

RUN #	GAMMA	B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G 1 1/4	CO-BD 2 1/8	COM-N 1 1/4
MODULE TYPE / S.N.	CS01 F22	CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute	10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR			
SAMPLE INTERVAL =	0.2	0.2	0.2

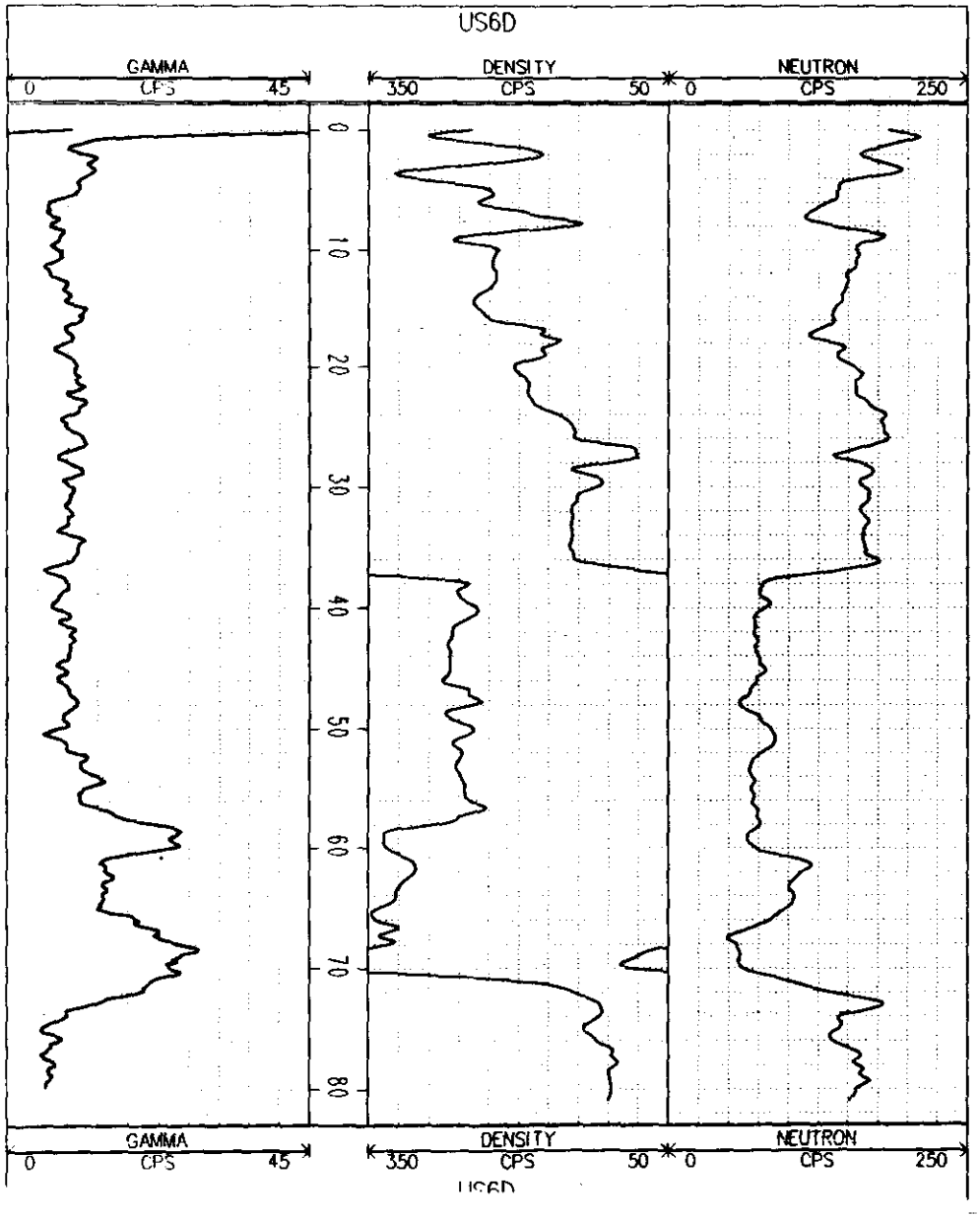
COMMENTS:



RUN #	GAMMA		B. DENSITY	NEUTRON
PROBE TYPE / S.N.	COM-G 1 1/4		GO-BD 2 1/8	COM-N 1 1/4
MODULE TYPE / S.N.	CS01 F22		CS22 F22	CS10 F22
LOGGING SPEED	10 ft./minute		10 ft./minute	10 ft./minute
AFTER SURVEY DEPTH ERROR				
SAMPLE INTERVAL =	0.2		0.2	0.2
COMMENTS:				



COMMENTS:


US6D
GAMMA
0 CPS 45
DENSITY
350 CPS 50
NEUTRON
0 CPS 250
0
10
20
30
40
50
60
70
80
GAMMA
0 CPS 45
DENSITY
350 CPS 50
NEUTRON
0 CPS 250
US6D

E

E

LANDFILL BORING LOGS

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" IDHSA

BORING NO. B1

SHEET 1 OF 1

SAMPLING METHOD: 2" OD SPLIT SPOON

		DRILLING START TIME	DRILLING FINISH TIME
WATER LEVEL			
TIME			
DATE		DATE	DATE
CASING DEPTH		4/27/93	4/27/93

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8 , T 46 N, R 10 E/W

NORTHING 2115338.7 EASTING 1053435.5

DATUM ELEVATION 774.7

DRILL RIG CME 750 ATV

SURFACE CONDITIONS GRASS COVERED LANDFILL CAP

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
					FILL: Brown CLAY Over Black CLAY Cap Material								
5 769.7	4 6 7 6	92		1	FILL: Very Stiff Brown Clay, Gray Clay, White Plaster Like Material Over Brown and Black Peat Like Material	SS							3-4.5
768.2	4 7 10 6	92		2	FILL: Refuse Over Brown and Black Clay Fill	SS							–
766.4 765.7	2 2 2 2	100		3	Brown Fine to Coarse SAND 4" Over Gray Fine to Coarse SAND	SS							–
10	2 3 4 4	100		4	Fibrous PEAT (PT), Little Clay, Grades to Organic CLAY (OH)	SS							–
760.7	8 4 6 7	83		5		SS							–
15	4 5 4 7	67		6	Loose Brown and Tan Fine to Coarse SAND (SP), Little Fine to Coarse Gravel and Silt	SS							–
757.7	3 7 8 8	92		7	Silty Fine to Medium SAND (SP), Little to Some Coarse Sand, Trace Fine Gravel	SS							–
20	5 8 5 9	92		8	Medium Dense Gray Fine to Coarse SAND (SP), Trace to *Little Fine Gravel and Silt* Medium Dense Fine to Medium SAND and Some Silt (SP-SM), Trace to Little Fine Gravel and Coarse Sand to 20 Feet, Grades to Fine to Coarse SAND (SP), Trace to Little Fine Gravel	SS							–
	4 4 5 9	42		9		SS							–
	5 7 6 6	46		10		SS							–
25	10 15 16 18	58		11	Fine to Coarse SAND (SP-SM) Some Gravel, Trace Silt and Clay	SS							–
	–	46		12	Grades to Medium SAND, Trace to Little Fine to Coarse Sand	SS							–
745.7	8 5 5 5	71		13	Grades to Fine to Coarse SAND and Fine Gravel	SS							1-1.5
30 743.7	4 6 7 7	100		14	Stiff Gray Sandy Silty CLAY to Clayey Silt (CL/ML) to Clayey Silty Sand (SM)	SS				31	15		1.75-2.75
	3 3 3 4	75		15	Stiff to Very Stiff Gray Lean CLAY (CL) Little Fine to Coarse Sand, Trace Fine Gravel	SS							1.25-2
35 739.7					End of Boring at 35 Feet Boring Backfilled with Bentonite Slurry and Chips								

LOGGED BY SJC

DRILLING CONTR E&F

DATE 9/23/93 CHK'D BY DAP

CHAS. MARKGRAF

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" IDHSA

BORING NO. B2

SHEET 1 OF 2

SAMPLING METHOD: 2" OD SPLIT SPOON

	START	FINISH
DRILLING TIME		
DATE	4/26/93	4/27/93

WATER LEVEL
TIME
DATE
CASING DEPTH

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8, T 46 N, R 10 E/W

NORTHING 2115329.8 EASTING 1050990.5

DATUM ELEVATION 772.1

DRILL RIG CME 750 ATV

SURFACE CONDITIONS GRASS COVERED LANDFILL CAP

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
					FILL: Clay Cap Material to Approximately 4 Feet								
768.1													
5					Refuse to Approximately 10 Feet								
10 762.1													
761.1	2 3 1 1	67		1	Tan Fine to Coarse SAND (SP)	SS							–
760.1					Peat and Organic CLAY (PT/OH)								
	2 1 1 1	33		2	Soft Gray Fat CLAY (CH), Little to Some Sand, 1/4" Woody Peat Lense at 13.5 Feet	SS							–
758.1	7 7 7 7	71		3	Medium Dense Fine to Coarse SAND (SP), Trace to Little Fine Gravel	SS							–
15 756.1													
755.1	6 5 7 6	71		4	Silty Fine to Coarse SAND (SM) 1" Silt Layer at 17 Feet	SS							–
	3 6 10 12	25		5	Medium Dense Fine to Coarse SAND (SP), Trace Fine Gravel Trace to Little Silt	SS							–
20	7 15 19 19	50		6	1/4" Silt Lenses at 21 and 21.9 Feet	SS							–
	7 9 12 9	58		7	Grades to Fine to Coarse SAND (SP), Little to Some Fine Gravel	SS							–
	7 8 8 12	58		8		SS							–
25					Grades to Fine to Medium SAND								
	4 6 8 10	38		9		SS							–
	4 5 7 10	54		10	Grades to Fine to Coarse SAND and Fine GRAVEL (SP/GP) Grades to Fine to Medium SAND (SP), Trace to Little Coarse Sand, Trace Gravel	SS							–
30	8 9 9 40	63		11	Fine to Medium SAND, Little Coarse Sand, Trace Fine Gravel	SS							–
739.1	8 5 3 5	71		12		SS							1.25-2.5
35	5 6 6 6	71		13	Stiff Gray Silty Sandy CLAY (CL) Grades to More Clayey Sand and Silt (CL/ML) Gray Sandy Silty CLAY (CL) Silt Lenses	SS				23	9		–
	4 6 7 10	83		14		SS							1.5

LOGGED BY SJC

DRILLING CONTR E&F

DATE 9/22/93 CHK'D BY DAP

CHAS. MARKGRAF

ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

SHEET 2 OF 2

BORING NO. B2

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
734.1				Stiff Gray Lean Clay (CL), Little to Some Fine to Coarse Sand and Silt, Trace to Little Fine Gravel								
				End of Boring at 38 Feet Boring Backfilled with Bentonite Slurry and Chips								
40												
45												
50												
55												
60												
65												
70												
75												
80												
85												

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" ID HSA

BORING NO. B2A

SHEET 1 OF 1

SAMPLING METHOD: 2" OD SPLIT SPOON

DRILLING START TIME / FINISH TIME

WATER LEVEL: TIME

DATE

CASING DEPTH

DATE 4/27/93 DATE 4/27/93

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8 , T 46 N, R 10 E/W

NORTHING 2115329.8 EASTING 1051000.3

DATUM ELEVATION 772.1

DRILL RIG CME 75

SURFACE CONDITIONS GRASS COVERED LANDFILL CAP

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				FILL: Brown Clay Cap Material, Blind Drilled to 15 Feet								
768.1				FILL: Refuse to 10 Feet, Logged from Cuttings								
5												
10 762.1												
15	12 11 13 12	100		1 Medium Dense Brown and Gray, Fine to Coarse SAND (SP), Some Gravel, Little Silt, Trace Clay	SS							
755.1				End of Boring at 17 Feet Boring Backfilled with Bentonite Chips								
20												
25												
30												
35												

LOGGED BY PMS

DRILLING CONTR E & F

DATE 9/22/93 CHK'D BY DAP

CHAS. MARKGRAF

Template 10: WM1

ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, *Illinois*

DRILLING METHOD: 4 1/4" IDHSA

BORING NO. B3

SHEET 1 OF 2

SAMPLING METHOD: 2" OD SPLIT SPOON 2.5" ID

SPLIT SPOON 22'-24'; SHELBY TUBE 48'-50'

	START	FINISH
DRILLING TIME		
DATE	4/26/93	4/26/93

WATER LEVEL
TIME
DATE
CASING DEPTH

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8 , T 46 N, R 10 E/W

NORTHING 2115331.9 EASTING 105115.3

DATUM ELEVATION 773.7

DRILL RIG CME 750 ATV

SURFACE CONDITIONS GRASS COVERED LANDFILL CAP

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				FILL: Clay Cap Material to Approximately 4 Feet								
769.7				FILL: Refuse to Approximately 10.5 Feet								
5												
10 763.2	5 4 5 3	38		1 Black and Brown PEAT (PT) and Wood Chips Present	SS							–
	1 1 2 2	33		2 Brown Organic CLAY to PEAT (PT/OH)	SS							–
15 758.7	2 3 7 8	67		3 2" Layer of Organic Silt and Clay, Over 1" Layer of Fine to Medium Sand Over Gray Organic Clay	SS							–
	5 6 8 8	58		4 Medium Dense Gray Fine to Medium SAND (SP)	SS							–
754.7	5 2 1 1	67		5	SS							–
20 753.7				Gray Organic CLAY (OH)								
	5 8 10 8	50		6 Medium Dense Fine to Coarse SAND (SP), Little Fine Gravel	SS							–
	7 17 18 15	75		7 Some Gravel, Little Silt, Trace Clay	SS							–
25	5 6 10 11	58		8 Grades to Fine then Coarse Sand	SS							–
	5 6 13 10	25		9	SS							–
	4 5 6 6	79		10 1/2" Gray SILT to Clayey Silt Lens at 28'	SS							–
30	6 8 9 9	42		11 Medium Dense Fine to Coarse SAND and Trace to Little Fine Gravel, Trace Coarse Sand; 2" Fine to Medium Sand Lens, Grades to Fine to Coarse SAND and Fine GRAVEL (SP/GP)	SS							–
	6 7 8 9	50		12 Medium Dense Fine to Coarse SAND (SP), Little to Some Fine Gravel Trace Coarse Sand	SS							–
35	6 8 9 10	63		13	SS							–
	12 8 8 8	67		14	SS							–

LOGGED BY SJC

DRILLING CONTR E&F

DATE 9/22/93 CHK'D BY DAP

CHAS. MARKGRAF

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

SHEET 2 OF 2

BORING NO. B3

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	5 6 8 8	50		15	SS							–
40 733.7	6 6 10 10	33		16 Gray Clayey SILT (ML)	SS							–
				Grades to Gray Sandy Silty CLAY (CL)								
730.7	6 8 18 18	75		17 Very Stiff Gray Silty CLAY (CL), Trace to Little Fine to Coarse Sand	SS							2.75-3.25
728.7	5 10 10 8	75		18 Gray Fine to Medium SAND (SP), Little Coarse Sand, Trace Fine Gravel	SS							–
45 727.7				Silt to Sandy SILT (ML), Trace to Little Fine Gravel, and Fine to Coarse Sand, Grades to Sandy Silty Clay								
	6 7 9 10	88		19 Very Stiff Gray Lean CLAY (CL), Little Fine to Coarse Sand, Trace Fine Gravel	SS							2.25-2.75
	--	100		20	SB							–
50 723.7				End of Boring at 50 Feet Boring Backfilled with Bentonite Slurry and Chips								

55

60

65

70

75

80

85

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" IDHSA

BORING NO. B4

SHEET 1 OF 2

SAMPLING METHOD: 2" OD SPLIT SPOON 2 1/2" ID

SPLIT SPOON 37'-39'

		DRILLING START	DRILLING FINISH
WATER LEVEL		TIME	TIME
TIME			
DATE		DATE	DATE
CASING DEPTH		4/23/93	4/23/93

BORING LOCATION:

SE 1/4 of SE 1/4 of Section 8 , T 46 N, R 10 E/W

NORTHING 2115328.1 EASTING 1051350.4

DATUM ELEVATION 774.1

DRILL RIG CME 750 ATV

SURFACE CONDITIONS GRASS COVERED LANDFILL CAP

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
					FILL: Blind Drilled to 5 Feet Brown and Black Clay Cap Material								
770.1													
5	2 10 6 4	25		1	FILL: Refuse Paper, Metal, Plastic, Etc.	SS							–
10	5 7 3 4	17		2	FILL: Refuse Concrete, Paper, Plastic, Metal, Etc.	SS							–
760.6													
15	3 7 7 8	67		3	Medium Dense Tan Fine Silty SAND to Fine Sandy SILT (SM)	SS							–
757.6	5 7 8 9	71		4	Medium Dense Gray Fine SAND (SP), Trace to Little SILT	SS							–
20	3 4 5 7	75		5	Loose Brown Fine SAND (SP), Trace Silt, Trace to Little Medium Sand	SS							–
	4 5 6 7	71		6	Medium Dense Brown Fine to Medium SAND	SS							–
	3 4 6 8	54		7	Grades to Fine to Coarse SAND and Fine GRAVEL (SP/GP)	SS							–
25	5 7 7 7	67		8	Fine to Coarse SAND (SP), Little Fine Gravel	SS							–
	2 5 7 8	75		9		SS							–
30	–	75		10	Sand Grades Fine to Coarse	SB							–
	8 8 8 10	67		11	Medium Dense Gray Fine to Medium SAND (SP)	SS							–
	6 10 11 13	88		12	SILT and SAND (SP/ML)	SS							–
35	5 7 8 8	71		13	Medium Dense Fine Sandy SILT to Silty SAND (SM), Silt	SS							–

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DRILLING CONTR E&F

DATE 9/22/93 CHK'D BY DAP

CHAS. MARKGRAF

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

SHEET 2 OF 2

BORING NO. B4

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER	DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	5 6 7 9	71		14	and Sand Fine Sand, Some Silt, Trace Clay and Gravel	SS							–
40	6 7 8 10	75		15		SS							–
	5 8 9 11	96		16	Fine Sand, Little Medium Sand	SS							–
	4 3 3 5	96		17	Medium Dense Fine to Coarse SAND (SP), and Fine Gravel	SS							–
45	11 10 9 10	75		18	Medium Dense Fine to Coarse SAND (SP), Trace to Little Fine Gravel	SS							–
727.1	–	75		19	Stiff Gray Lean CLAY (CL), Little to Some Silt, Little Fine to Coarse Sand, Trace Gravel	SB				25	11		1.5-2.0
725.1					End of Boring at 49 Feet Boring Backfilled with Bentonite Slurry and Chips								
50													
55													
60													
65													
70													
75													
80													
85													

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" IDHSA

BORING NO. B5

SHEET 1 OF 2

SAMPLING METHOD: 2" OD SPLIT SPOON

		DRILLING START	DRILLING FINISH
WATER LEVEL		TIME	TIME
TIME			
DATE		DATE	DATE
CASING DEPTH		4/23/93	4/23/93

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8 , T 46 N, R 10 E/W

NORTHING 2115444.5 EASTING 1051463.4

DATUM ELEVATION 775.2

DRILL RIG CME 750 ATV

SURFACE CONDITIONS GRASS COVERED LANDFILL CAP

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
					FILL: Brown Clay Cap Material to 5 Feet Blind Drilled to 10 Feet								
5					FILL: Refuse and Clay								
10	5 8 5 12	25		1	FILL: Refuse	SS							–
15	6 6 6 12	13		2		SS							–
758.2	5 10 11 12	79		3	Refuse, Little Sand in Tip of Spoon	SS							–
20	5 6 11 12	63		4	Medium Dense Fine to Medium SAND (SP), Trace to Little Clayey Sand	SS							–
	5 2 1 1	46		5	2" Organic Sandy Clay, Wood Fibers in End of Spoon	SS							–
	5 12 13 16	25		6	Medium Dense Fine to Medium SAND (SP) Grades to Fine to Coarse Little Fine Gravel, Little Clay	SS							–
25	5 8 10 9	50		7	Medium Dense Fine to Coarse SAND (SP), Little Fine Gravel	SS							–
	3 6 9 10	71		8		SS							–
30	5 7 8 8	83		9	Fine to Coarse Sand, Some Gravel, Little Silt, Trace Clay	SS							–
	10 9 10 10	67		10	Grades to Medium Dense Fine SAND (SP), Less Coarse Sand, Grades Back to Fine to Coarse Sand	SS							–
	6 9 11 14	67		11		SS							–
35 740.2	7 10 10 11	67		12	3" Gray Clayey Silt Layer Over Fine Silty SAND (SM), Grades to Fine to Coarse Sand in Tip of Spoon	SS							–

LOGGED BY SJC

DRILLING CONTR E&F

DATE 9/22/93 CHK'D BY DAP

CHAS. MARKGRAF

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

SHEET 2 OF 2

BORING NO. B5

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	3 10 10 10	75		13	Fine Silty SAND (SM)	SS							–
40	5 7 9 6	58		14	Fine Silty SAND to Fine SAND (SM/SP), Trace to Some Silt	SS							–
	6 11 10 10	63		15	Fine Silty SAND (SM) Grades to Silt in Tip of Spoon	SS							–
731.7	5 7 4 6	58		16	6" Fine to Coarse Sand and Silt, Trace Fine Gravel; Very Stiff Gray Silty CLAY (CL)	SS							2.25-2.75
45	6 8 10 12	100		17	Stiff Gray Silty CLAY (CL), Little Fine to Coarse Sand, Shale Fragments Present	SS				29	13		1.25-2.50
	4 6 9 9	100		18		SS							1.25-2.25
726.2					End of Boring at 49 Feet Boring Backfilled with Bentonite Slurry and Chips								
50													
55													
60													
65													
70													
75													
80													
85													

F

GEOTECHNICAL LABORATORY DATA

WARZYN

MADISON
ONE SCIENCE COURT
P.O. BOX [illegible]
MADISON, [illegible]
[illegible]
FAX [illegible]

LABORATORY RESULTS

Project: HOD Landfill

Project #: 10010201

Location: Antioch, Illinois

Sample Number	Description	Liquid Limit %	Plasticity Index %	Natural Moisture %
6764-0001	HD-SU01-01	28	12	27.8
6764-0002	HD-SU02-01	33	8	28.3
6764-0003	HD-SU03-01	51	21	44.2
6764-0004	HD-SU04-01	26	10	24.0
6764-0005	HD-SU04-91	25	9	22.7
6764-0006	HD-SU05-01	29	12	18.5

Ck'd: GLS **App'd:** DTL
Date Issued: 6-9-93

[var-soil-008]
10010201-lab

WARZYN

MADISON
ONE SCIENCE COURT
P.O. BOX [illegible]
MADISON, [illegible]
[illegible]
FAX [illegible]

LABORATORY RESULTS

Project: HOD Landfill RI/FS **Project #:** 10010201

Location: Antioch, Illinois

Sample Number	Description	Loss on Ignition %	Estimated Total Porosity
6619-0006	HD-SSW3D-38	1.64	0.24

Ck'd: JMR **App'd:** DTL
Date Issued: 6-4-93

WARZYN

MADISON
ONE SCIENCE COURT
P.O. BOX 5385
MADISON, WI 53705
(608) 231-4747
FAX (608) 231-4777

LABORATORY RESULTS

Project: HOD Landfill RI/FS

Project #: 10010201

Location: Antioch, Illinois

Sample Number	Description	Loss on Ignition %	Estimated Total Porosity
6877-0008	HD-SSW2D-31	3.6	0.38
6878-0006	HD-SSW5S-9	11.7	--

-- Not requested.

Ck'd: DTL App'd: VJR
Date Issued: 6-16-93

Job No. [illegible]
Date: [illegible]

FALLING HEAD PERMEABILITY TEST

arsyn Inc., 1 Science Court, Madison, WI 53711 Phone: (608) 231-6955 or 231-4747

PROJECT	H.O.D. LANDFILL RI/FS
STATION	Antioch, Illinois
SAMPLE	HD-SSW2D-31
DEPTH (ft)	
SOIL DESCRIPTION (a)	Gray Lean CLAY (CL)
SAMPLE DIAMETER (cm)	7.4
SAMPLE AREA, A(cm²)	42.6

	INITIAL	FINAL
SAMPLE LENGTH, L(cm)	18.0	17.8
MOISTURE CONTENT, %	21.6	20.9
DRY DENSITY (lb/cu ft)	104.9	106.1
PERCENT COMPACTION	-	-

RUN	COEFFICIENT OF PERMEABILITY, k(cm/sec)
1	1.3E-08
2	1.5E-08
3	1.4E-08
4	1.7E-08
5	1.6E-08
6	1.5E-08
7	1.8E-08
8	1.8E-08
9	1.3E-08
10	1.6E-08

AVERAGE COEFFICIENT OF PERMEABILITY = 1.5E-08 cm/sec
(Based on run numbers 8 through 10)

FORMULA: $k = \frac{2.3aL}{At} \log_{10} \frac{h_0}{h_1}$, Where a = cross-sectional area of standpipe,
t = time for water level to fall from initial height, h_0, to final height, h_1
(All other terms are defined above)

FOOTNOTES: (a) Visual Soil Description.

REMARKS: This permeability test was performed on a relatively undisturbed 3-inch diameter Shelby tube sample.

CHECKED BY: CLS DATE: 5-26-93 APPROVED BY: DTL DATE: 6-8-93

[illegible]
Date: [illegible]

[illegible] HEAD PERMEABILITY TEST

[illegible] Inc., 1 Science Court, Madison, WI 53711 Phone: (608) 231-[illegible] or 231-4747

[illegible]	H.O.D. LANDFILL FI/FS
[illegible]ATION	Antioch, Illinois
[illegible]AMPLE	HD-8SW3D-38
[illegible]	
[illegible] DESCRIPTION (a)	Gray Lean CLAY, Some Sand, Little Gravel (CL)
[illegible]AMPLE DIAMETER (cm)	7.4
[illegible]AMPLE AREA,A(cm²)	42.6

	INITIAL	FINAL
[illegible]AMPLE LENGTH,L(cm)	18.7	18.6
[illegible]STURE CONTENT,%	11.7	11.6
[illegible] DENSITY (lb/cu ft)	127.4	127.[illegible]
[illegible]ERCENT COMPACTION	-	-

RUN	COEFFICIENT OF PERMEABILITY,k(cm/sec)
1	1.9E-08
2	1.6E-08
3	1.5E-08
4	1.6E-08
5	1.9E-08
6	2.0E-08
7	1.4E-08
8	1.7E-08
9	1.7E-08
10	1.7E-08

AVERAGE COEFFICIENT OF PERMEABILITY = 1.7E-08 cm/sec
(Based on run numbers 8 through 10)

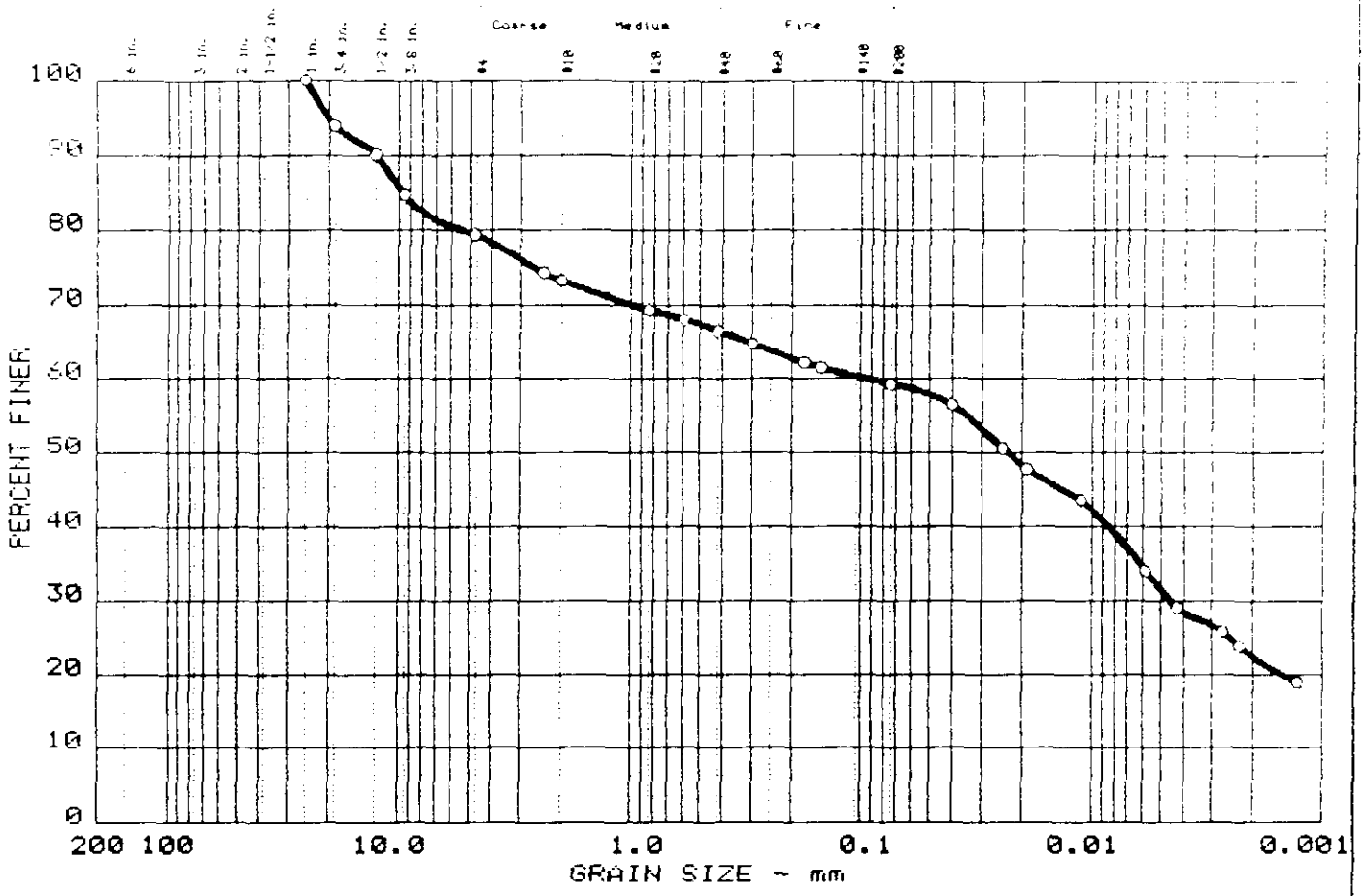
[illegible]ORMULA: $k = \frac{2.3aL}{At} \log_{10} \frac{h_o}{h_1}$, Where a = cross-sectional area of standpipe, t = time for water level to fall from initial height, h_o, to final height, h_1 (All other terms are defined above)

[illegible]OOTNOTES: (a) Visual Soil Description

[illegible]ANKS: This permeability test was performed on a relatively undisturbed 3-inch diameter Shelby tube sample.

[illegible] BY: CLS DATE: 5/21/93 APPROVED BY: DTL DATE: 5/27/93

GRAIN SIZE DISTRIBUTION TEST REPORT



Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	20.6	20.1	28.1	31.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	28	12	9.66	0.09	0.02	0.005				

MATERIAL DESCRIPTION	USCS
○ Gray Lean CLAY, Some Gravel and Sand	CL

Project No.: 10010201
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SU01-01

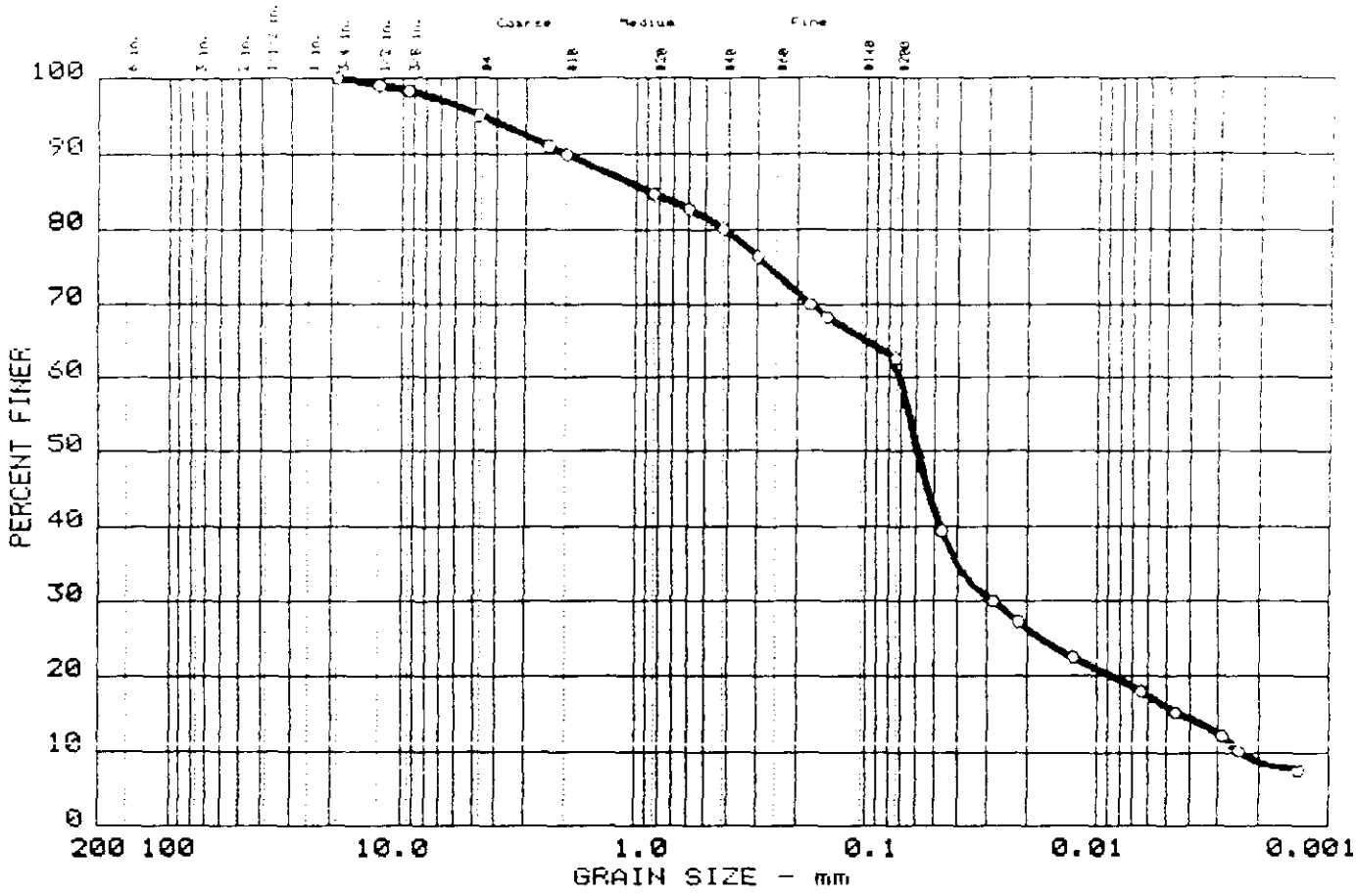
Date: 5/27/93

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Remarks:
TESTED BY CLS
CHECKED BY CLS
APPROVED BY DTL

Sheet No.

GRAIN SIZE DISTRIBUTION TEST REPORT



Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	4.9	32.4	47.0	15.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	33	8	0.87		0.06	0.028	0.0046	0.0024	4.62	29.9

MATERIAL DESCRIPTION	USCS
○ Gray Lean CLAY, Some Sand, Trace Gravel	CL

Project No.: 10010201
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SU02-01

Date: 5/27/93

Remarks:
TESTED BY CLS
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APPROVED BY DTL

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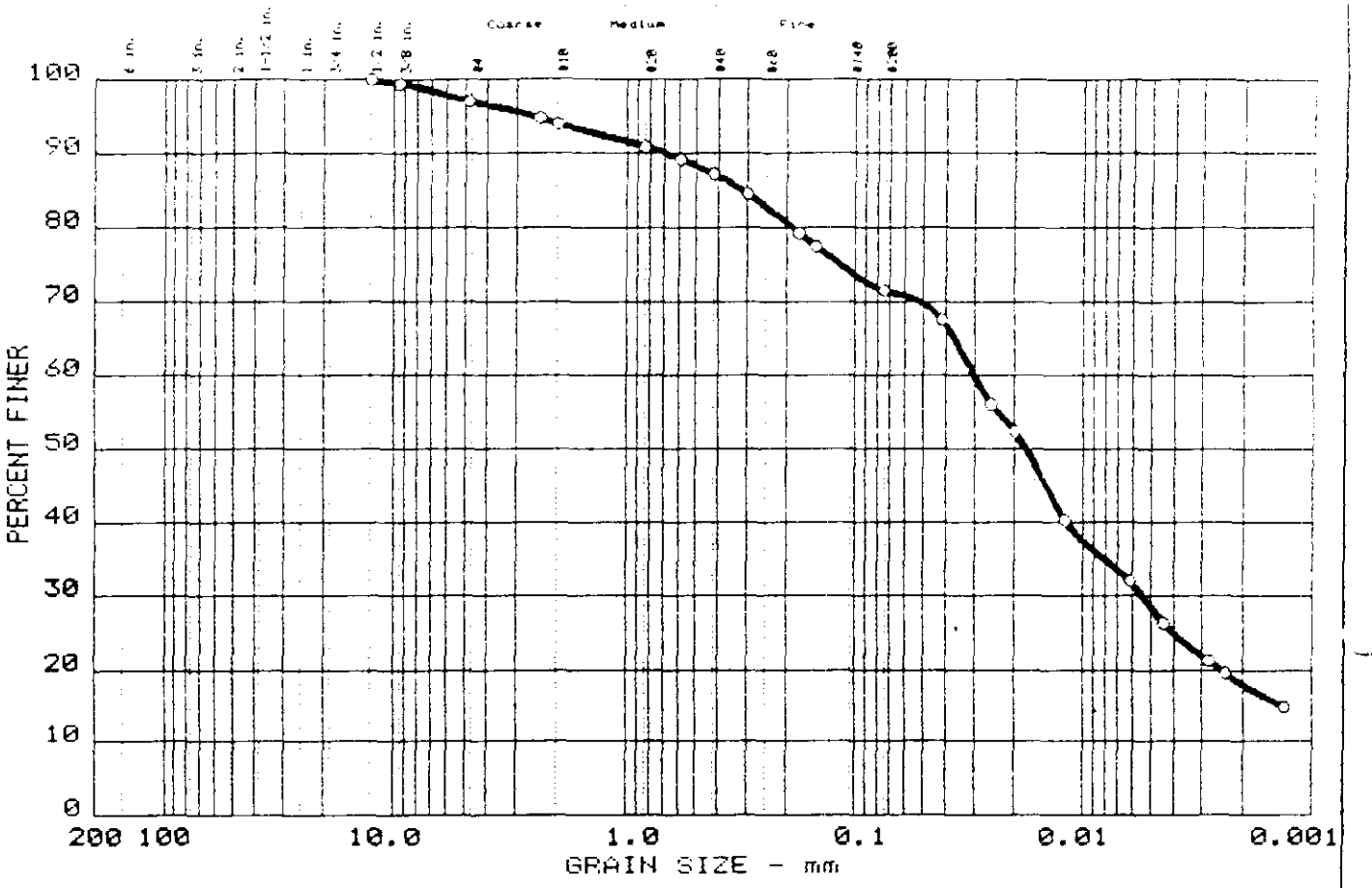
GRAIN SIZE DISTRIBUTION TEST REPORT



Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	3.0	25.5	43.2	28.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	51	21	0.31		0.02	0.005				

MATERIAL DESCRIPTION	USCS
○ Gray-Brown Elastic SILT, Some Clay and Sand, Trace Gravel	MH

Project No.: 10010201
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SU03-01

Date: 5/27/93

Remarks:
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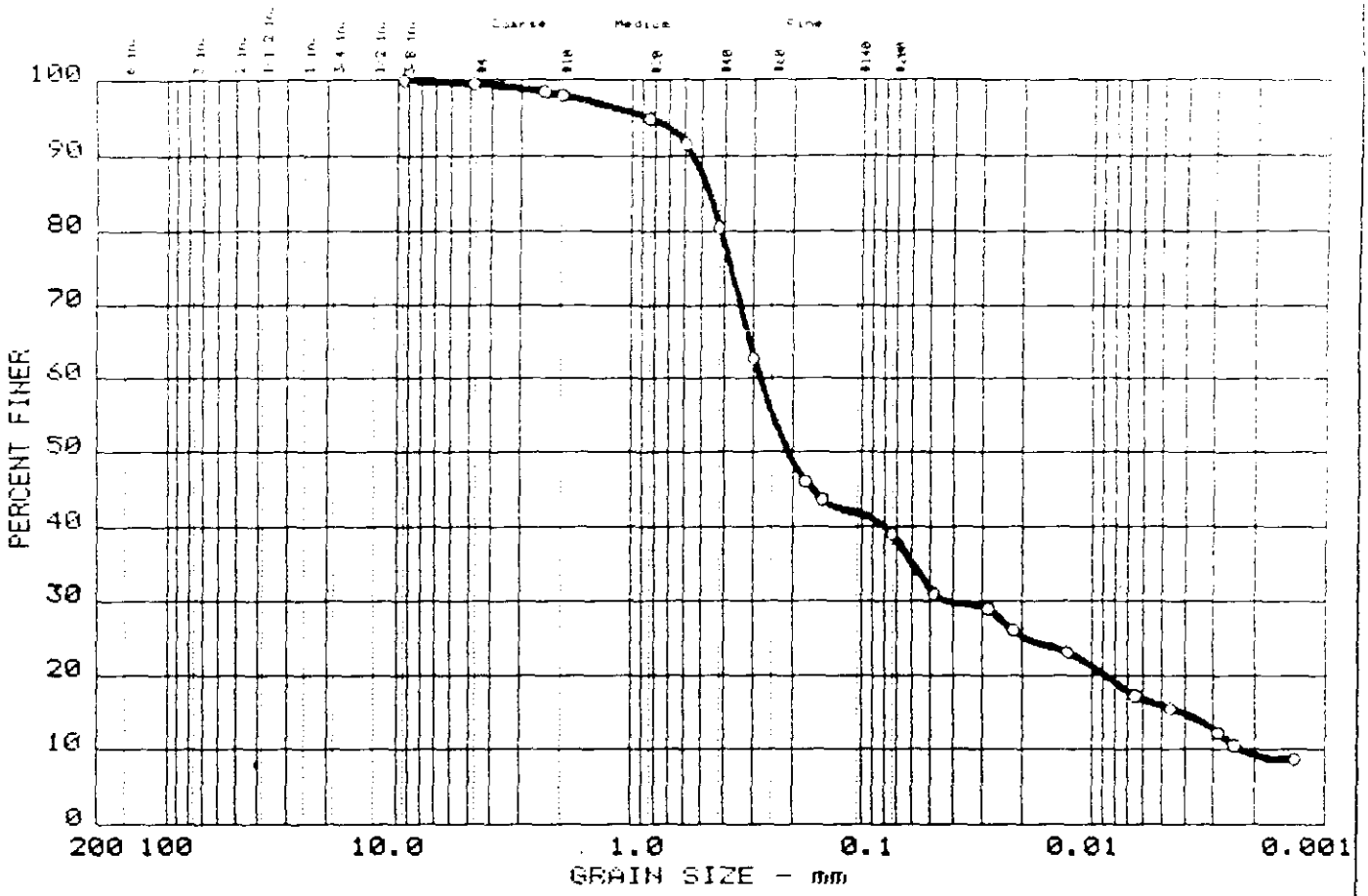

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	0.5	60.5	23.2	15.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	26	10	0.47	0.28	0.21	0.043	0.0041	0.0023	2.88	123.0

MATERIAL DESCRIPTION	USCS
○ Brown Clayey SAND, Trace Gravel	SC

Project No.: 10010201
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SU04-01

Date: 5/27/93

Remarks:
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CHECKED BY CLS
APPROVED BY DTL

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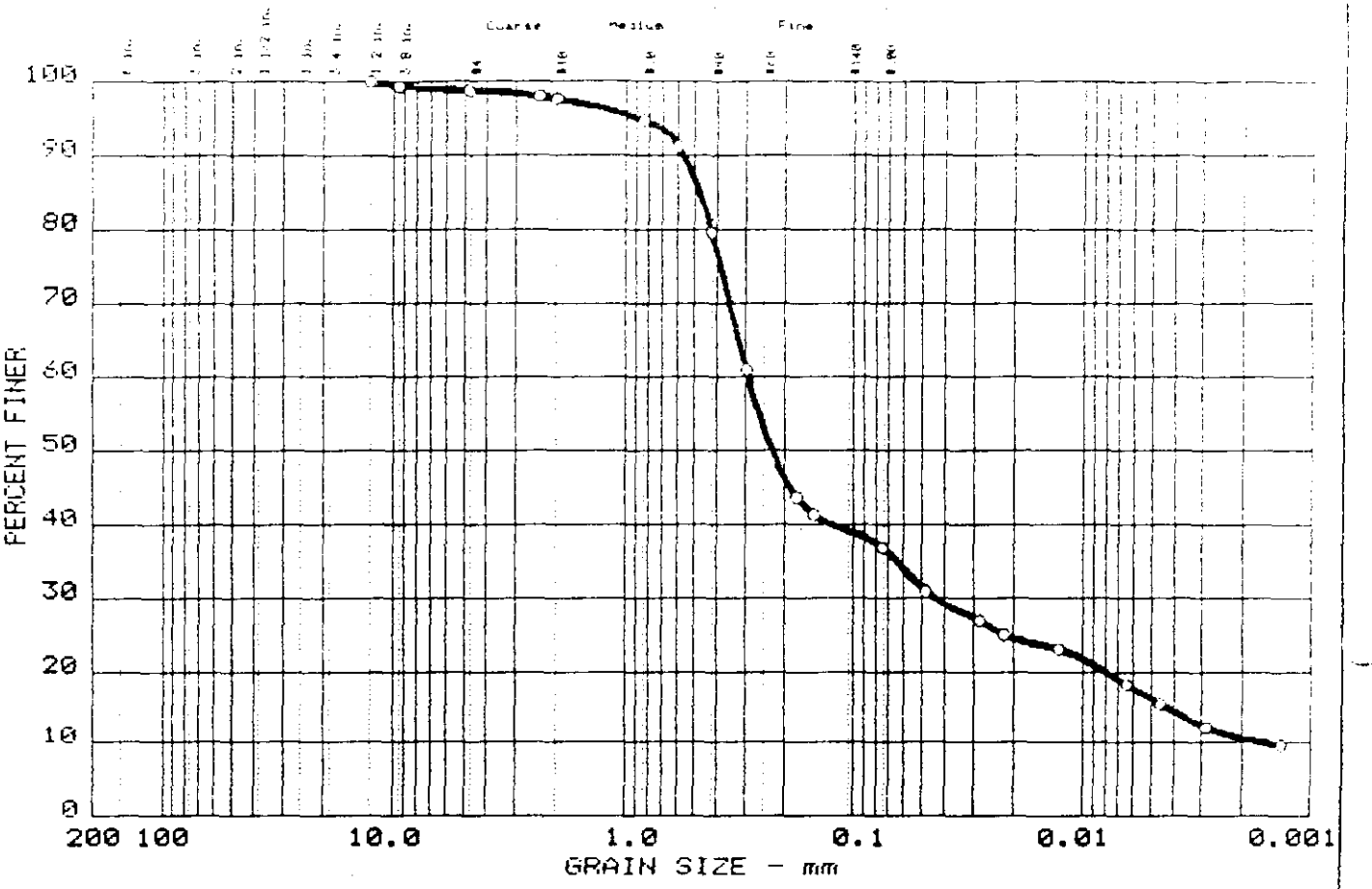

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	1.2	62.0	20.6	16.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	25	9	0.48	0.29	0.23	0.044	0.0043	0.0014	4.62	202.1

MATERIAL DESCRIPTION	USCS
○ Brown Clayey SAND, Trace Gravel	SC

Project No.: 10010201
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SU04-91

Date: 5/27/93

Remarks:
TESTED BY CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

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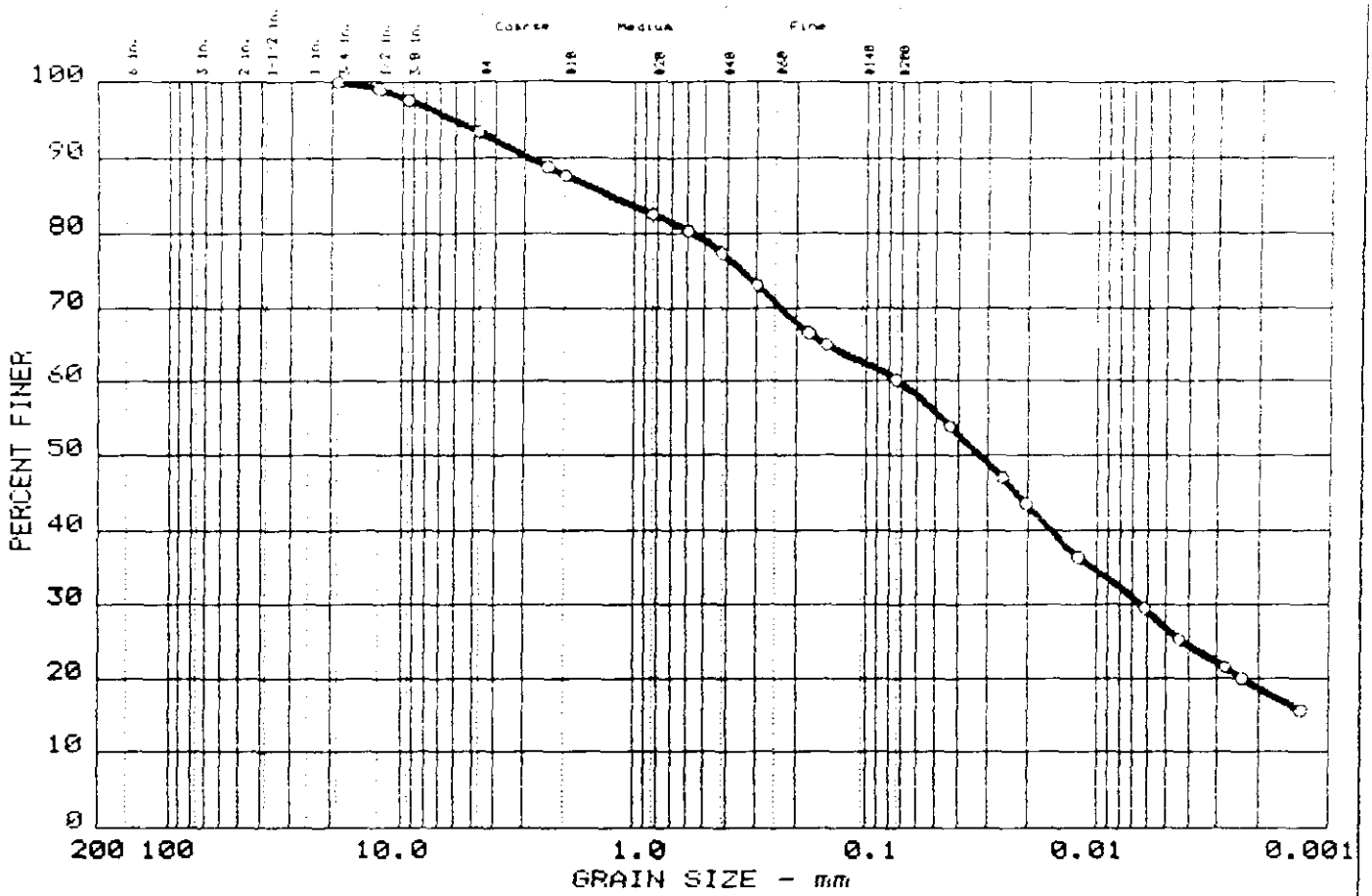
GRAIN SIZE DISTRIBUTION TEST REPORT



Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	6.6	33.1	33.5	26.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	29	12	1.26		0.03	0.006				

MATERIAL DESCRIPTION	USCS
○ Gray-Brown Lean CLAY, Some Sand, Little Gravel	CL

Project No.: 10010201
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SU05-01

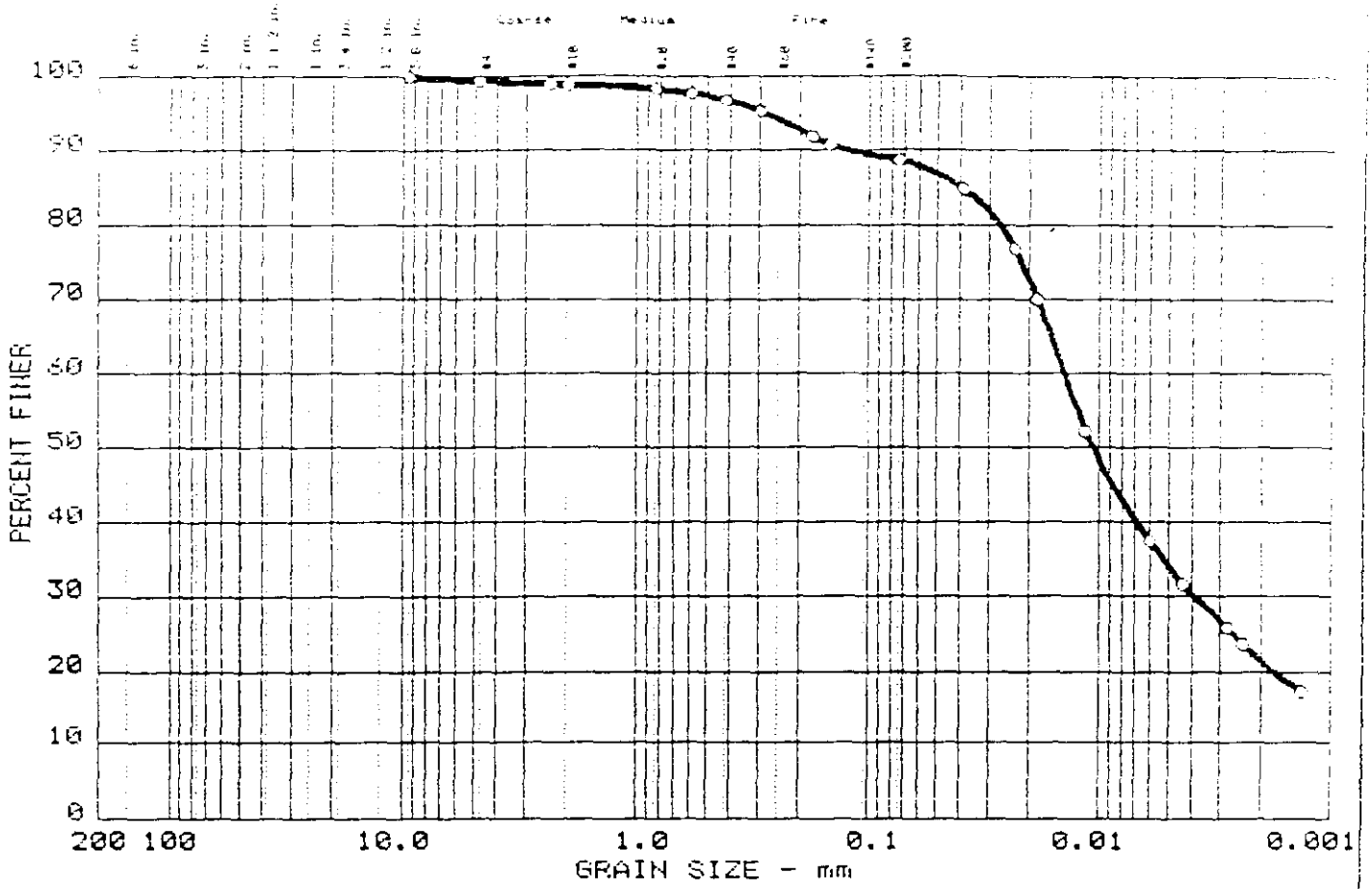
Date: 5/27/93

Remarks:
TESTED BY CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Sheet No.

GRAIN SIZE DISTRIBUTION TEST REPORT



Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	0.6	10.8	54.8	33.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	30	11			0.01	0.004				

MATERIAL DESCRIPTION	USCS
○ Brown Lean CLAY, Little Sand, Trace Gravel	CL

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSW2D-9

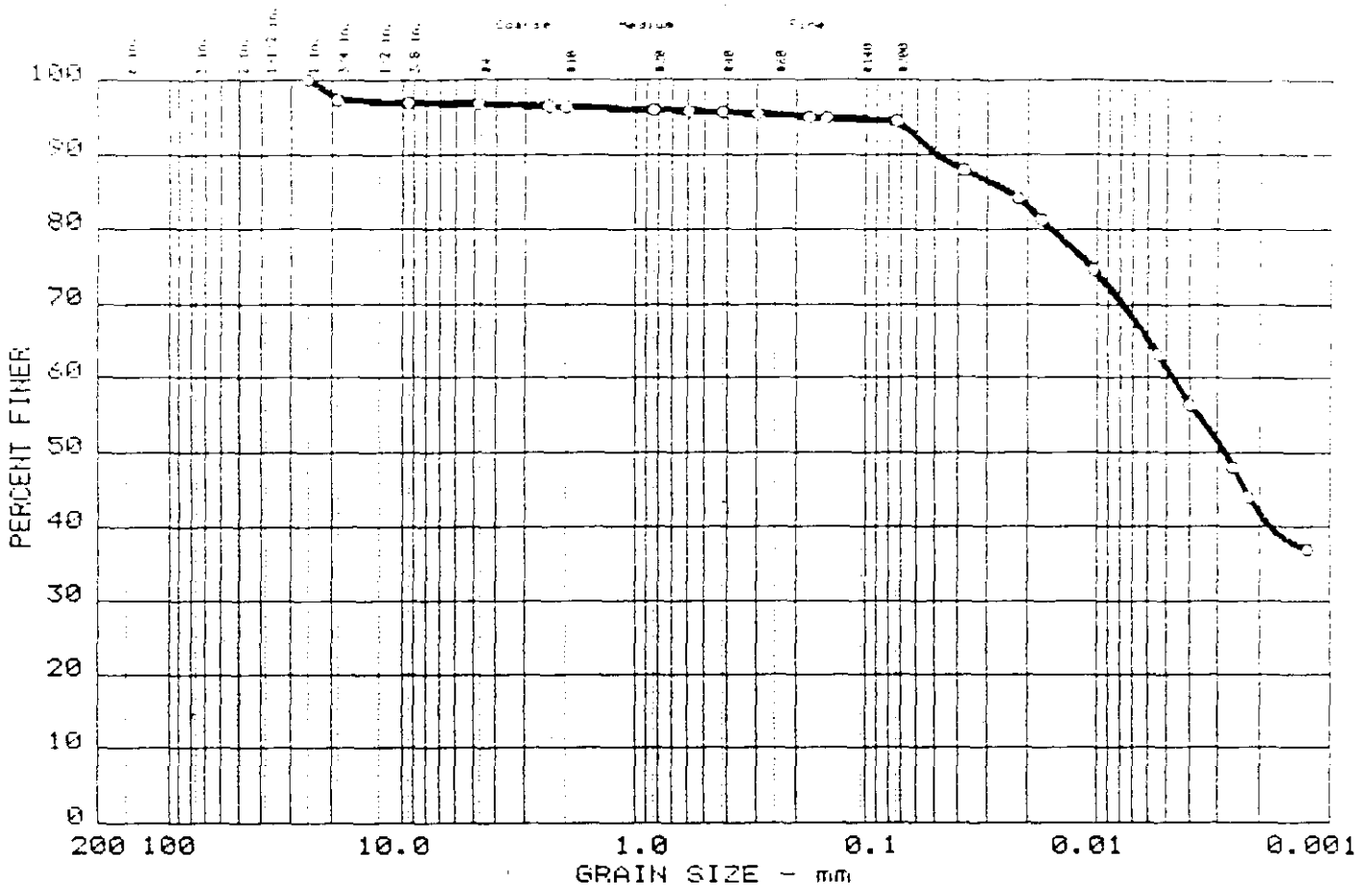
Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Sheet No.

GRAIN SIZE DISTRIBUTION TEST REPORT



Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	3.3	2.3	33.3	61.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	38	19			0.00					

MATERIAL DESCRIPTION	USCS
○ Brown Lean CLAY, Trace Gravel and Sand	CL

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSW2D-34

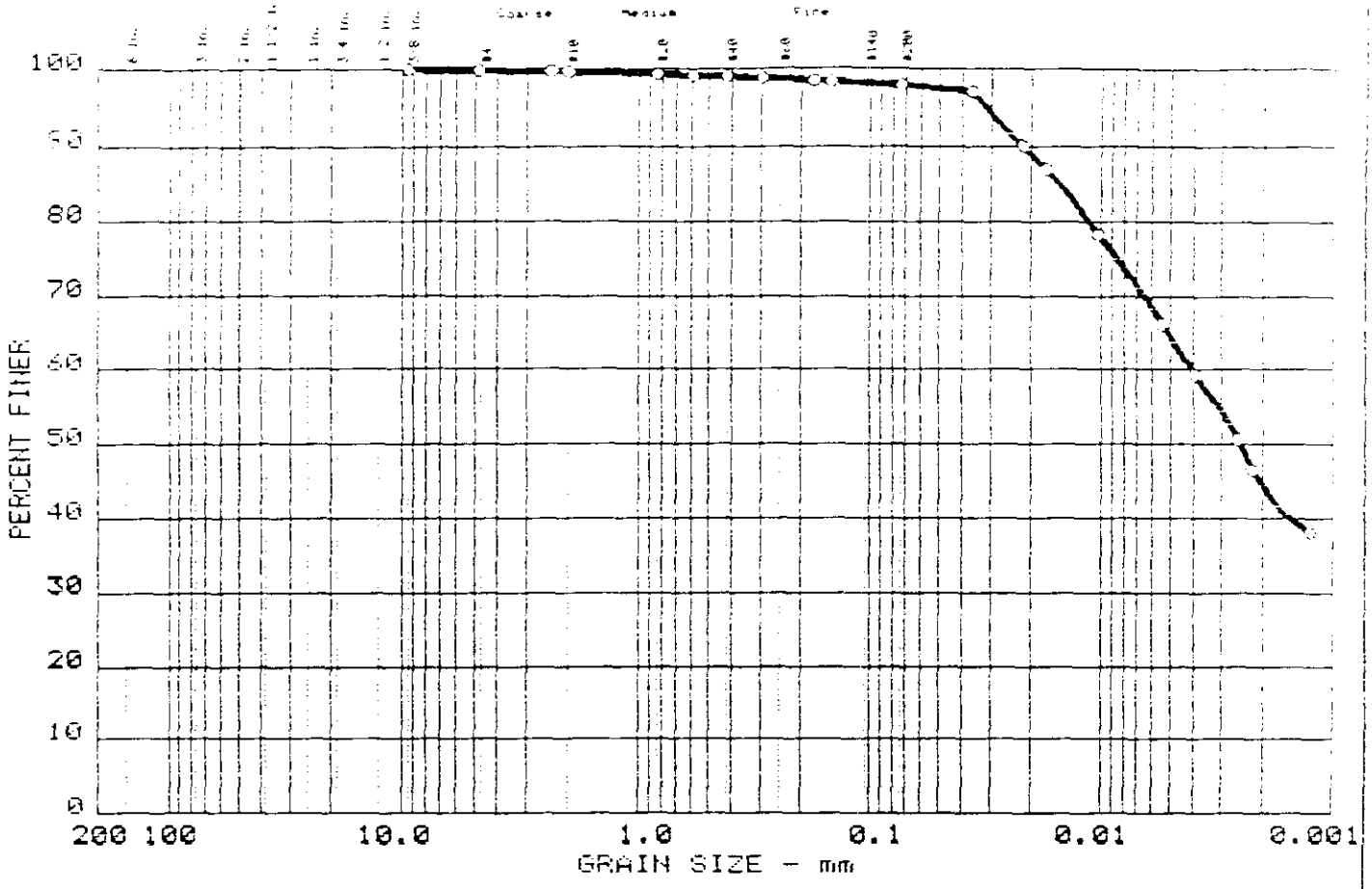
Date: 5/20/93

Remarks:
TESTED BY TWP
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Sheet No.

GRAIN SIZE DISTRIBUTION TEST REPORT



Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	0.1	2.0	33.4	64.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	38	19			0.00					

MATERIAL DESCRIPTION	USCS
○ Brown Lean CLAY, Trace Sand	CL

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSW2D-934

Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Sheet No.

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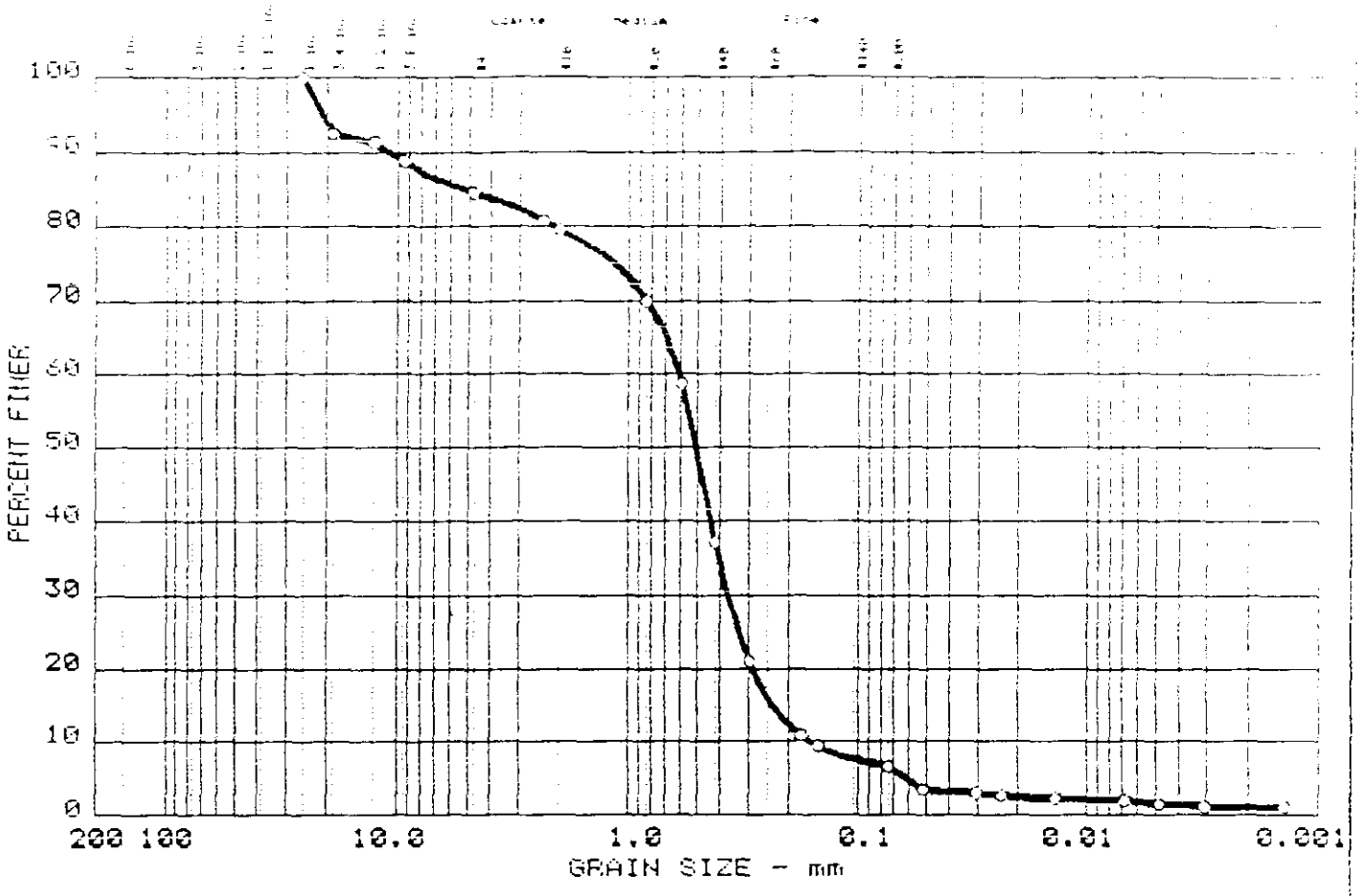

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	15.3	78.0	5.1	1.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	--	--	5.13	0.61	0.51	0.369	0.2355	0.1574	1.43	3.8

MATERIAL DESCRIPTION	USCS
○ Brown Fine-Coarse SAND, Some Gravel, Little Silt, Trace Clay	SP-SM

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSW2D-88

Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Sheet No.

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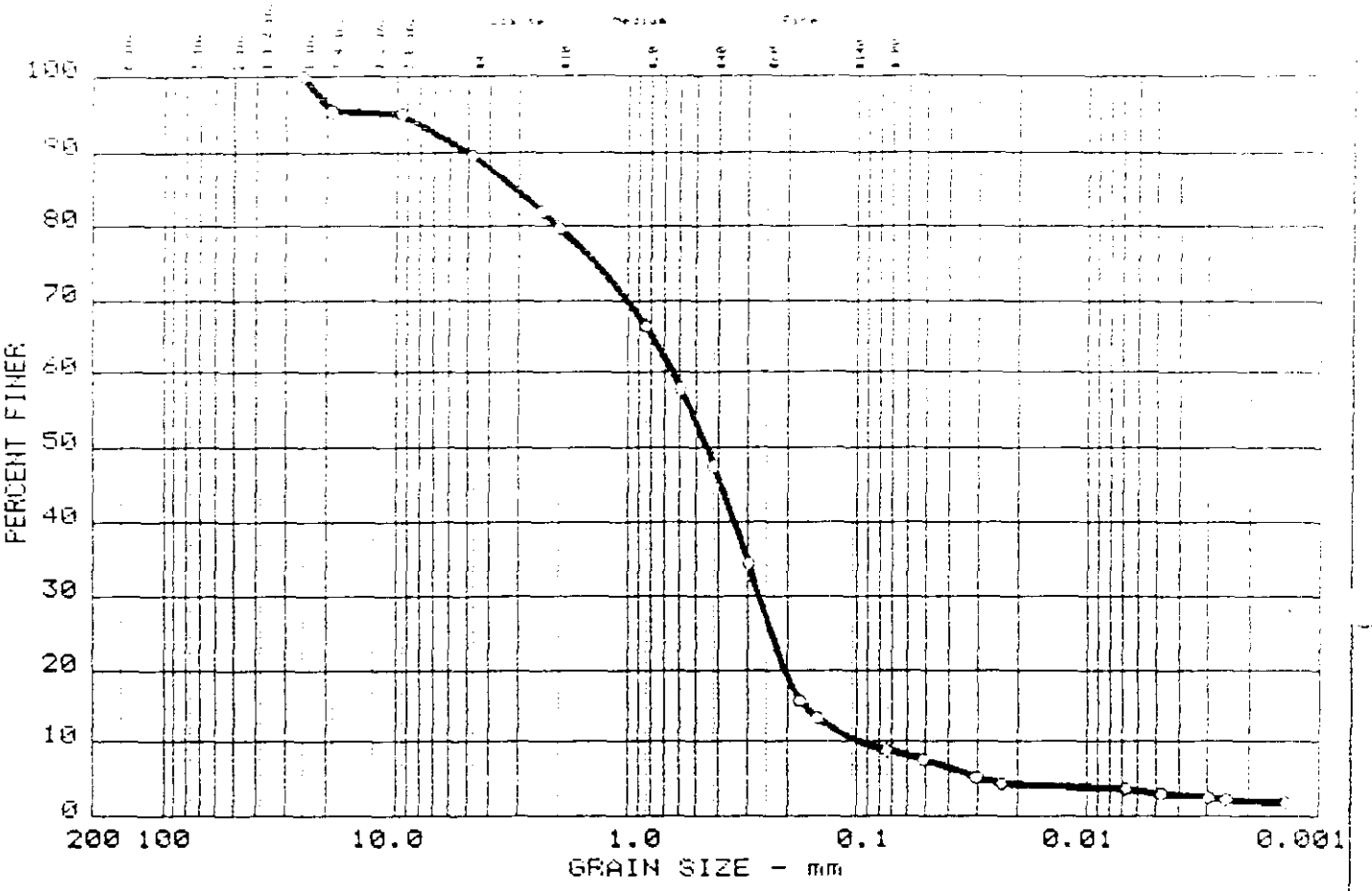

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	10.4	80.7	5.7	3.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	--	--	3.09	0.64	0.45	0.268	0.1690	0.0940	1.20	6.8

MATERIAL DESCRIPTION	USCS
○ Gray-Brown Fine-Coarse SAND, Little Gravel & Silt, Trace Clay	SW-SM

Project No.: 10010201/38140
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: Boring HD-SSW3SB-20

Date: 4/28/93

Remarks:
TESTED BY CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Sheet No.

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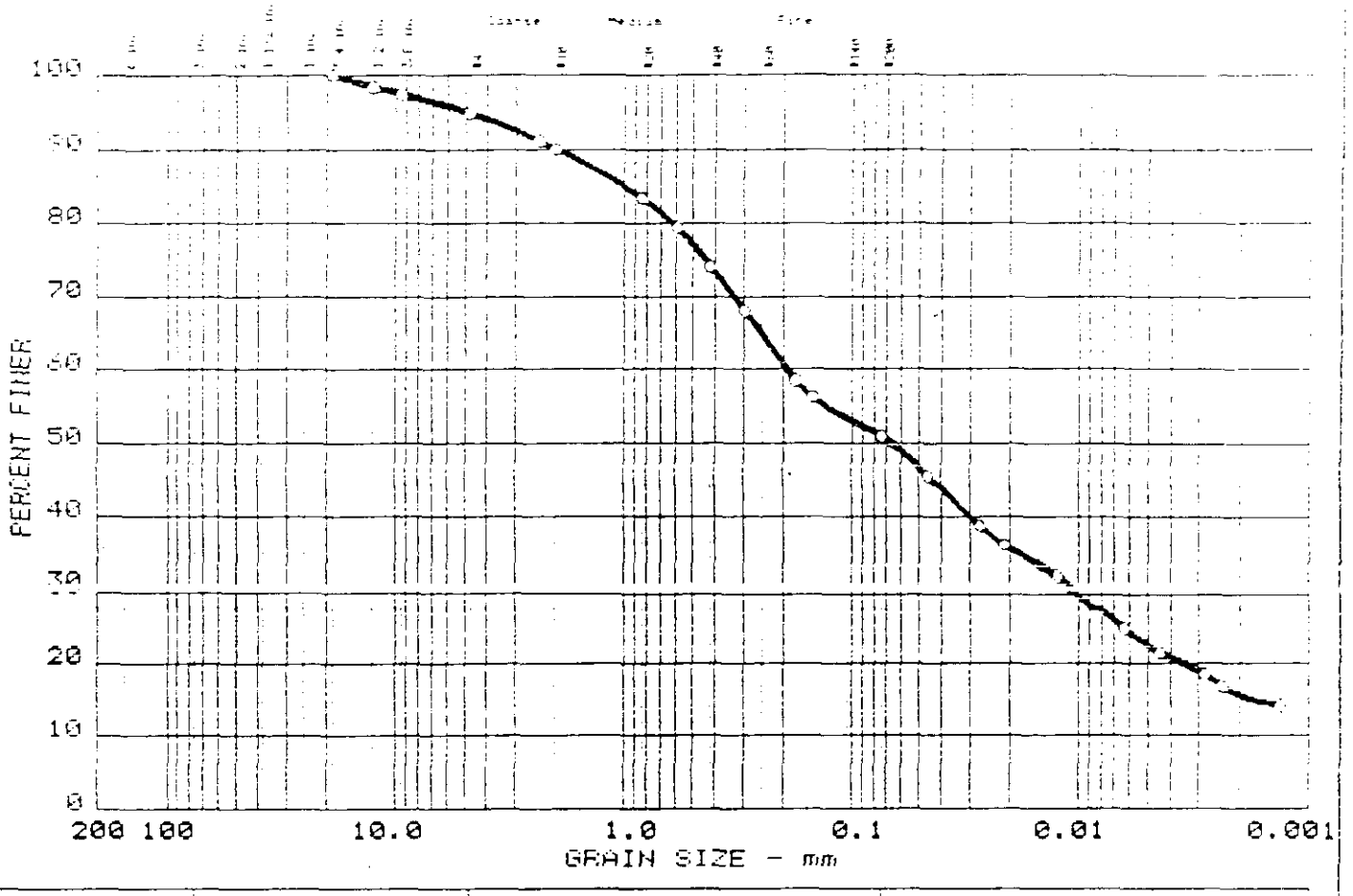

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	5.0	44.0	28.8	22.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	18	6	1.00	0.19	0.07	0.010	0.0017			

MATERIAL DESCRIPTION	USCS
○ Gray-Brown Sandy Silty CLAY, Trace Gravel	CL-ML

Project No.: 10010201/38140
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: Boring HD-SSW3D-40

Date: 4/28/93

Remarks:
TESTED BY CLS
CHECKED BY CLS
APPROVED BY DTL

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WARZYN, INC.

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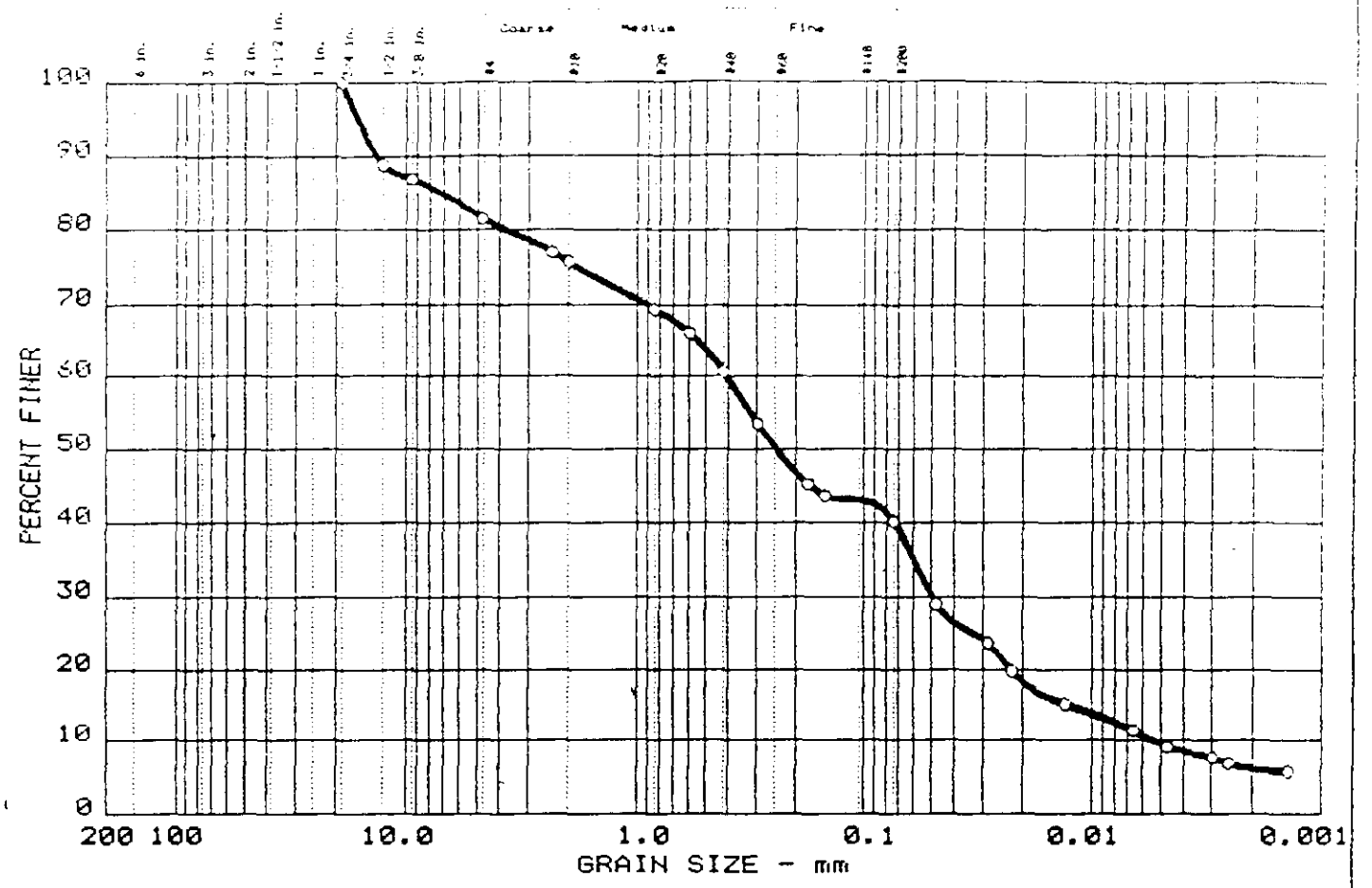

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	18.5	41.4	30.6	9.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	63	NP	7.08	0.40	0.25	0.050	0.0127	0.0054	1.16	75.0

MATERIAL DESCRIPTION	USCS
○ Brown Silty Fine-Coarse SAND, Some Gravel, Little Clay (Organic Content = 11.7%)	SM

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSW5S-9

Date: 5/26/93

Remarks:
TESTED BY TWP/CLS
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APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

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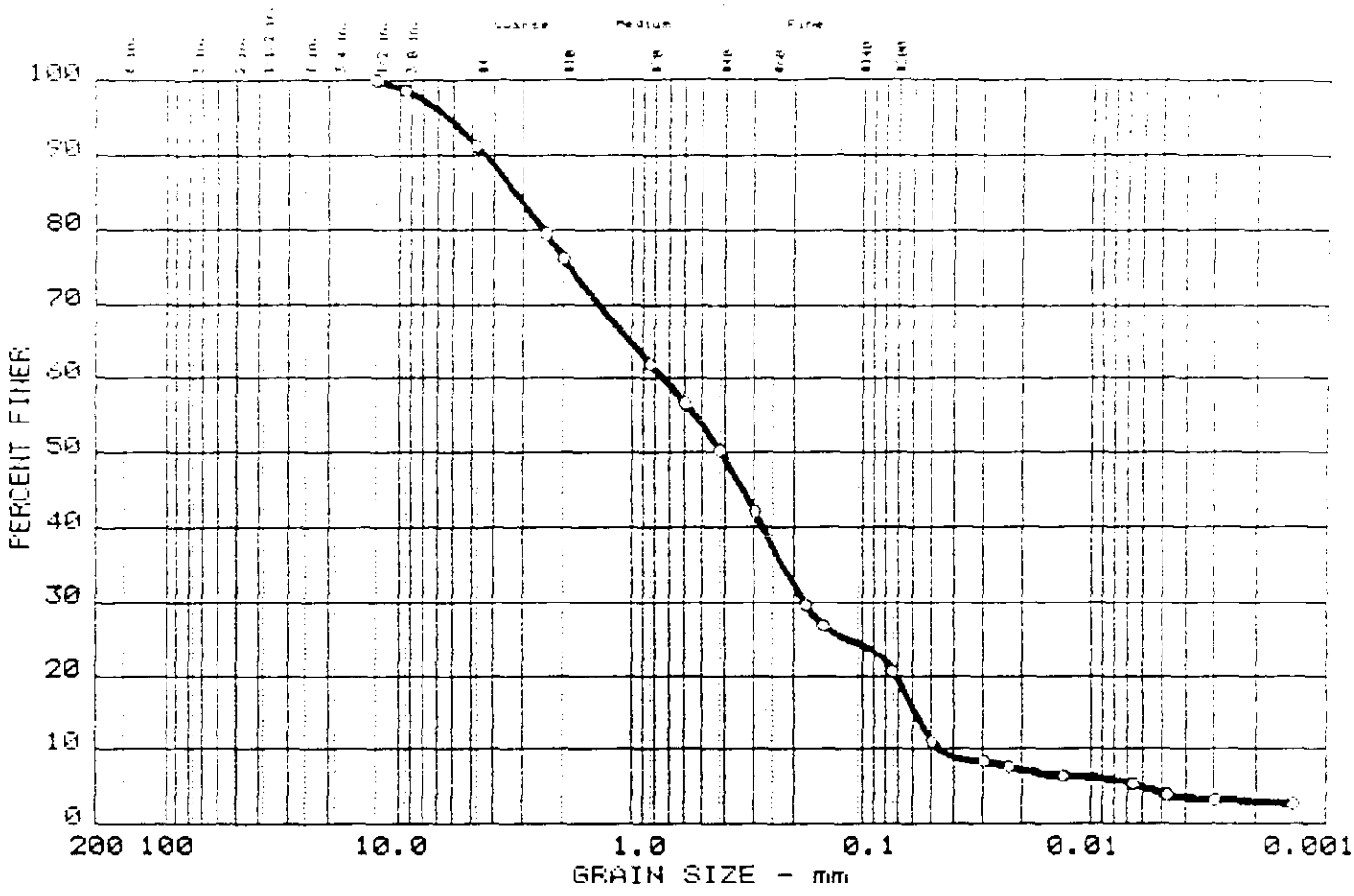

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	8.8	70.6	16.5	4.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	--	--	3.20	0.72	0.41	0.180	0.0589	0.0462	0.97	15.7

MATERIAL DESCRIPTION	USCS
○ Brown Fine-Coarse SAND, Some Silt, Little Gravel, Trace Clay	SM

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSW5S-14

Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
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APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

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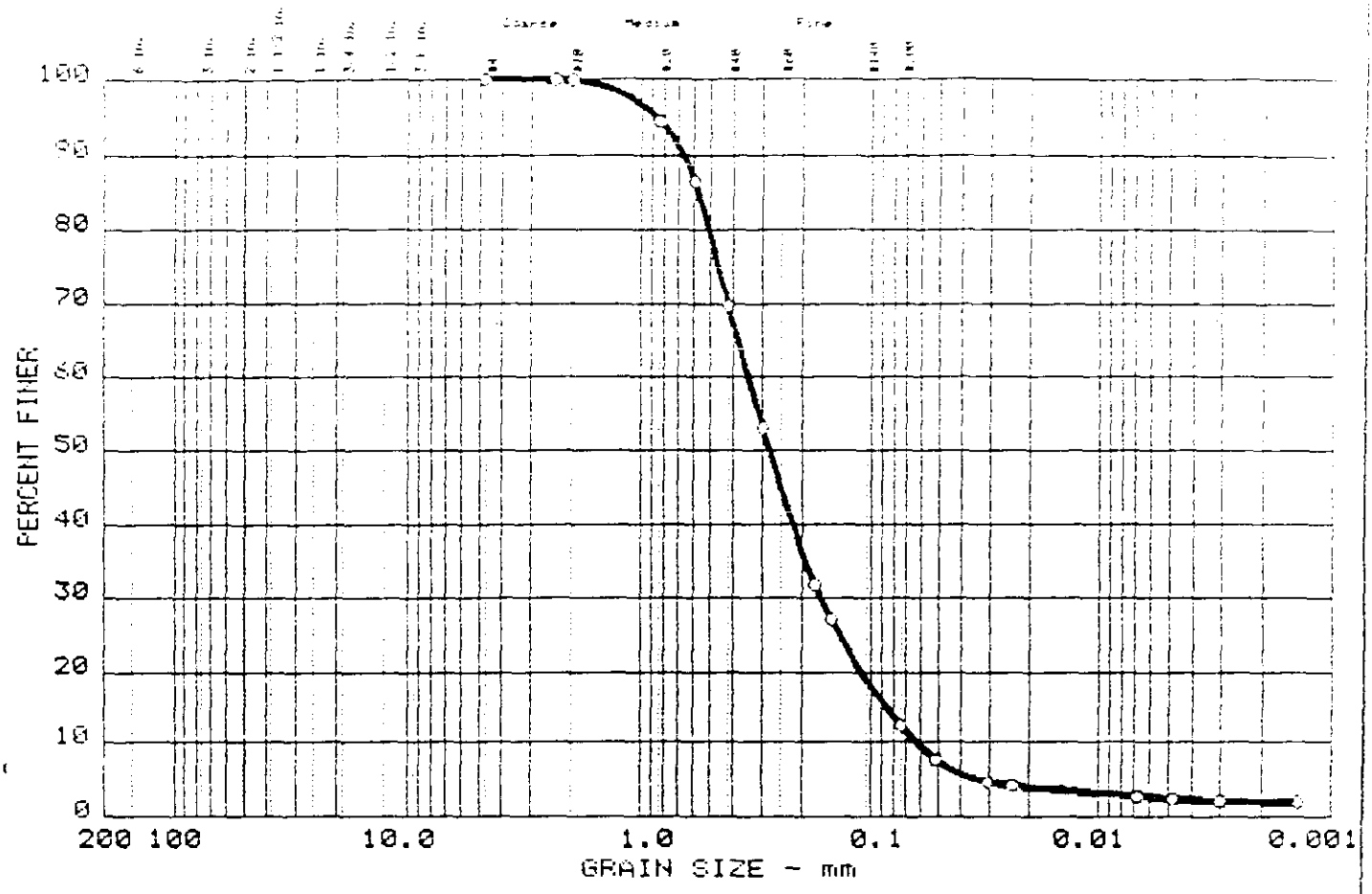

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	0.0	87.6	9.9	2.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	--	--	0.57	0.34	0.28	0.167	0.0854	0.0626	1.29	5.5

MATERIAL DESCRIPTION	USCS
○ Brown Fine-Medium SAND, Little Silt, Trace Clay	SM

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSW6S-14

Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
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APPROVED BY DTL

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WARZYN, INC.

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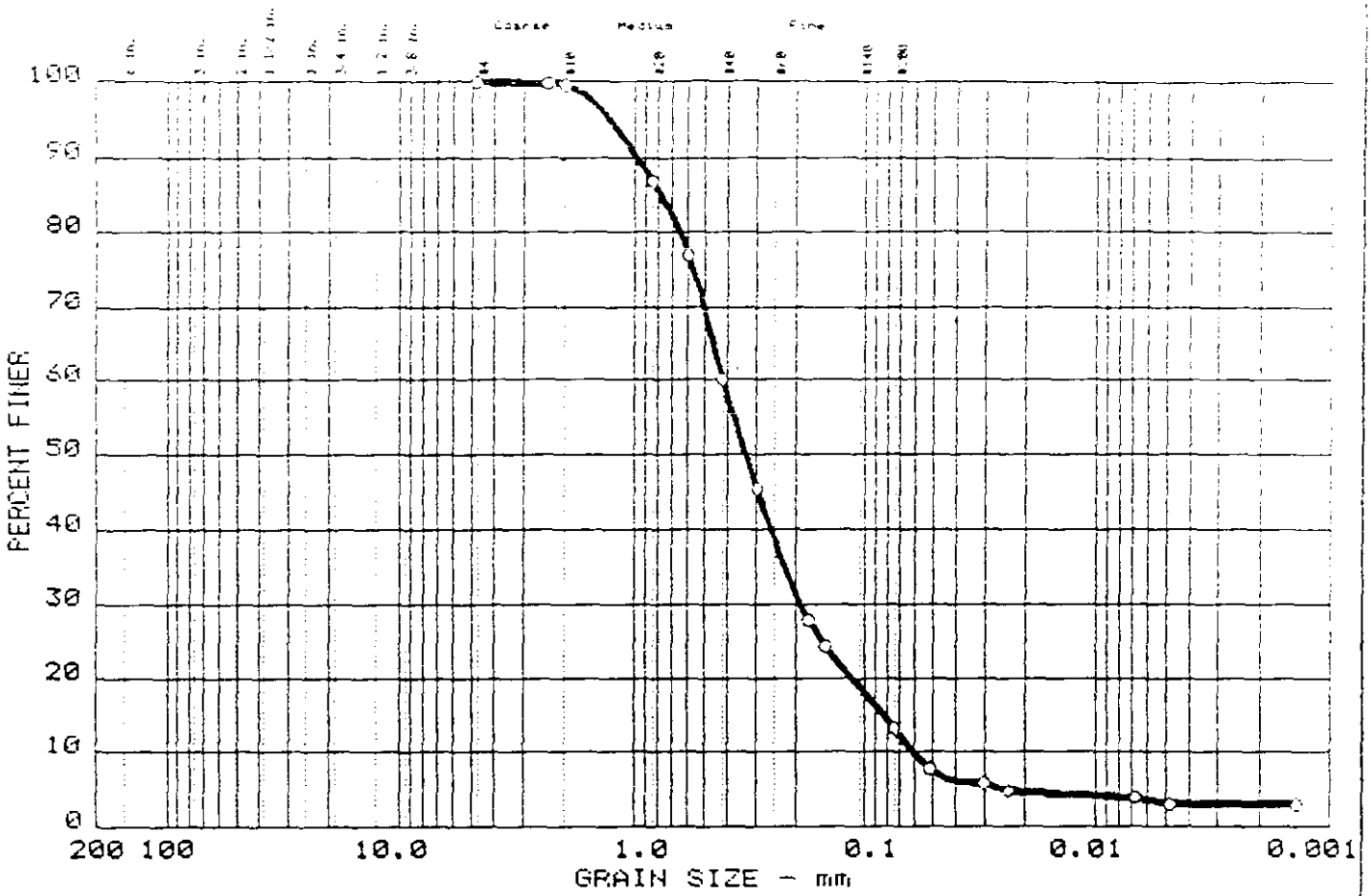

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	0.0	86.9	10.1	3.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	--	--	0.77	0.42	0.33	0.192	0.0827	0.0606	1.45	6.9

MATERIAL DESCRIPTION	USCS
○ Brown Fine-Medium SAND, Little Silt, Trace Clay	SM

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSW6S-914

Date: 5/21/93

Remarks:
TESTED BY TWP/CLS
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APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

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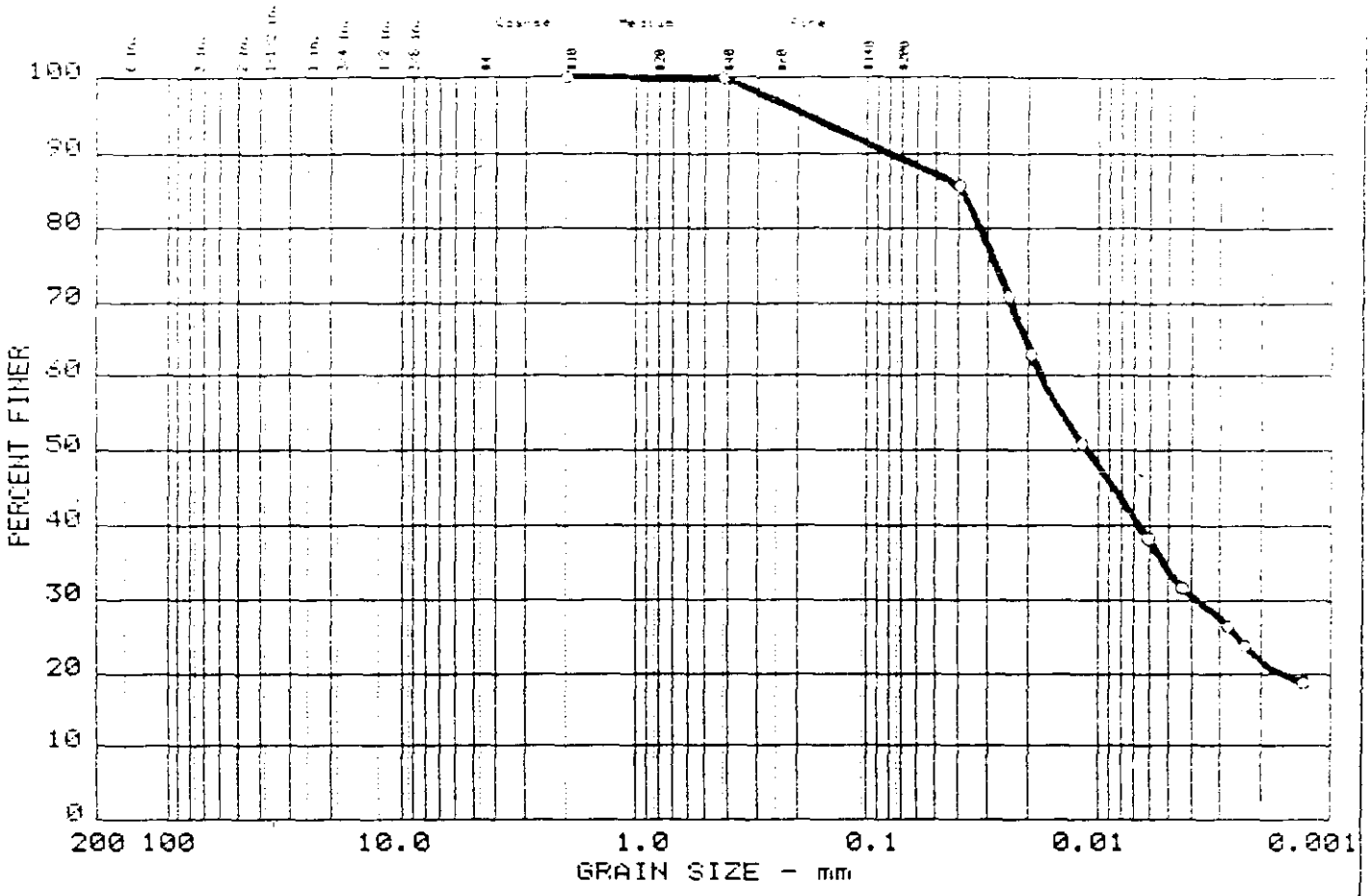

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	0.0	10.5	55.5	34.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	33	14			0.01	0.004				

MATERIAL DESCRIPTION	USCS
○ Gray-Brown Lean CLAY, Little Sand	CL

Project No.: 10010201/38140
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: Boring HD-SSW7D-4

Date: 4/28/93

Remarks:
TESTED BY CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Sheet No.

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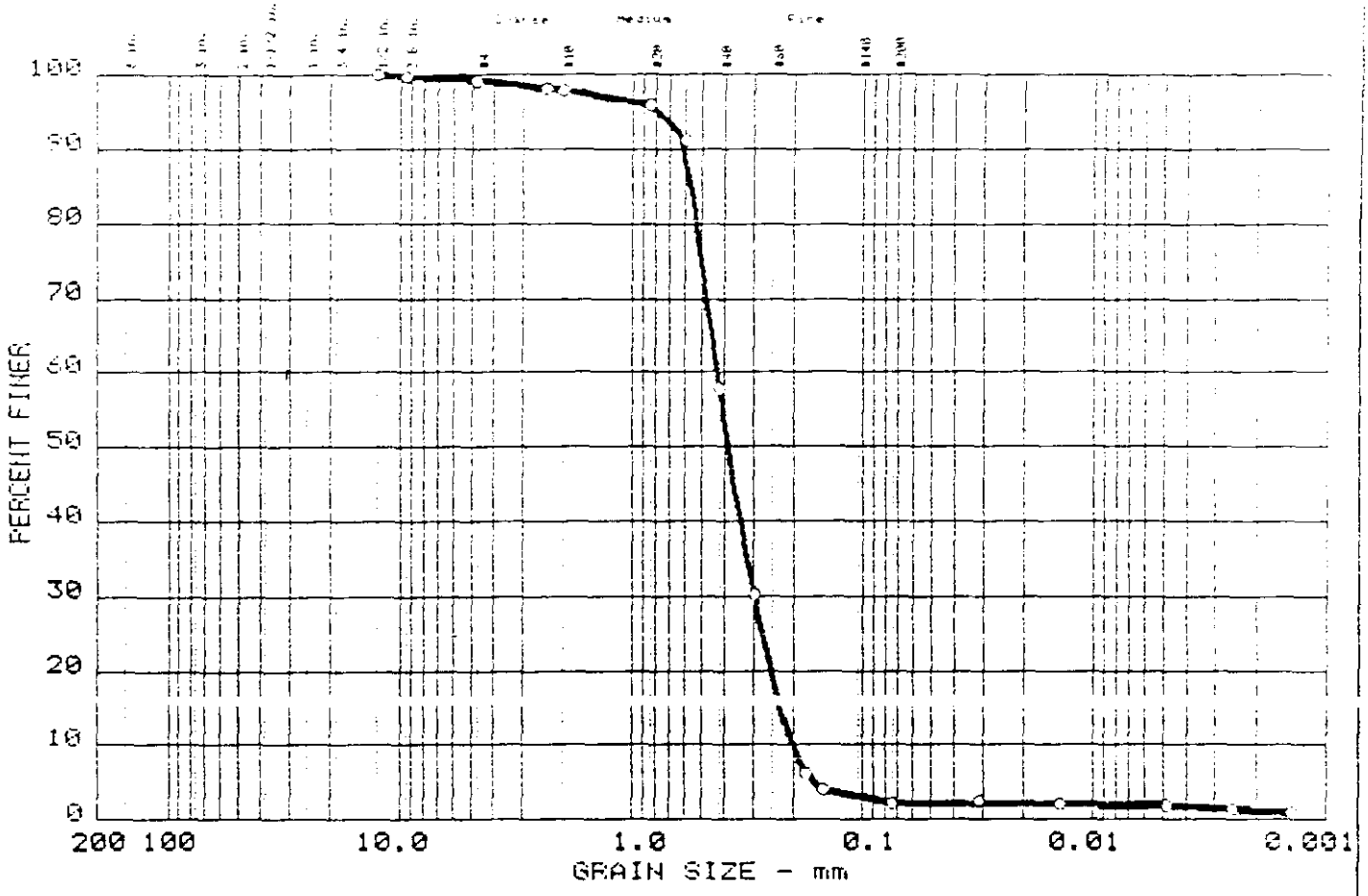


Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	0.9	96.9	0.3	1.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	--	--	0.56	0.43	0.39	0.296	0.2270	0.2018	1.01	2.1

MATERIAL DESCRIPTION	USCS
○ Gray-Brown Fine-Medium SAND, Trace Clay, Gravel and Silt	SP

Project No.: 10010201/38140
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: Boring HD-SSW7D-94

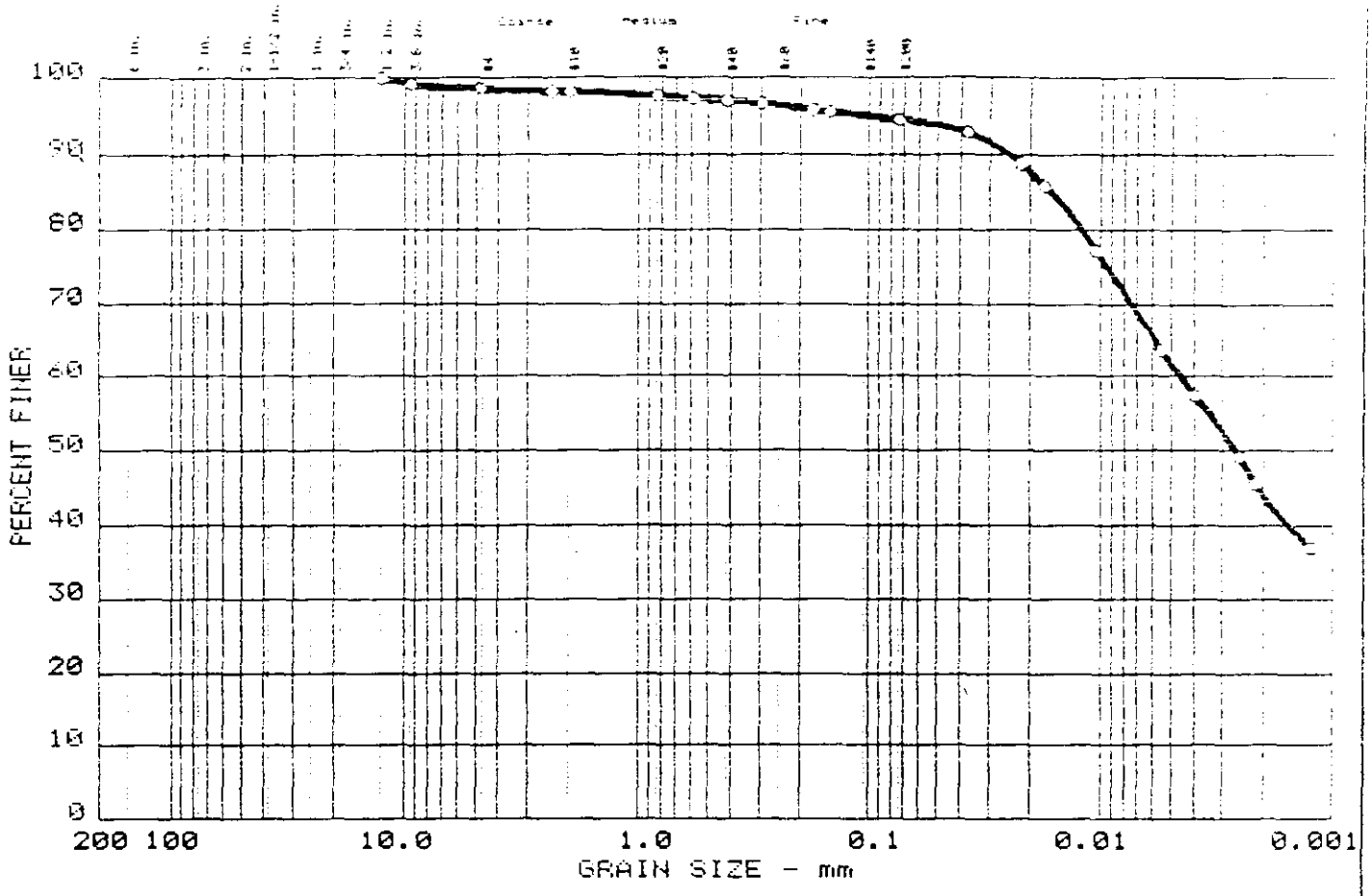
Date: 4/28/93

Remarks:
TESTED BY CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Sheet No.

GRAIN SIZE DISTRIBUTION TEST REPORT



Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	1.4	4.1	32.8	61.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	34	15			0.00					

MATERIAL DESCRIPTION	USCS
○ Gray-Brown Lean CLAY, Trace Sand and Gravel	CL

Project No.: 10010201/38140
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: Boring HD-SSW7D-29

Date: 4/28/93

Remarks:
TESTED BY CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Sheet No.

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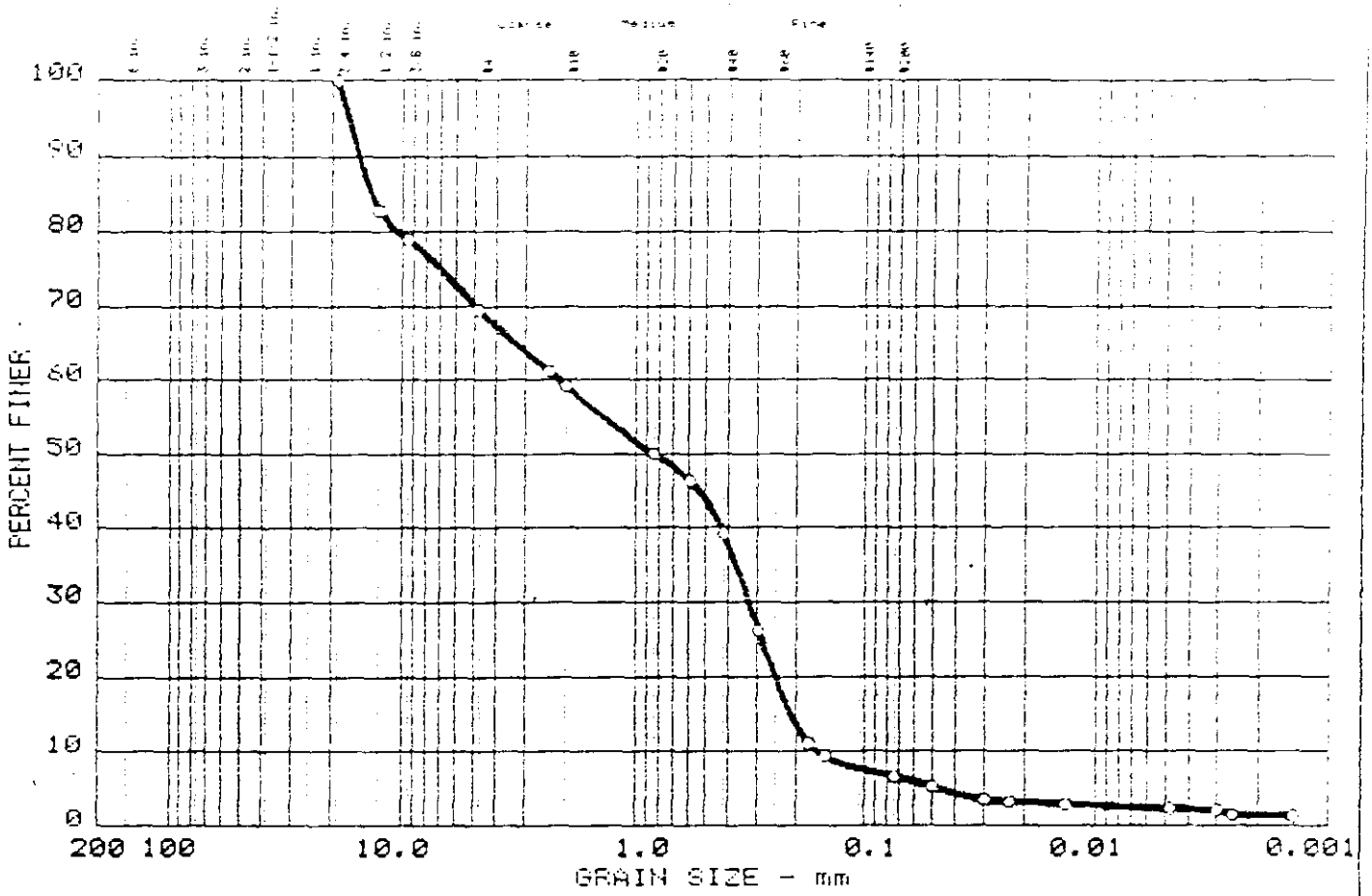

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	30.5	62.8	4.3	2.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	--	--	13.65	2.11	0.82	0.327	0.2131	0.1598	0.32	13.2

MATERIAL DESCRIPTION	USCS
○ Brown Fine-Coarse SAND, Some Gravel, Trace Silt and Clay	SP-SM

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSB1-27

Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

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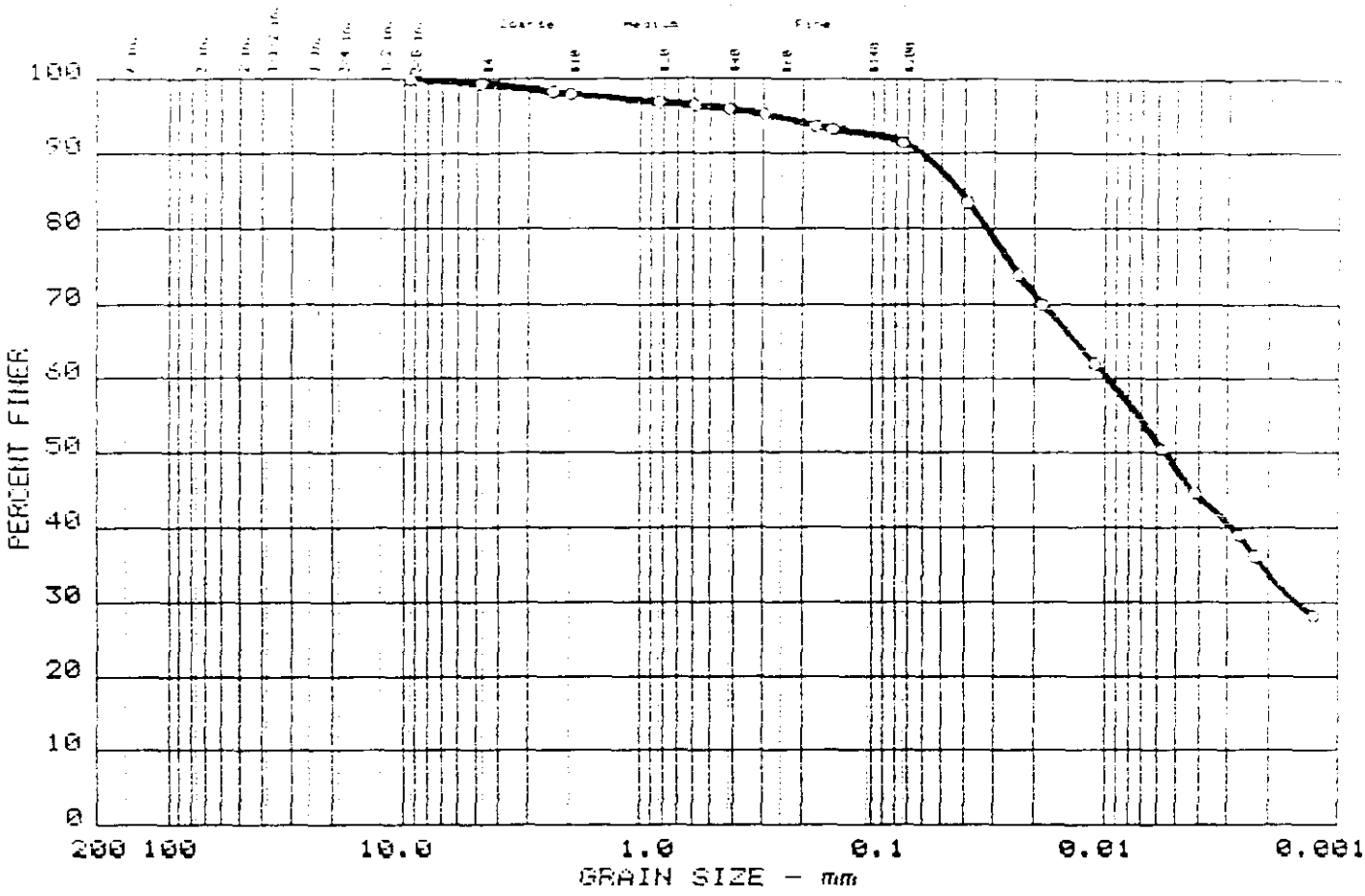

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	0.7	7.9	43.7	47.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	31	15			0.01	0.001				

MATERIAL DESCRIPTION	USCS
○ Brown Lean CLAY, Little Sand, Trace Gravel	CL

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSB1-33

Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

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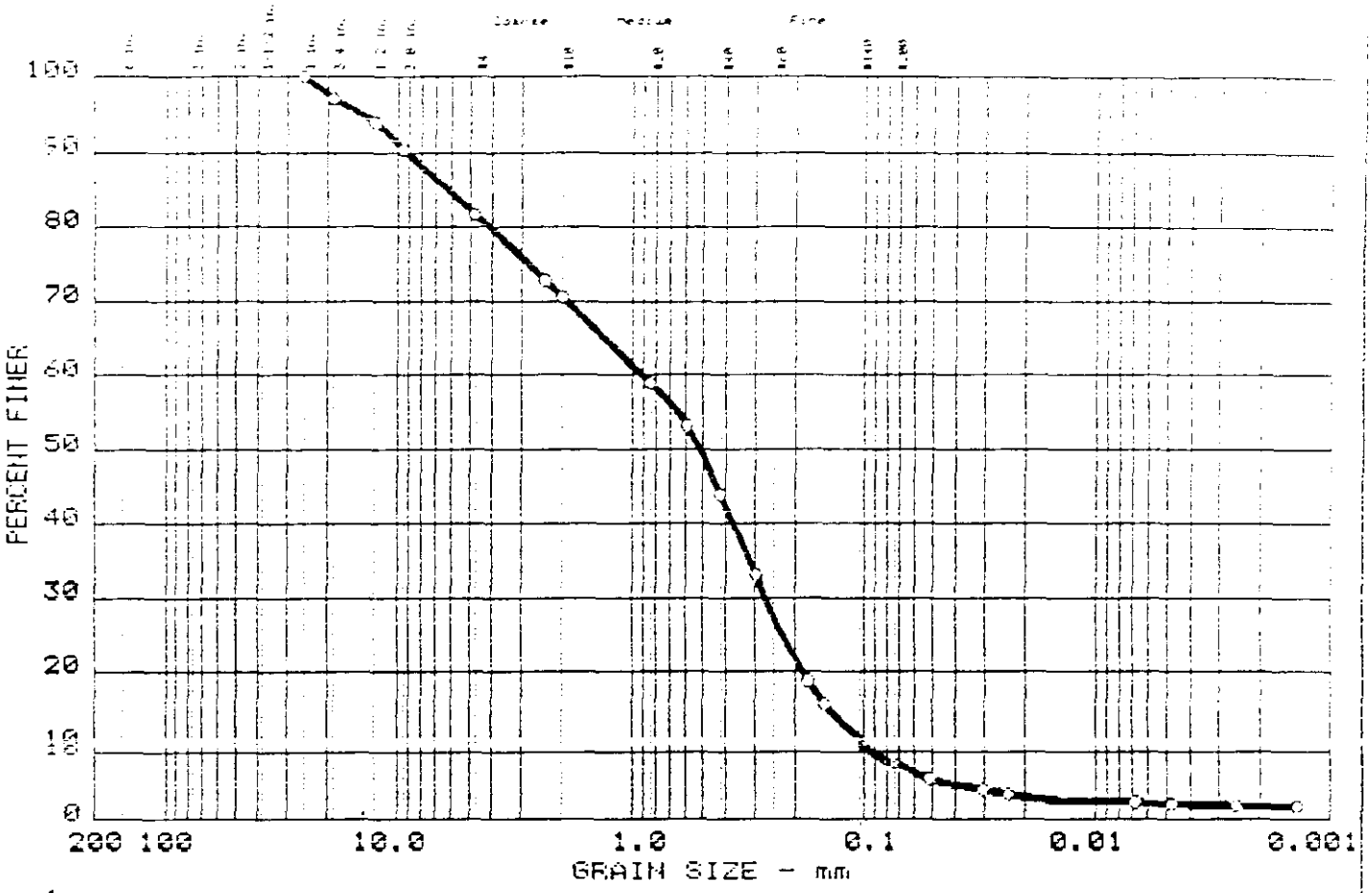

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	18.3	73.9	5.7	2.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	--	--	6.17	0.90	0.52	0.269	0.1429	0.0944	0.85	9.5

MATERIAL DESCRIPTION	USCS
○ Brown Fine-Coarse SAND, Some Gravel, Little Silt, Trace Clay	SP-SM

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSB2A-17

Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

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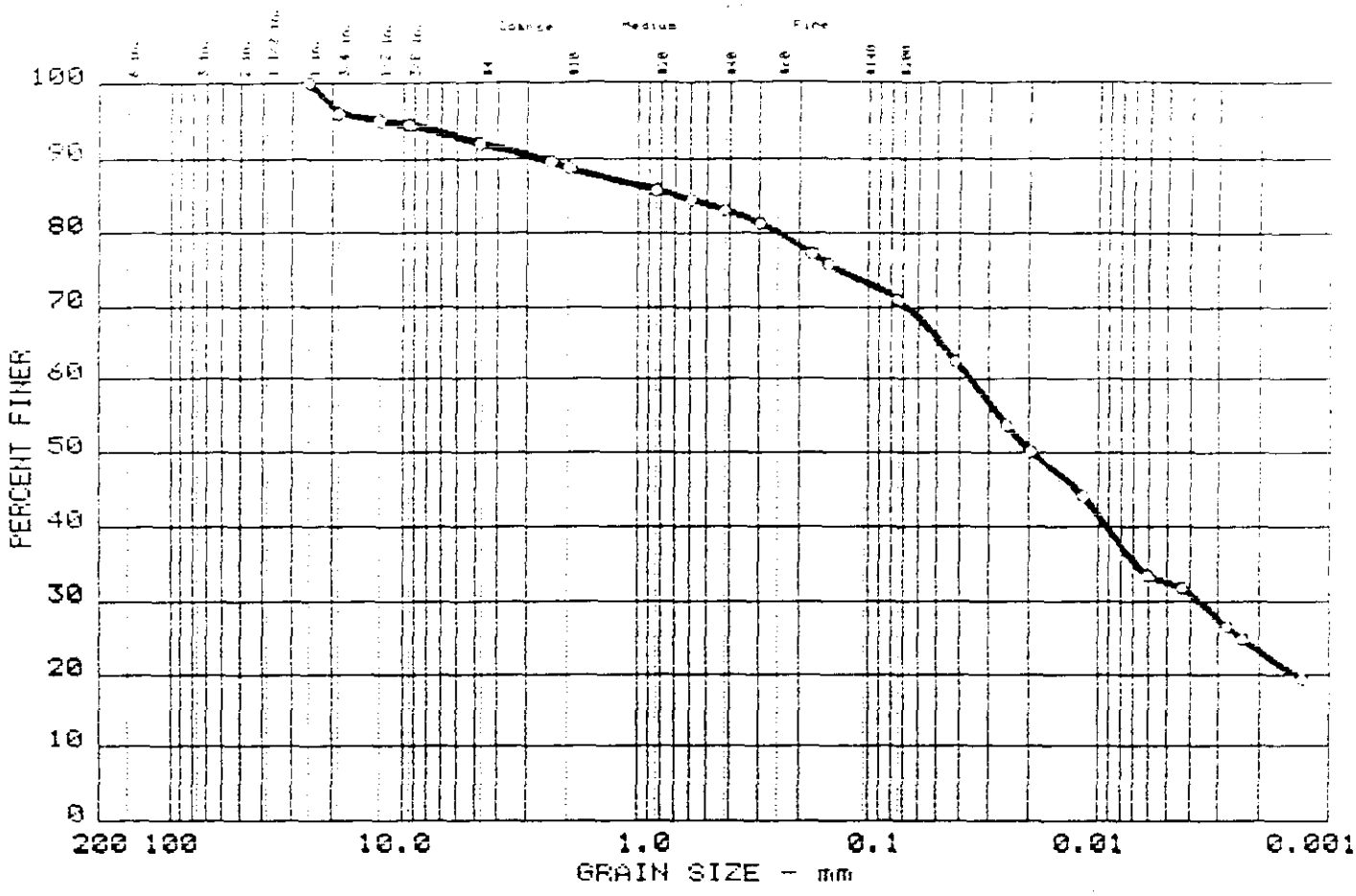

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	7.9	21.1	38.5	32.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	23	9	0.65		0.02	0.004				

MATERIAL DESCRIPTION	USCS
○ Brown Lean CLAY, Some Sand, Little Gravel	CL

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSB2-36

Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

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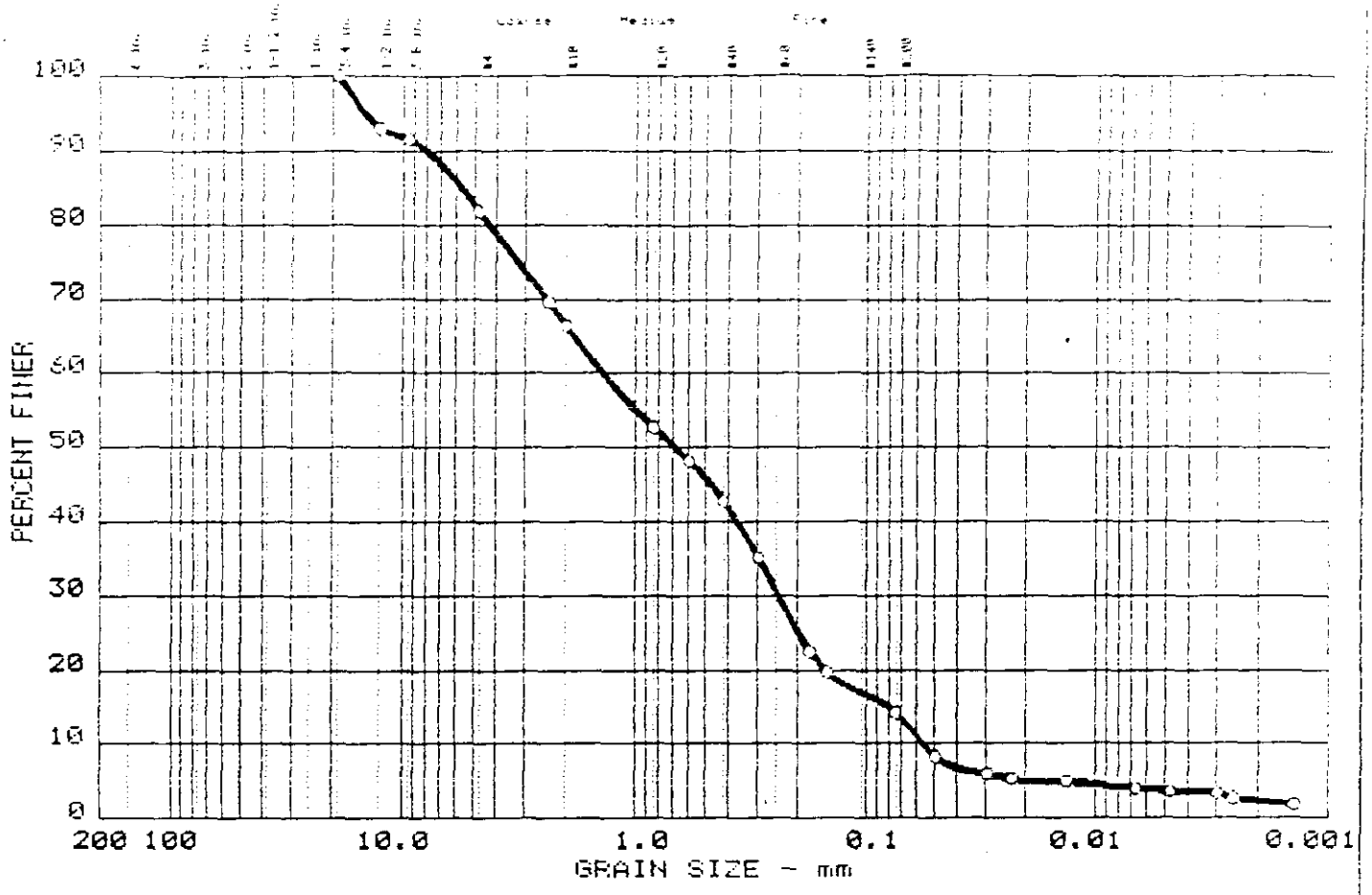

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	18.2	67.6	10.5	3.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	--	--	5.69	1.38	0.68	0.243	0.0794	0.0562	0.76	24.5

MATERIAL DESCRIPTION	USCS
○ Brown Fine-Coarse SAND, Some Gravel, Little Silt, Trace Clay	SM

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSB3-24

Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

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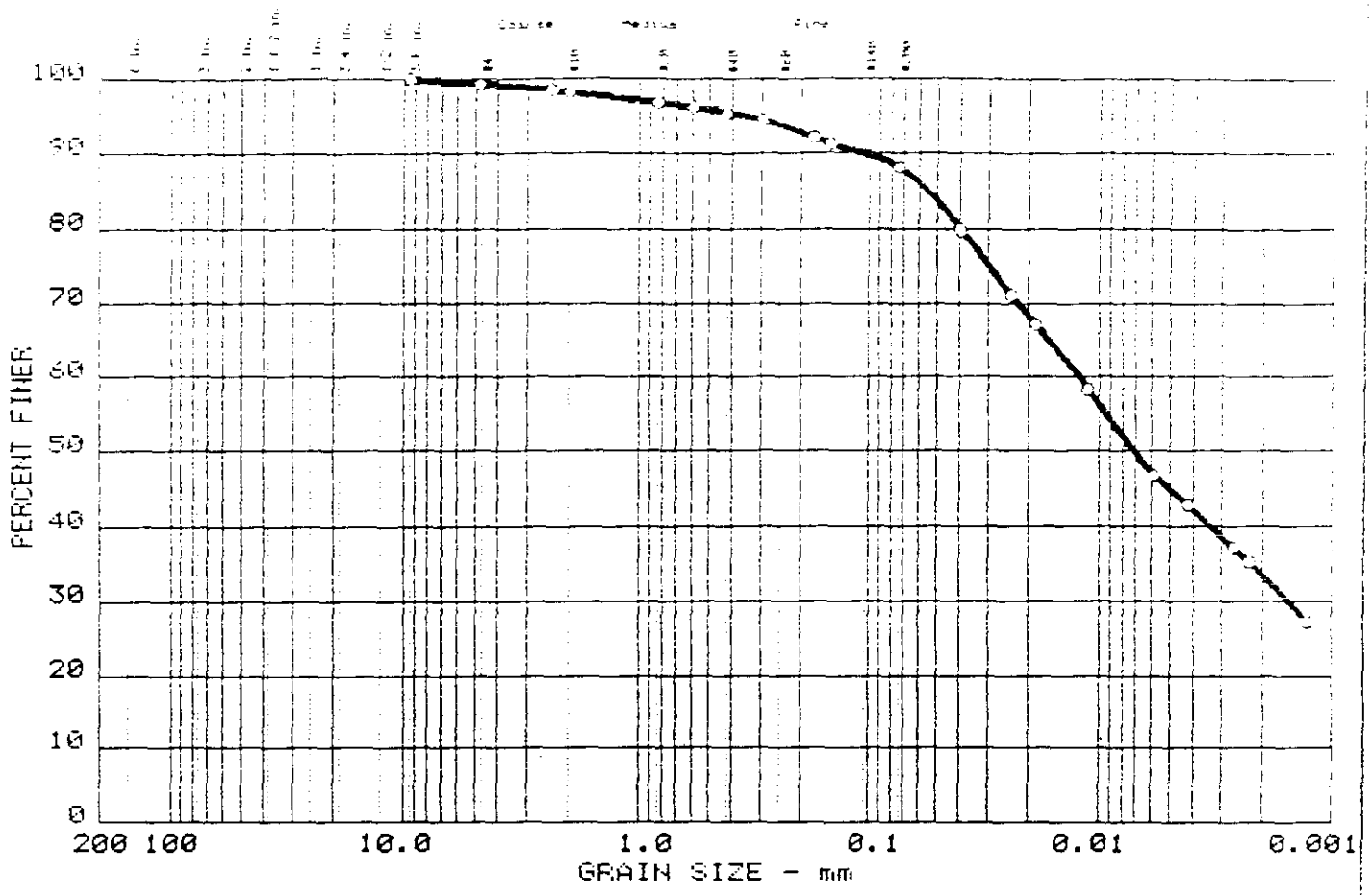

Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	0.7	11.2	43.3	44.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	27	12			0.01	0.002				

MATERIAL DESCRIPTION	USCS
○ Brown Lean CLAY, Little Sand, Trace Gravel	CL

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSB3-48

Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

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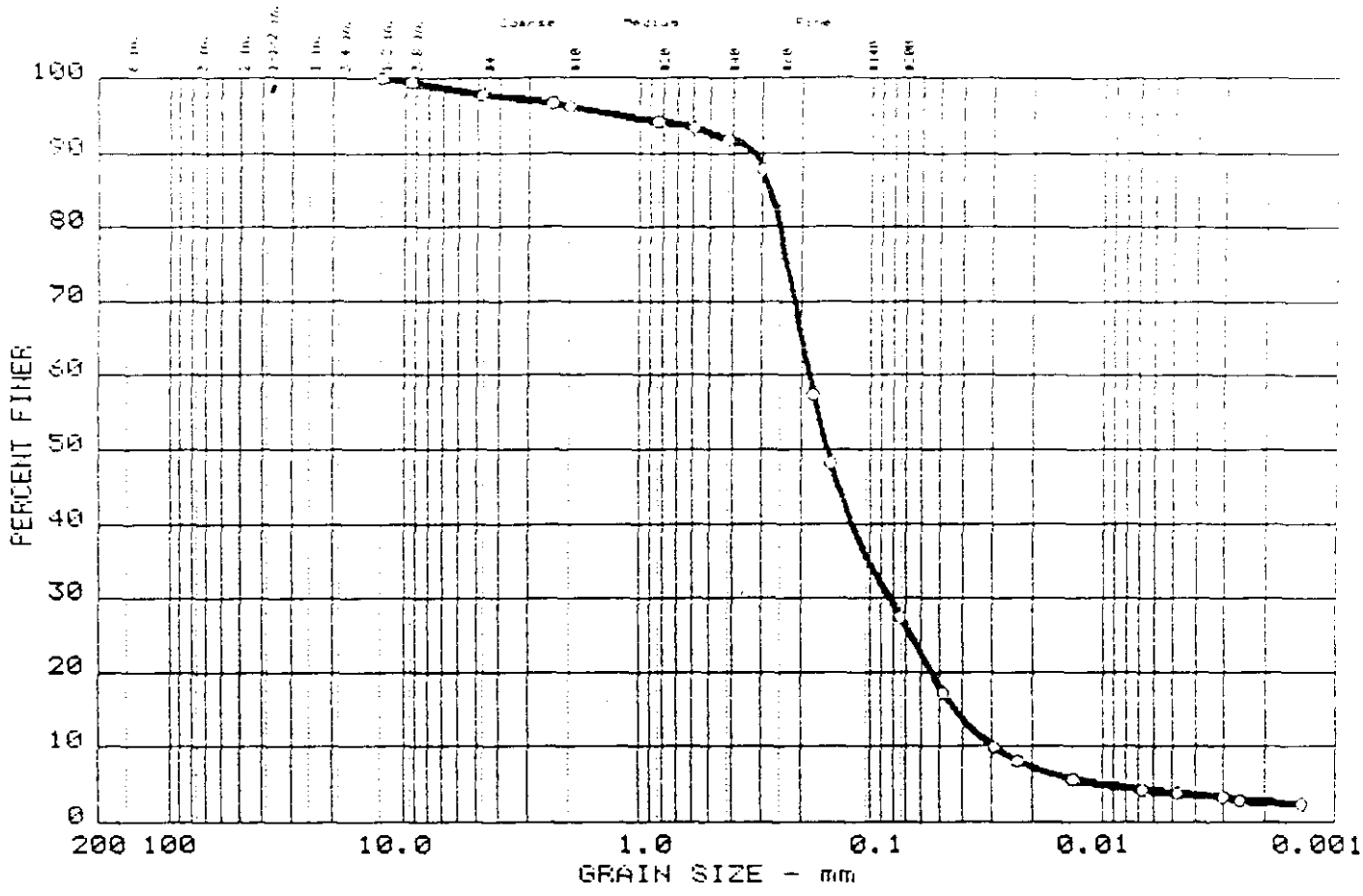


Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	2.3	70.4	23.5	3.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	--	--	0.28	0.18	0.15	0.083	0.0426	0.0291	1.29	6.3

MATERIAL DESCRIPTION	USCS
○ Brown Fine SAND, Some Silt, Trace Clay and Gravel	SM

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSB4-39

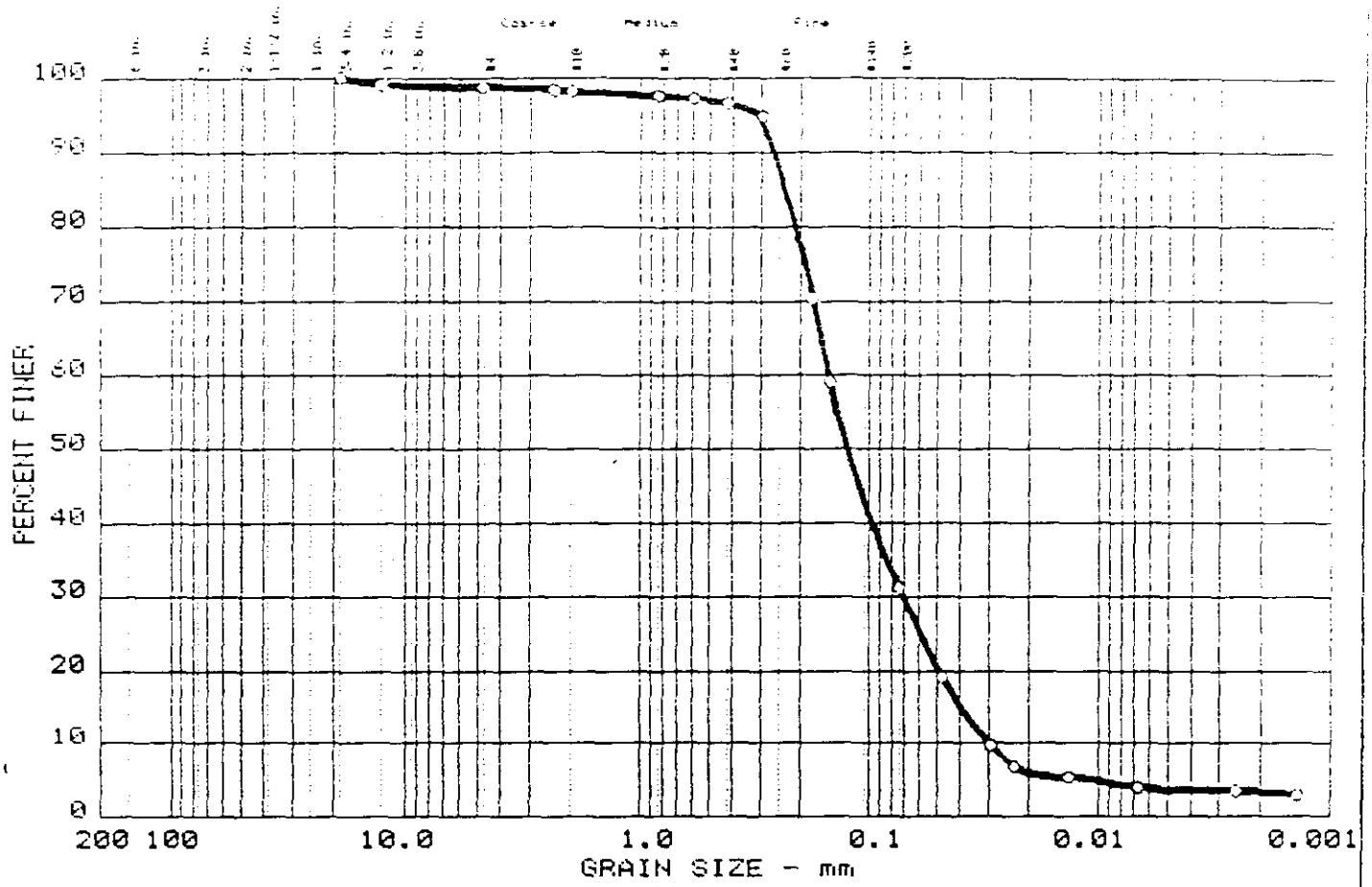
Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Sheet No.

GRAIN SIZE DISTRIBUTION TEST REPORT



Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	1.1	67.7	27.6	3.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	--	--	0.24	0.15	0.13	0.071	0.0395	0.0296	1.13	5.1

MATERIAL DESCRIPTION	USCS
○ Brown Fine SAND; Some Silt; Trace Clay and Gravel	SM

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSB4-939

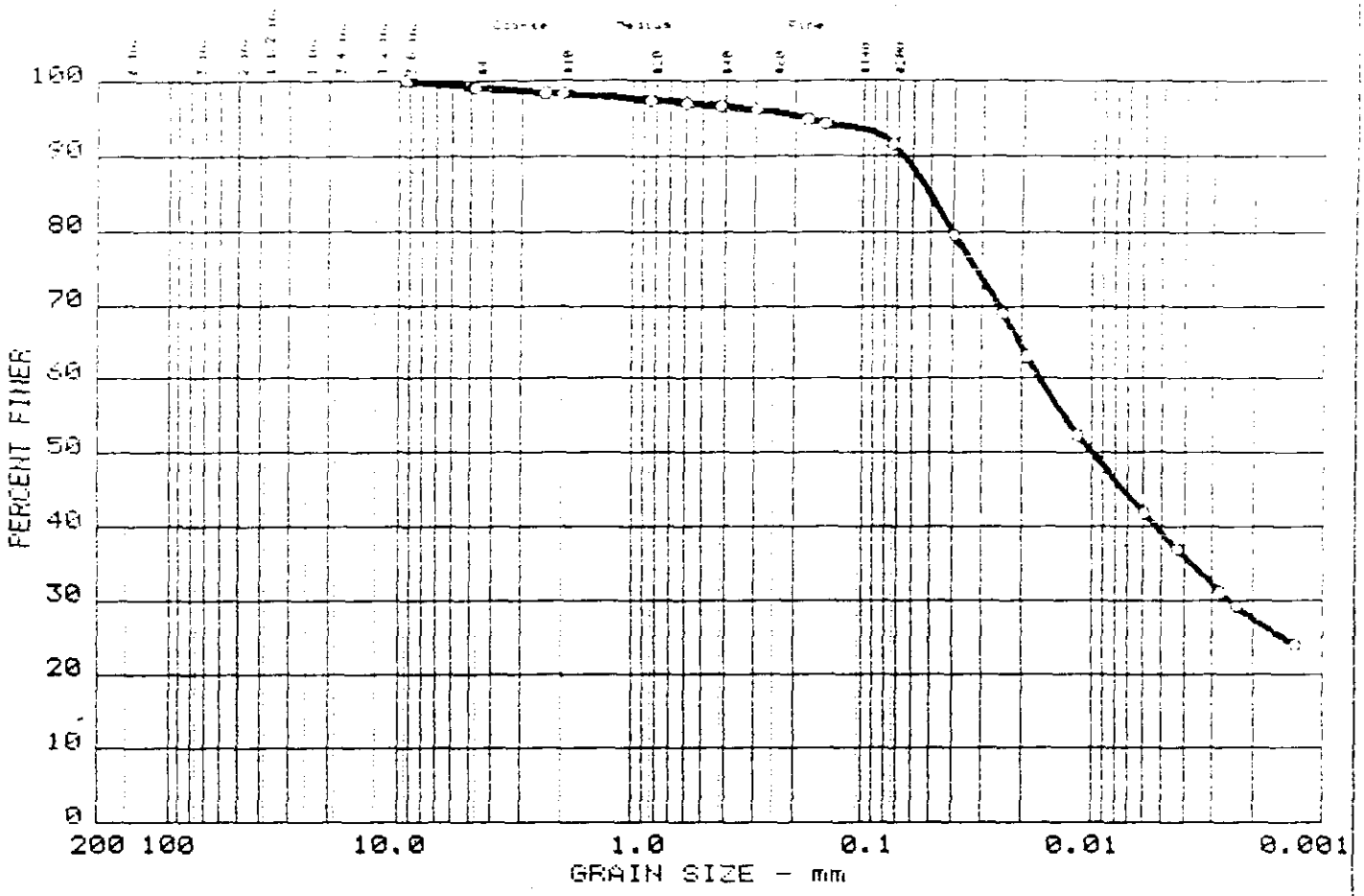
Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Sheet No.

GRAIN SIZE DISTRIBUTION TEST REPORT



Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	0.9	7.7	52.3	39.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	25	11			0.01	0.003				

MATERIAL DESCRIPTION	USCS
○ Brown Lean CLAY, Little Sand, Trace Gravel	CL

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSB4-49

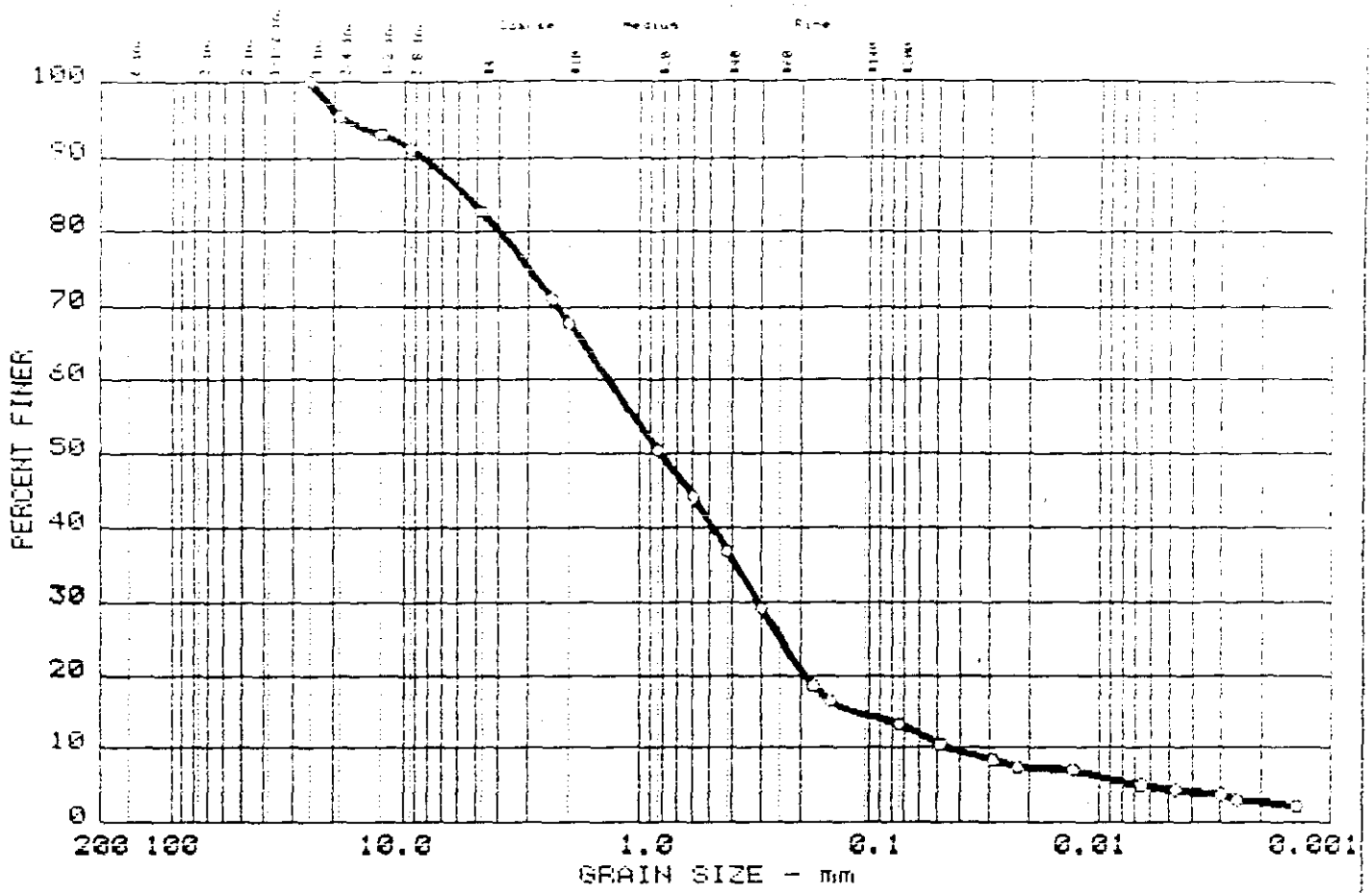
Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Sheet No.

GRAIN SIZE DISTRIBUTION TEST REPORT



Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	17.3	69.5	8.8	4.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	--	--	5.56	1.36	0.81	0.309	0.1175	0.0432	1.62	31.5

MATERIAL DESCRIPTION	USCS
○ Brown Fine-Coarse SAND, Some Gravel, Little Silt, Trace Clay	SM

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSB5-31

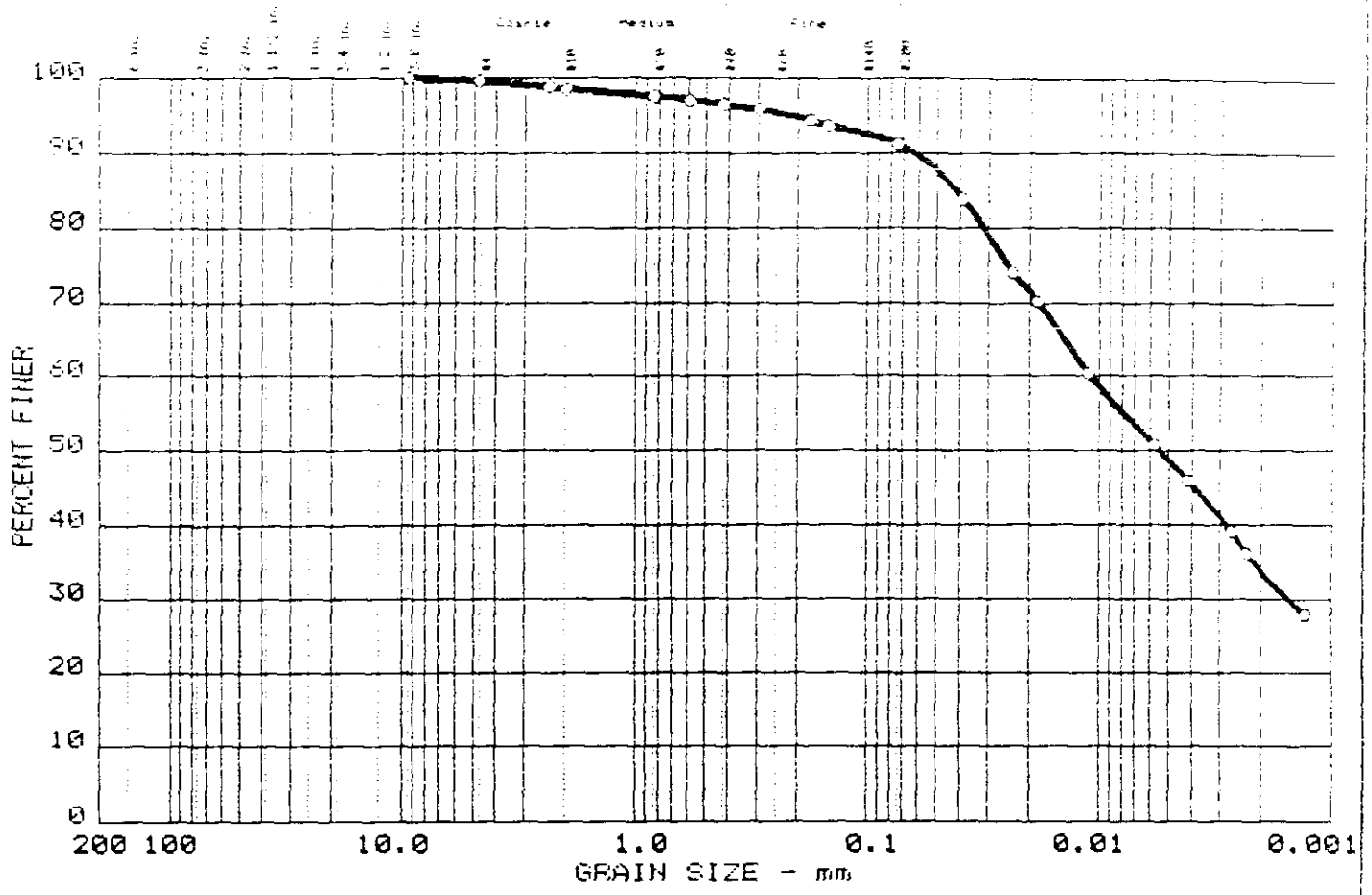
Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Sheet No.

GRAIN SIZE DISTRIBUTION TEST REPORT



Symbol	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	0.4	8.5	42.4	48.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	29	13			0.01	0.002				

MATERIAL DESCRIPTION	USCS
○ Brown Lean CLAY, Little Sand	CL

Project No.: 10010201/38133
Project: H.O.D. LANDFILL RI/FS, Antioch, Illinois
○ Sample: HD-SSB5-47

Date: 5/24/93

Remarks:
TESTED BY TWP/CLS
CHECKED BY CLS
APPROVED BY DTL

GRAIN SIZE DISTRIBUTION TEST REPORT
WARZYN, INC.

Sheet No.

G

Development and Environmental History of Sequoit Acres Industrial Park

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SUMMARY OF ENVIRONMENTAL HISTORY OF SEQUOIT ACRES INDUSTRIAL PARK THROUGH 1989

The Sequoit Acres Industrial Park, which is located west of the site on the western bank of Sequoit Creek, contains several companies which are RCRA small quantity hazardous waste generators, five registered underground storage tanks, and fill areas that were, at least in part, waste dumps (the Cunningham Dump and the Quaker Dump). The status of waste storage and disposal activities practiced by the small quantity generators prior to RCRA is not known. Figure 7 of the main text shows the locations of these facilities. The following discussion of the industrial park is based on an environmental audit conducted by Patrick Engineering, Inc. (Patrick Engineering, 1989).

LANDFILLING ACTIVITIES

West of the H.O.D. Landfill, on the eastern portions of the Sequoit Acres Industrial Park, the naturally low lying areas were filled as part of a dump operation. Filling began south of the bend in McMillen Road, in the area that now makes up the Quaker Industries parking lot. Other areas along Sequoit Avenue and Anita Avenue have also been filled for industrial development (see Figure 8 of main text). The makeup of the fill in these areas is unknown.

Possibly of as early as 1959, north of McMillen Road and adjacent to and west of H.O.D. Landfill, waste disposal occurred in the Cunningham Dump operated on land owned by Quaker Industries. It has been reported that this dump was open for dumping of any material, and in general there was no supervision of dumping

activities. Combustible materials were periodically burned. Private waste disposal on the Quaker property, which is in the same general area as the Cunningham Dump, continued until 1965. The exact location of this disposal area is not known. This operation and disposal areas will be referred to as the Quaker Dump. Figure 8 of the main text shows the filled and landfilled areas in Sequoit Acres Industrial Park.

QUAKER INDUSTRIES

Quaker Industries, Inc. (Quaker) is a manufacturer of wood and metal tray tables. Quaker is currently located south of McMillen Road, but Quaker also formerly owned land north of McMillen Road and west of Sequoit Creek that was used as the Cunningham Dump in the early 1960s. After landfilling started at the H.O.D. Landfill, Quaker built a storage warehouse over the location of the closed Cunningham Dump. Quaker sold this warehouse to Malnekoff Closeouts in 1987.

Potentially, hazardous wastes generated from Quaker's operations include: paint thinners, sludges, and lacquers. This statement is based on information provided by Quaker to U.S. EPA. Supplemental disposal permits obtained by the H.O.D. Landfill allowed the site to dispose of Quaker paints, coolants, paint booth oversprays, and water soluble oils and stains.

A January 30, 1968 letter from Applied Engineering Company (consultant to the Village of Antioch) to the State of Illinois Sanitary Board, indicated that Quaker discharged untreated industrial effluent to the wetlands in this this area which discharged to Sequoit Creek. Attached to the letter was a summary of chemicals used in Quaker's manufacturing processes at that time. This correspondence is included at the end of this Appendix. The chemicals used by Quaker included paint strippers containing chlorinated hydrocarbons. This effluent was discharged to Sequoit Creek and the nearby wetlands via an existing discharge pipe located near the southwestern corner of the H.O.D. Landfill Site. It is unclear for how long of time the discharge occurred. Prior to the rerouting of Sequoit Creek, the area to the east of McMillen Road was wetlands. It is likely that at the time the surface water flow in this area was toward the east and northeast, across the area now occupied by the H.O.D. Landfill, to Sequoit Creek. Therefore, there was the potential for the discharge from Quaker to spread over a relatively large area of the present H.O.D. site. The area of this effluent discharge overlies the surficial sand, and the Quaker effluent, which included chlorinated hydrocarbons, potentially moved downward into the surficial sand.

The State of Illinois Sanitary Board replied in their February 15, 1968 letter to Applied Engineering, that this discharge of untreated waste was not acceptable.

An NPDES permit for Quaker's non-contact cooling water discharge was issued in 1974. Quaker currently maintains this NPDES permit for their discharge of approximately 30,000 gallons per day (gpd) of non-contact cooling water to Sequoit Creek.

Quaker has stored drums containing hazardous waste on their property. Review of aerial photographs taken over the period 1980-1981 indicated that several dozen 55-gallon drums were present at that time (Patrick Engineering, 1989). In 1980, Quaker applied for a RCRA permit for their storage of hazardous wastes. This permit application was withdrawn in 1983. In 1984, the U.S. EPA informed Quaker that they were a small quantity generator and that they were not required to obtain a RCRA permit (Patrick Engineering, 1989).

Other potential contamination sources include floor drains within Quaker's manufacturing facility, Quaker's discharge to the sanitary sewer, and Quaker's air emissions. Solvents were used in Quaker's manufacturing processes and may have entered the facility's floor drains and/or sanitary sewer. The sewer line serving Quaker's facility runs north from the facility along Anita Avenue. Quaker's facility uses hot and cold solvent processes and, until 1980, discharged VOCs into the air.

Quaker historically has had underground storage tanks (USTs) on their property. A 10,000-gallon steel UST containing oil was installed in approximately 1961 and was removed in 1989. The 10,000-gallon tank was removed by Quaker because it was no longer needed. A 200,000-gallon concrete UST for water was installed by Quaker in 1964. This water tank was necessary for the operation of a sprinkler system at the Quaker factory, and was last used in 1975. Another steel UST (500 to 750 gallons) is reportedly currently used at the Quaker for storage of used oil and/or water (Patrick Engineering, 1989).

ANTIOCH TOWNSHIP HIGHWAY DEPARTMENT

The Antioch Township Highway Department (the Department) is responsible for maintaining the township's roads. The Department performs truck maintenance, and uses fuels, road salts, paints, and solvents.

The Department has three registered USTs. A 4,000-gallon unlined steel UST is used for gasoline storage and a 1,000-gallon unlined steel UST is used for diesel fuel storage. These two USTs were painted externally before they were installed to resist corrosion. The third UST on the Department's property has not been used since August 1983 and is of an unspecified size. This unlined UST was

apparently used for gasoline storage, and it is not known if this UST was painted externally prior to installation to resist corrosion.

CHICAGO INK AND RESEARCH COMPANY, INC.

Chicago Ink and Research Company, Inc. (Chicago Ink) manufactures industrial inks. Chicago Ink has been operating in the Sequoit Acres Industrial Park since 1956. Hazardous wastes generated by Chicago Ink may include the following: solvent washes and sludges, caustic washes and sludges, and water washes and sludges generated from cleaning the equipment that is used in the production of ink from pigments; soaps, and stabilizers containing chromium and lead (Patrick Engineering, 1989). Chicago Ink has a registered 60-gallon UST that is both internally lined and externally painted to resist corrosion. The present contents and use, if any, of this tank is unknown.

GALDINE ELECTRONICS, INC.

Galdine Electronics, Inc. is a manufacturer of printed electronic circuit boards and has operated at their current location in the Sequoit Acres Industrial Park for approximately 21 years. Hazardous wastes generated by Galdine Electronics include: methylene chloride, a hydrochloric acid mixture, a chromic acid solution, a plating sludge, and a flammable liquid waste (Patrick Engineering, 1989). Rinse water from Galdine Electronics' manufacturing processes and currently discharged into the Village of Antioch's sanitary sewer system for treatment at the Village of Antioch's Publically Owned Treatment Works (POTW).

MAJOR INDUSTRIAL TRUCK, INC.

Major Industrial Truck, Inc. is concerned with the sales, service, and rental of forklifts and has been at their current location in the Sequoit Acres Industrial Park for approximately 9 years. They are a service company and do not manufacture any products on-site. In September 1988, Major Industrial Truck notified the IEPA that they would be shipping the small quantity of ignitable hazardous waste which they generated to Safety Kleen Corporation in Elgin, Illinois (Patrick Engineering, 1989).

NU-WAY SPEAKER PRODUCTS, INC.

Nu-Way Speaker Products, Inc. (Nu-Way) is a manufacturer of non-metallic components for loudspeakers and has been in business at their current location in the Sequoit Acres Industrial Park for approximately 14 years. Hazardous materials that are generated by Nu-Way's manufacturing process are acetone and phenol (Patrick Engineering, 1989).

NCG ELECTRONICS, INC.

NCG Electronics, Inc., was an affiliate of Galdine Electronics, Inc. and once occupied a building in the Sequoit Acres Industrial Park. NCG Electronics was also a manufacturer of printed circuit boards. A spent copper etching solution, a by-product of their manufacturing process classified as non-hazardous was generated by NCG Electronics (Patrick Engineering, 1989).

ROLL FOIL LAMINATING, INC.

No information was available regarding the manufacturing processes at this facility. In March 1987, a Notification of Hazardous Waste Activity report was filed by Roll Foil Laminating, Inc. with the U.S. EPA indicating that they generate less than 1000 kilograms per month of F003 and F005 non-halogenated solvents (Patrick Engineering, 1989).

REFERENCE

Patrick Engineering, Inc., 1989. *Environmental Audit of Sequoit Acres Industrial Park*, Antioch, Illinois.

AJS/njt/RHW
[chi 609 9ue]
10010201

H

GROUNDWATER MONITORING WELL BORING LOGS AND WELL CONSTRUCTION DETAILS

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" ID HSA

BORING NO. W2D

SHEET 1 OF 2

SAMPLING METHOD: 5' CME SAMPLING TUBE
2" OD SPLIT SPOON (84-88 FT)

		DRILLING START	DRILLING FINISH
WATER LEVEL		TIME	TIME
TIME			
DATE		DATE	DATE
CASING DEPTH		4/17/93	4/17/93

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 17, T 46 N, R 10 E/W

NORTHING 2116648.2 EASTING 1052499.9

DATUM ELEVATION 770.7

DRILL RIG CME 750 ATV

SURFACE CONDITIONS GRASS COVERED PRAIRIE

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
769.2	–	75		1	Stiff to Very Stiff Reddish Brown Organic Top Soil (OH), Roots to 1 ft then Brown Silty Sandy Clay	SB							1-3.5
					Brown Silty CLAY (CL), Limonite Precipitate, Magnesium Nodules Present								
766.7													
765.7 (5)	–	83		2	Soft to Stiff Brown and Gray Mottled Clayey SILT to Silty CLAY (ML/CL)	SB				30	11		.25-1.0
					Grades to more silty CLAY (CL) Trace to Little Fine to Coarse Sand and Fine Gravel, Sand Pocket at 9 Ft								
761.7													
760.7 (10)	–	75		3	Brown SAND Layer (SP)	SB							2->4.5
					Brown Silty CLAY (CL) to 11.5'								
759.2													
					Gray Silty CLAY (CL), Little to Some Fine to Coarse Sand, Trace to Little, Fine to Coarse Gravel, Sand Lens at 12' and 14', Shale Fragments Present								
756.7 (15)	–	100		4	Gravelly Stiff to Very Stiff Gray Silty CLAY (CL)	SB							1.5-4.0
752.7													
					Gray Very Stiff Lean CLAY (CL), Little to Some Silt, Trace to Little Gravel and Fine to Coarse Sand								
(20)	–	95		5		SB							2.5-3.0
					Gray Stiff to Very Stiff Lean CLAY (CL) Little to Some Silt, Trace to Little Fine to Coarse Sand, Trace Fine Gravel								
(25)	–	95		6		SB							1.5-2.5
(30)	–	90		7	Shelby Tube 29 - 31' Shale Fragments Present	SB				38	19		1.5-2.5
					Lean Clay (CL) Trace Gravel and Sand								
(35)	–	100		8		SB							1-2.5
	–	93		9		SB							1.5-

LOGGED BY SJC DRILLING CONTR E & F

DATE 9/17/93 CHK'D BY DAP CHAS. MARKGRAF

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

SHEET 2 OF 2

BORING NO. W2D

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
												2.5
45 725.2	–	97		10 Grades to Lean Clay, Little Fine to Coarse Sand Grades to Medium Stiff to Very Stiff Coarse Gravelly Lean CLAY (CL)	SB							.75-2.5
50	–			11 Ribbon of Sample Pushed Rock, no Recovery, Gray CLAY	SB							–
55 716.2	–	27		12 Fossiliferous Limestone Cobble in Sample Possibly Pushed from Above Gray Lean Clay (CL) with a Silty Layer Grading into Silty CLAY, Clayey SILT (CL/ML) to 59'	SB							.5-3.0
60 711.7	–	97		13 Gray Stiff to Very Stiff Lean CLAY (CL) Trace Little Silt, Little Fine to Coarse Sand, Trace Fine Gravel	SB							1.5-2.5
65	–	100		14 2" Silty Fine Sand Layer at 65' and 1/2" Sand Lens 65.8'	SB							1.5-2.5
70	–	95		15 4" Silt Layer at 69.5' Over 1/2" Fine to Medium Sand Lens	SB							1.0-3.0
697.7 696.7	–	98		Gray Lean CLAY (CL), Little Fine Sand and Silt, Trace to Little Fine Gravel, Trace Coarse Sand 16 Gravelly Medium Stiff to Very Stiff Pinkish Gray Clay Layer from 73'-74' Pinkish/Reddish-Gray Lean CLAY (CL), Little to Some Silt and Fine to Coarse Sand, Trace to Little Fine Gravel, Trace Coarse Sand	SB							[illegible]
75												
▼ 691.7	–	13		17 Fine to Coarse SAND and Fine GRAVEL (SP/GP)	SB							–
80												
85	9 11 14 14			19 No Recovery	SS							–
682.2	7 12 15 17			18 Fine to Coarse Medium Dense SAND (SP), Some Gravel, Little Silt, Trace Clay 20	SS SS							– –
90				End of Boring 88.5 Feet PID = None Detected * = PID Malfunctioning Monitoring Well Set at 88.33 Feet								
95												

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" ID HSA

BORING NO. W3SA

SHEET 1 OF 1

SAMPLING METHOD: 2" OD SPLIT SPOON

		DRILLING START	DRILLING FINISH
WATER LEVEL		TIME	TIME
TIME			
DATE		DATE	DATE
CASING DEPTH		4/6/93	4/6/93

BORING LOCATION:
NE 1/4 of NE 1/4 of Section 17, T 46 N, R 10 E/W

NORTHING 2115185.3 EASTING 1051029.2

DATUM ELEVATION 763.8

DRILL RIG CME 750 ATV

SURFACE CONDITIONS MARSH/WETLAND, SURFACE WATER

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	6 3 1 1	67		1	Frozen Black Muck - Peaty, Vegetation Debris (PT)	SS							–
	WT	75		2	Greenish Light Gray Soft Clay (OH) Silt Lenses Vegetation Debris, Gastropod Shells and Other Shell Material Present, Spongy Peat Like	SS							–
5 758.8	5 4 1 1	83		3	Very Loose Light Gray Fine SAND to Silty Sand (SP/SM), Some Medium, Trace Coarse Sand Little to Some Silt	SS							–
	5 5 5 5	46		4		SS							–
755.7 754.8	5 5 4 4	83		5	Greenish Soft Clay (CH) Trace Silt, Gastropod Shells Present	SS							–
10	2 3 4 6	66		6	Very Loose Gray Fine to Coarse SAND and Fine GRAVEL (SP/GP), Grades to Coarse to Fine to Coarse	SS							–
	2 2 4 5	92		7	Medium SAND (SP) to 13.5 Feet Grades to Medium to Coarse Sand	SS							–
15 747.8	5 7 9 13	75		8	Trace Fine Gravel	SS							–

End of Boring at 16 Feet
Monitoring Well Set at 15.64'
PID = None Detected

20 25 30 35

LOGGED BY SJC

DRILLING CONTR E & F

DATE 9/22/93 CHK'D BY DAP

CHAS. MARKGRAF

ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4 ID HSA

BORING NO. W3SB

SHEET 1 OF 1

SAMPLING METHOD: 2" OD SPLIT SPOON

	DRILLING START	DRILLING FINISH
WATER LEVEL	TIME	TIME
TIME		
DATE	DATE	DATE
CASING DEPTH	4/7/93	4/7/93

BORING LOCATION:
NE 1/4 of NE 1/4 of Section 17, T 46 N, R 10 E/W

NORTHING 2115189.4 EASTING 1051027.8

DATUM ELEVATION 763.7

DRILL RIG CME 750 ATV

SURFACE CONDITIONS MARSH/WETLAND, SURFACE WATER

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
					Blind Drill to 16 Feet See Boring Log W3SA for Geologic Description to 16 Feet								
5													
10													
15													
747.7	WT/12"	100		1	Loose Gray Fine to Coarse SAND (SP), Trace Silt, Grades to Fine to Medium Sand to 19 Feet Then Fine to Coarse	SS							-
	2 3 5 6	100		2		SS							-
20	2 3 5 5	63		3	Loose Gray-Brown Fine to Coarse SAND (SP) Little Fine Gravel, and Silt, Trace Clay	SS							-
	6 8 7 7	42		4		SS							-
	6 11 13 11	58		5		SS							-
25	6 9 7 6	42		6	Medium Dense Fine to Coarse SAND (SP), Trace to Little Fine Gravel and Silt 3" Gray Silty CLAY Layer at 26'	SS							-
	6 9 7 6	71		7		SS							-
734.2													
30	3 4 6 6	67		8	Very Stiff Gray Silty CLAY (CL), Trace Medium to Coarse Sand, Trace to Little Fine Sand, Grades to Clayey Silty CLAY (CL/ML), Shale Fragments Present	SS							2.0-2.75
731.7					End of Boring at 32 Feet Monitoring Well Set at 29.5 Feet PID = None Detected								
35													

LOGGED BY SJC

DRILLING CONTR E & F

DATE 9/22/93 CHK'D BY DAP

CHAS. MARKGRAF

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION: H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 6" RB WITH MUD

BORING NO.: W3D

SHEET 1 OF 2

SAMPLING METHOD: 2" SPLIT SPOON, SHELBY TUBE (34.5 - 38 FT)

DRILLING START DATE: 4/8/93 TIME:

DRILLING FINISH DATE: 5/25/93 TIME:

WATER LEVEL:
TIME:
DATE:
CASING DEPTH:

BORING LOCATION:
NE 1/4 of NE 1/4 of Section 17, T 46 N, R 10 E/W

NORTHING 2115187.6 EASTING 1051022.7

DATUM ELEVATION 763.7

DRILL RIG CME750 ATV/Track Rig

SURFACE CONDITIONS MARSH/WETLAND WET

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				Blind Drill to 34.5 Feet See Logs W3SA and W3SB for Geologic Descriptions of Upper 35 Feet								
5												
10												
15												
20												
25												
30 (734.2)				Gray Silty CLAY (CL)								
35 (729.2)	–	17	1	Shelby Tube 34.5 to 36.5, Pushed Rocks and Gravel in End of Tube (Tube Destroyed)	SS							–
	–	0	2		SS							–

LOGGED BY SJC

DRILLING CONTR E & F, ETI

DATE 9/22/93 CHK'D BY DAP

CM/JR

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

SHEET 2 OF 2

BORING NO. W3D

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
				Shelby Tube 36 to 38 Ft								
	5 7 9 16	100		3	SS							3-1.5
40 723.7	7 12 8 12	71		4 Gray Stiff to Very Stiff Sandy Silty CLAY to Clayey SAND (CL/SC) Grades to Silty Clay (CL) Little to Some, Fine to Coarse Sand, Trace Fine Gravel, Pyrite Fragments Present	SS				18	6		1.25-2.25
721.7	4 5 9 10	83		Clayey SAND (SC) at 40' Shale Fragments Present 5 Gray Stiff to Very Stiff Silty CLAY (CL), Little to Some Fine to Coarse Sand, Little Fine Gravel	SS							2.25-1.25
45	5 7 9 11	100		6	SS							1.25-0.75
	5 7 11 12	100		7	SS							4-2
	4 8 10 13	29		8 Sand and Gravel Lens at Approximately 48.5', Grades to Some Fine to Coarse Sand, Little Gravel	SS							2.75
50	5 8 11 15	100		9 Gray Stiff to Very Stiff Lean CLAY (CL), Trace to Little Silt and Fine to Coarse Sand, Trace Fine Gravel, Shale Fragments, Pyrite Fragments Present	SS							1.5-2.5
	12 11 13 15	100		10	SS							1.75
55 708.7	6 10 23 21	0		11	SS							–
705.7				Gray Fine to Coarse SAND (SP) Little to Some Fine Gravel, Trace Coarse Gravel, Little Silt Gray Silty CLAY (CL) Little Fine to Coarse Sand, Trace to Little Fine Gravel								
60	6 9 11 14			12	SS							–
	8 10 16 18	85		13 Gray Silty CLAY (CL), Trace Fine to Coarse Sand and Gravel	SS							–
65	12 14 23 38	100		14	SS							–
	5 15 39 50.5	0		15	SS							–
	27 30 32 50	75		16	SS							–
70	14 17 29 30	100		1" Fine to Coarse Sand Seam at 69 Ft 17 Gray Silty CLAY (CL)	SS							–
692.2	9 10 27 27	90		18 Brown/Gray Silty Fine to Coarse SAND (SP)	SS							–
75	16 26 30 26	90		19 1/2" Silty CLAY Lens at 74.5 and 75.5 Ft	SS							–
	15 23 27 31	75		20 Clayey SILT Seam at 77 Feet	SS							–
	12 23 30 30	75		21	SS							–
80 683.8				End of Boring at 80 Feet Well Installed to 78 Feet PID = None Detected								
85												

SOIL BOREHOLE LOG

SITE NAME AND LOCATION: H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" ID HSA

BORING NO.: W4S

SHEET 1 OF 1

SAMPLING METHOD: 2" OD SPLIT SPOON

		DRILLING START TIME	DRILLING FINISH TIME
WATER LEVEL			
TIME			
DATE		DATE	DATE
CASING DEPTH		5/25/93	5/26/93

BORING LOCATION:
NW 1/4 of NE 1/4 of Section 17, T 46 N, R 10 E/W

NORTHING 2115202.0 EASTING 1050628.3

DATUM ELEVATION 767.5

DRILL RIG CME 850

SURFACE CONDITIONS ASPHALT SURFACE/STOCK YARD

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
					Asphalt Surface Over FILL								
765.5	2 2 2 2	15		1	FILL: Brown Silty Fine to Coarse Gravel and Sand	SS							–
763.5	1 2 2 2	0		2	Brown Silty Clay and Trace Sand, Probable Fill	SS							–
5	2 9 9 10	20		3	Black Clayey PEAT (PT) Trace to Some Fine to Coarse Gravel	SS							–
759.5	5 10 10 9	50		4	Gray Fine to Coarse Silty SAND and GRAVEL (SP/GP) Trace Clay	SS							–
10	5 7 7 11	50		5		SS							–
	11 17 30 50/3"	50		6	PID = None Detected	SS							–
15	–	50		7		SS							–
751.5					End of Boring at 16 Feet Well Set at to 15 Feet PID = None Detected								
20													
25													
30													
35													

LOGGED BY PMS

DRILLING CONTR ETI (for E & F)

DATE 9/17/93 CHK'D BY DAP

JOEL RUDA

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" ID HSA

BORING NO. W5S

SHEET 1 OF 1

SAMPLING METHOD: 5' CME SAMPLING TUBE
2" OD SPLIT SPOON (14 - 16 FT)

					DRILLING START	DRILLING FINISH
WATER LEVEL					TIME	TIME
TIME						
DATE					DATE	DATE
CASING DEPTH					4/21/93	4/21/93

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8 , T 46 N, R 10 E/W

NORTHING 2115375.1 EASTING 1050760.5

DATUM ELEVATION 771.1

DRILL RIG CME 750 ATV

SURFACE CONDITIONS GRASS COVERED LANDFILL AREA, DRY

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
770.1	–	54		1	Brown Clayey Top Soil Over 4" Brown and Black Organic Clay Possible Peat (OH), Roots Present, Possible Fill	SB							.75
767.1					Clayey Fine to Medium SAND (SC), Wood Fragments Over Fine to Coarse Sand, Trace to Little Fine Gravel Possible FILL								
5	–	50		2		SB				63	NP		–
765.1					Black Silty Organic SAND (SM), Some Gravel, Little Clay								
764.6					Wet Fine to Coarse Sand Layer								
10	–	57		3	Wet SAND (SM) Little Fine Gravel, Some Silt, Trace Gravel Grades to Fine to Coarse Sand 1/4" Silt Lens at Approximately 11.5"	SB							–
15	7 10 9 9	92		4	Fine to Medium SAND (SM) Trace to Little Gravel Grades to Fine to Coarse Sand, Little Coarse Gravel	SS							–
755.1					End of Boring at 16 Feet Monitoring Well Set at 15.51 Feet PID = None Detected								
20													
25													
30													
35													

LOGGED BY SJC DRILLING CONTR E & F

DATE 9/17/93 CHK'D BY DAP CHAS. MARKGRAF

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" ID HSA

BORING NO. W6S

SHEET 1 OF 1

SAMPLING METHOD: 5' CME SAMPLING TUBE 2" OD SPLIIT SPOON 14 - 16 FT

					DRILLING START	DRILLING FINISH
WATER LEVEL					TIME	TIME
TIME						
DATE					DATE	DATE
CASING DEPTH					4/16/93	4/16/93

BORING LOCATION:
SE 1/4 of SE 1/4 of Section 8 , T 46 N, R 10 E/W

NORTHING 2115399.4 EASTING 1051541.1

DATUM ELEVATION 764.9

DRILL RIG CME 750 ATV

SURFACE CONDITIONS LOW LYING GRASS COVERED, TREED AREA

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	–	38		1 Black PEAT (PT)	SB							–
5 759.9	–	57		2 1" Moist Greenish Organic Silty Clay Lens, Grades to 2" Light Tan-Gray Silty to Fine Sand Layer over Fine to Medium SAND (SM), Little Silt, Trace Clay	SB							–
10	–	73		3 Grades Little Coarser Sand (1/4" Gray Clayey Silt Lense at 12')	SB							–
15 750.5 749.5 749.0	–	96		4 Stiff Greenish Gray Fat CLAY (CH), Trace Fine to Coarse Sand, Little to Some Silt	SS							1.5
				SAND (SP)								
20				End of Boring at 16 Feet Monitoring Well Set at 15 Ft PID = None Detected								
25												
30												
35												

LOGGED BY SJC

DRILLING CONTR E & F

DATE 9/17/93 CHK'D BY DAP

CHAS MARKGRAF

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

DRILLING METHOD: 4 1/4" ID HSA

BORING NO. W7D

SHEET 1 OF 3

SAMPLING METHOD: 5' CME SAMPLE TUBE (0 - 94 FT) 2" OD SPLIT SPOON (94 - 100 FT) SHELBY TUBE (29 - 31 FT)

					DRILLING START	DRILLING FINISH
WATER LEVEL					TIME	TIME
TIME						
DATE					DATE	DATE
CASING DEPTH					4/13/93	4/13/93

BORING LOCATION:
SW 1/4 of SW 1/4 of Section 9 , T 46 N, R 10 E/W

NORTHING 2116326.0 EASTING 1053153.3

DATUM ELEVATION 780.2

DRILL RIG CME 750 ATV

SURFACE CONDITIONS GRASS COVERED PRAIRIE

ANGLE Vertical BEARING ------

SAMPLE HAMMER TORQUE FT-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
779.2	–	92		1	Approximately 6 - 12" Black Top Soil, Organic Silt Tan Laminated Silt (ML) With Limonite Precipitate, Grades to More Grayish with Laminated Limonite	SB				33	14		3.0-1.25
5 775.2	–	97		2	Gray Laminated Silty CLAY to Clayey SILT (CL/ML) Interbedded with Tan Silt Gray Lean Clay (CL), Little to Some Silt	SB							3.0-1.25
10	–	98		3	Gray Lean CLAY (CL) with Little to Some Silt, with Laminated Lenses of Silt, Little to Some Fine to Coarse Sand	SB							2.25-1.25
15	–	97		4	Gray Lean CLAY (CL) Little to Some Silt, Sand Pocket with Coarse Gravel at 15 Feet, Trace to Little Fine to Coarse Sand, and Fine Gravel, Shale Fragments Present	SB							2.5-3.25
20	–	97		5	Gray Massive Lean CLAY (CL), Trace to Little Silt and Trace Fine to Coarse Sand, Trace Fine to Coarse Gravel, Shale Fragments Approximately 6" Sandy Zone at 20 Ft	SB							2 1.
25	–	85		6		SB				34	15		2.5-3.0
30	–	92		7	Shelby Tube to 31' Collected CME Tube Sample 29' to 34'	SB							1.5-2.5
35	–	97		8	Trace Shale Fragments	SB							2.5-3.0
	–	97		9		SB							2.0-

LOGGED BY SJC

DRILLING CONTR E & F

DATE 9/17/93 CHK'D BY DAP

CHAS. MARKGRAF

Template ID: WM1 ID: WM1

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

SHEET 2 OF 3

BORING NO. W7D

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL		SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
					Trace Shale Fragments								3.25
45	–	97		10		SB							2.5-3.0
50	–	97		11		SB							1.25-2.5
55	–	100		12		SB							2-3
60	–	100		13	Gray Lean CLAY (CL), Little Silt, Little Fine to Coarse Sand, Trace Fine to Coarse Gravel, Approximately 1/4mm to 1mm thick Silt Lenses and Pockets Interbedded in Clay	SB							1-2
65	–	100		14	Approximately 10" Silt Layer at 67 to 68 Feet	SB							1.25-3
70	–	100		15	3" Silt Layer at 71'	SB							2.25->4.5
75	–	97		16	1/2" Silt Layer at 73', Silt Lenses Interbed Cobbles at 75' 3" Silt Layer at 76.5', Trace to Little Shale Fragments Present, Few Silt Pockets and Lenses in Clay	SB							2.75-4.25
80	–	98		17	Silty 2" Layer (Silty Clay Clayey Silt) at 81.5 Feet 2mm Silt Lens at 83'	SB							2.5-4
85	–	100		18		SB							3->4.5
692.7					1/2" Lens of Reddish Silty CLAY, Clayey SILT over 1" Lense of Gray Clayey SILT at 85' Grades to Grey CLAY (CL)								
90 690.2	–	75		19	Light Pinkish Gray Silty CLAY (CL), Little to Some Fine to Coarse Sand Little Fine Gravel, Trace Coarse Sand Fine to Medium Sand (SP) 7" Gray Clay Layer at 92', Grades to Coarse Sand and Trace Clay, Gravel, and Silt, Fine Gravel at 95'	SB							–
95	16 12 12 12	8		20	Medium Dense Fine to Medium SAND (SP)	SS							–
	10 30 30 20	100		21	Very Dense Fine to Medium SAND to 97', Grades to	SS							–

SOIL BOREHOLE LOG

SITE NAME AND LOCATION H.O.D. Landfill - Antioch, Illinois

SHEET 3 OF 3

BORING NO. W7D

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER	RECOVERY %	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIALS	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
	8 10 16 20	75		22 More Fine, Trace to Little Fine Gravel Medium Dense Fine to Medium SAND (SP), Little Coarse Sand, Trace to Little Fine Gravel	SS							–
100 680.2				End of Boring at 100 Feet Monitoring Well Set at 99.94 Feet PID = None Detected								
105												
110												
115												
120												
125												
130												
135												
140												
145												
150												

Well No. [illegible]
Boring No. X-Ref. [illegible]

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: 2116648.2 N
1052499.9 E

Elevation Ground Level 770.7
Top of Casing 773.04

Drilling Summary:

Total Depth 88.33 ft
Borehole Diameter 8.5 in
Casing Stick-up Height: 2.34 ft
Driller Charles Markgraf E & F

Rig CME750 ATV
Bit(s) 4¼ in ID X 8½ in. OD HSA

Drilling Fluid water

Protective Casing Aluminum WMX Spec. - 7ft

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	1993			
	4/20		4/20	
Geophys. Logging:				
Casing:				
Filter Placement:	4/20		4/20	
Cementing:				
Development:	5/6		5/6	

Well Design & Specifications

Basis: Geologic Log X Geophysical Log ____

Casing String (s): C=Casing S=Screen.

Depth		String(s)	Elevation
-2.34	83.3	C1	773.04 - 687.4
83.3	88.33	S1	687.4 - 682.37

Casing: C1 2 in. ID Schedule 40 PVC flush threaded
C2

Screen: S1 2 in. ID Schedule 40 PVC .010" Slot Size
S2

Filter Pack: #30 Red flint sand (81.3 to 83.3 ft) Fine silica sand (79.8 - 81.3 ft)

Grout Seal: Bentonite Slurry (0 - 79.8 ft)

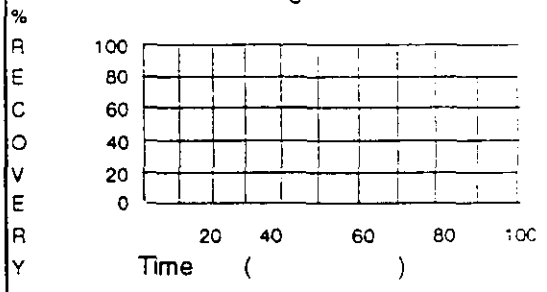
Bentonite Seal: None
fine silica sand over filter pack

Well Development:
Surge /purge w/ PVC bailer and steel cable for 30 min. keck pump, one well volume = 7.97 gallons.

Stabilizaton Test Data:

Time	pH	Spec. Cond.	Temp (C)

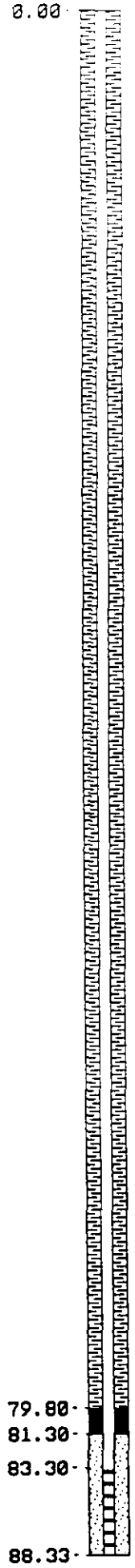
Recovery Data:
Q= S_o =



Comments:

SJC/llr/DAP

SITE NAME HOD Landfill
LOCATION Antioch, ILL.
WC
SUPERVISED BY S. Chillson - Warzyn Inc.



Well No. [illegible]
Boring No. X-Ref: [illegible]

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: 2115185.3 N
1051029.2E

Elevation Ground Level 763.8
Top of Casing 766.54

Drilling Summary:

Total Depth 16'
Borehole Diameter 8.5 in.
Casing Stick-up Height: 2.74 in.
Driller Charles Markgraf
Environmental and Foundation Drilling Inc. (E & F)
Rig CME750 ATV
Bit(s) 4.25 in. ID X 8.5 in. OD HSA

Drilling Fluid None

Protective Casing Aluminum WMX Spec.- 5ft

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	4/7		4/7	
Geophys. Logging:				
Casing:				
Filter Placement:	4/7		4/7	
Cementing:				
Development:	5/5		5/5	

Well Design & Specifications

Basis: Geologic Log X Geophysical Log ____

Casing String (s): C=Casing S=Screen.

Depth		String(s)	Elevation
-2.74	5.3	C1	766.54-758.5
5.3	15.64	S1	758.5-748.16

Casing: C1 2 in. ID Schedule 40 PVC flush Thread
C2

Screen: S1 2 in. ID Schedule 40 PVC,.010 Slot Size
S2

Filter Pack: #45-55 Red flint sand (5-15.64 ft) fine silica sand (4.0-5ft)

Grout Seal: None

Bentonite Seal: Bentonite Chips (0-4feet)

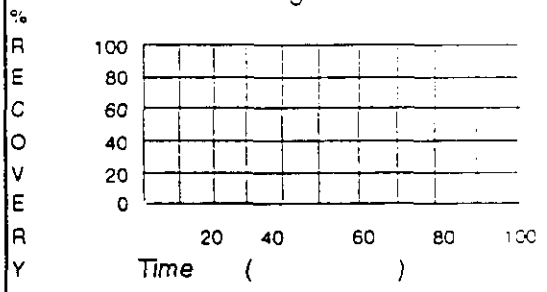
Well Development:
Surged and purged with stainless steel bailer and nylon rope. Purged 24 gallons, one well volume = 2.4 gallons

Stabilizaton Test Data:

Time	pH	Spec. Cond.	Temp (C)

Recovery Data:

Q= S_o=



Comments:

SJC/llr/DAP

0.00
4.00
5.30
15.64

SITE NAME HOD Landfill
LOCATION Antioch, IL
WC
SUPERVISOR BY S. Chillson

Well No. [illegible]
Boring No. X-Ref. [illegible]

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: 2115189.4N
1051027.8E

Elevation Ground Level 763.7
Top of Casing 766.81

Drilling Summary:

Total Depth 32 ft.
Borehole Diameter 8.5 in.
Casing Stick-up Height: 3.11 ft
Driller Charles Markgraf
Environmental & Foundation Drilling Inc. (E & F)
Rig CME750 ATV
Bit(s) 4¼ in. ID X 8¼ in. OD HSA

Drilling Fluid None

Protective Casing Alum. WMX Spec. - 5ft

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	1993			
	4/7		4/7	
Geophys. Logging:				
Casing:				
Filter Placement:	4/7		4/7	
Cementing:				
Development:	5/5		5/5	

Well Design & Specifications

Basis: Geologic Log X Geophysical Log ____

Casing String (s): C=Casing S=Screen.

Depth		String(s)	Elevation
-3.11	24.55	C1	766.81 - 739.15
24.55	29.57	S1	739.15 - 734.13
			-
			-
			-

Casing: C1 2 in. ID Schedule 40 PVC flush thread
C2

Screen: S1 2 in. ID Schedule 40 PVC .010 Slot Size
S2

Filter Pack: #45-55 Red flint sand (22.55 - 29.57 ft)

Grout Seal: Bentonite Slurry (8.5 - 17.55 ft)

Bentonite Seal: Bentonite Chips (17.55 - 22.55 ft), (0 - 8.5ft)

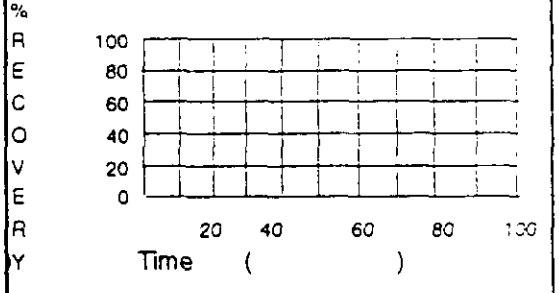
Well Development:
Surged & Purged w/PVC bailer and steel cable. Purged 200 gallons, one well volume = 4.7 gallons

Stabilizaton Test Data:

Time	pH	Spec. Cond.	Temp (C)

Recovery Data:

Q= S_o =



Comments: 18" pipe wrench dropped into annular space

SJC/llr/DAP

0.00
8.50
17.55
22.55
24.55
29.57

SITE NAME HOD Landfill
LOCATION Antioch, Ill.
SUPERVISED BY S. Chilson - Warzyn Inc.
WC

Well No. W33
Boring No. X-Ref: W33

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: 2115187.6 N
1051022.7 E

Elevation Ground Level 763.73
Top of Casing 765.93

Drilling Summary:

Total Depth 80 ft.
Borehole Diameter 8.5 in.
Casing Stick-up Height: 2.2 ft.
Driller Charles Markgraf E & F
Joel Ruda, ETI

Rig CME750 ATV
Bit(s) 8in. - 6in. roller bit rotary wash
Drilling Fluid 50 lbs supergel X/100 gallon H2O
Protective Casing Steel Well Box

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	1993 4/28		5/15	
Geophys. Logging:				
Casing:				
Filter Placement:	5/25		5/25	
Cementing:				
Development:	5/27		5/27	

Well Design & Specifications

Basis: Geologic Log X Geophysical Log ____

Casing String (s): C=Casing S=Screen.

Depth		String(s)	Elevation
0	34	C1	763.73 - 729.73
-2.2	73.3	C2	765.93 - 690.43
73.3	78	S1	690.43 - 685.73
			-
			-

Casing: C1 6in. ID Schedule 40 PVC, flush threaded
C2 2in. ID Schedule 40 PVC, flush threaded
Screen: S1 2in. ID Schedule 40 PVC, .010 Slot Size
S2

Filter Pack: #45-55 Red flint sand (70.9 - 78 ft.)

Grout Seal: 40 lb supergel/85 gallon H2O (0-65 ft)

Bentonite Seal: Bentonite Chips (65-70.9)

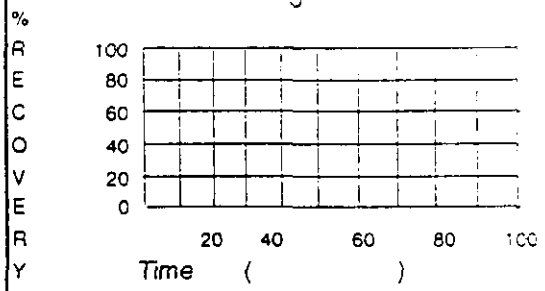
Well Development:
Surged and Purged w/PVC bailers and steel cable, Purged 200 gallon, one well volume - 8 gals

Stabilizaton Test Data:

Time	pH	Spec. Cond.	Temp (C)

Recovery Data:

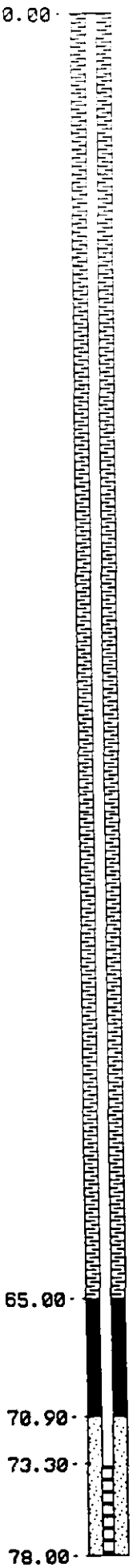
Q= S_0 =



Comments:

SJC/llr/DAP

SITE NAME HOD Landfill
LOCATION Antioch, Ill.
WC
SUPERVISED BY S. Chillson Warzyn



Well No. [illegible]
Boring No. X-Ref. [illegible]

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: 2115202N
1050628.3 E

Elevation Ground Level 767.5
Top of Casing 769.97

Drilling Summary:

Total Depth 16'
Borehole Diameter 8.5 in.
Casing Stick-up Height: 2.47 ft
Driller Joel Ruda
Exploration Technolgy Inc. (ETI)
for (E & F)
Rig CME850
Bit(s) 4¼ in. ID X 8.5 in. OD HSA

Drilling Fluid None

Protective Casing Alum. WMX Spec.

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	1993 5/26		5/26	
Geophys. Logging:				
Casing:				
Filter Placement:	5/26		5/26	
Cementing:				
Development:	6/1		6/1	

Well Design & Specifications

Basis: Geologic Log X Geophysical Log

Casing String (s): C=Casing S=Screen.

Depth		String(s)	Elevation
-2.47	5	C1	769.97 - 762.5
5	15	S1	762.5 - 752.5

Casing: C1 2 in. ID Schedule 40 PVC flush threaded
C2

Screen: S1 2 in. ID Schedule 40 PVC .010 Slot Size
S2

Filter Pack: Red flint sand (4 - 15 ft)

Grout Seal: None

Bentonite Seal: Hydrated Granular Bentonite (0 - 4 ft)

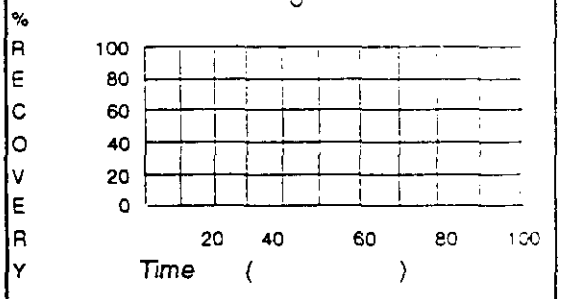
Well Development:
Surged & Purged with PVC bailer and steel cable. Purged 20 gals., one well volume = 1.5 gallons

Stabilizaton Test Data:

Time	pH	Spec. Cond.	Temp (C)

Recovery Data:

Q= S_o=



Comments: Pulled augers and redrilled w/wooden plug

SJC/llr/DAP

SITE NAME HOD Landfill
LOCATION Antioch, Ill.
WC
SUPERVISED BY S. Chillson - Warzyn

0.00
4.00
5.00
15.00

Well No W55
Boring No. X-Ref: W55

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: 2115375.1 N
1050760.5 E

Elevation Ground Level 771.10 ft MSL
Top of Casing 773.49

Drilling Summary:

Total Depth 16'
Borehole Diameter 8.5'
Casing Stick-up Height: 2.39'
Driller Charles Markgraf
Environmental & Foundation Drilling Inc.
(E & F)
Rig CME 750 ATV
Bit(s) 4 1/4" ID x 8.5" IDHSA

Drilling Fluid None

Protective Casing Alum WMX Spec. 5.5 ft

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	1993			
	4/21		4/21	
Geophys. Logging:				
Casing:				
Filter Placement:	4/21		4/21	
Cementing:				
Development:	5/4		5/4	

Well Design & Specifications

Basis: Geologic Log X Geophysical Log

Casing String (s): C=Casing S=Screen.

Depth	String(s)	Elevation
-2.39 - 5.22	C1	773.49 - 765.88
5.22 - 15.51	S1	768.88 - 755.59

Casing: C1 2in ID Schedule 40 PVC flush Thread
C2

Screen: S1 2" Schedule 40 PVC, 010 in. Slot size
S2

Filter Pack: 45-55 Redflint filter sand (3.9 - 15.51 ft)

Grout Seal: None

Bentonite Seal: Hydrated Granular Bentonite (0 - 3.9 ft)

Well Development:

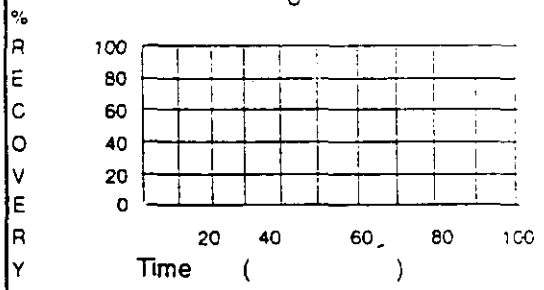
Surged & purged w/PVC Bailer & nylon rope. Purged 59.4 gallons, one well volume = 1.1 gallons

Stabilizaton Test Data:

Time	pH	Spec. Cond.	Temp (C)

Recovery Data:

Q= S_O =



Comments: Alconox solution was used for pre decon, of development equipment.

SJC/llr/DAP

SITE NAME HOD Landfill
LOCATION Antioch, IL
WELL
SUPERVISED BY S. Chillson - Urzyn Inc.

0.00
3.90
5.22
15.51

Well No. [illegible]
Boring No. X-Ref [illegible]

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: 2115399.4 N
1051541.1 E

Elevation Ground Level 764.9
Top of Casing 767.41

Drilling Summary:

Total Depth 16'
Borehole Diameter 8.5 in.
Casing Stick-up Height: 2.5'
Driller Charles Markgraf Environmental & Foundation Drilling, Inc. (E & F)
Rig CME750 ATV
Bit(s) 4¼ in. ID X 8.5 in OD HSA

Drilling Fluid None

Protective Casing Aluminum WMX Spec.

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	1993 4/16		4/16	
Geophys. Logging:				
Casing:				
Filter Placement:	4/16		4/16	
Cementing:				
Development:	5/4		5/4	

Well Design & Specifications

Basis: Geologic Log X Geophysical Log

Casing String (s): C=Casing S=Screen.

Depth		String(s)	Elevation
-2.51	5.02	C1	767.41 - 759.88
5.02	15	S1	759.88 - 749.9

Casing: C1 2 in. ID Schedule 40 PVC flush thread
C2

Screen: S1 2 in. ID Schedule 40 PVC .010" Slot Size
S2

Filter Pack: #45-55 Red flint sand (4 - 15 ft)

Grout Seal:

Bentonite Seal: Hydrated Bentonite Chips and Granular (0 - 4 ft)

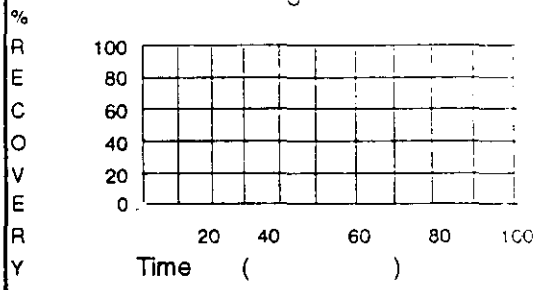
Well Development:
Surged & purged w/stainless steel bailer and steel cable purged 75 gallons, one volume = 2.1 gallons

Stabilizaton Test Data:

Time	pH	Spec. Cond.	Temp (C)

Recovery Data:

Q= S_0=



Comments:

SJC/TTF/DAP

SITE NAME HOD Landfill
LOCATION Antioch, Ill.
WC
SUPERVISED BY S. Chillson - Warzyn Inc.

0.00
4.00
5.00
15.00

Well No. [illegible]
Boring No. X-Ref. [illegible]

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: 2116326 N
1053153.3 E

Elevation Ground Level 780.2
Top of Casing 782.87

Drilling Summary:

Total Depth 100 ft
Borehole Diameter 8.5 in.
Casing Stick-up Height: 2.67 ft
Driller Charles Markgraf E & F

Rig CME750 ATV
Bit(s) 4¼ in. ID X 8½ in. OD HSA

Drilling Fluid Water

Protective Casing Alum. WMX Spec. - 7ft

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling	1993			
	4/14		4/14	
Geophys. Logging:				
Casing:				
Filter Placement:	4/14		4/14	
Cementing:				
Development:	5/5		4/14	

Well Design & Specifications

Basis: Geologic Log X Geophysical Log ____

Casing String (s): C=Casing S=Screen.

Depth		String(s)	Elevation	
-2.67	94.92	C1	782.87	685.28
94.92	99.94	S1	685.28	680.26

Casing: C1 2 in. ID Schedule 40 PVC, flush threaded
C2

Screen: S1 2 in. ID Schedule 40 PVC, .010 Slot Size
S2

Filter Pack: #45-55 Red flint sand (93-99.94 ft)

Grout Seal: Bentonite slurry (0-90 ft)

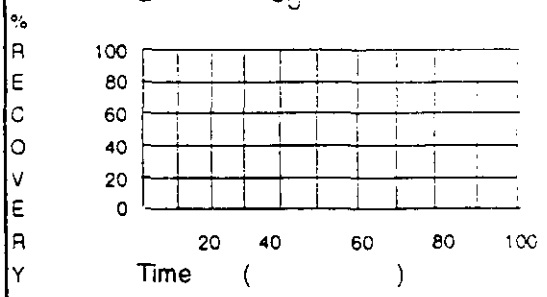
Bentonite Seal: Bentonite Chips (90-93 ft)

Well Development:
Surged & purged for 30 min. with PVC bailer and cable. Purged 100 gallons with keck pump. one well volume = 8.29 gallons

Stabilizaton Test Data:

Time	pH	Spec. Cond.	Temp (C)

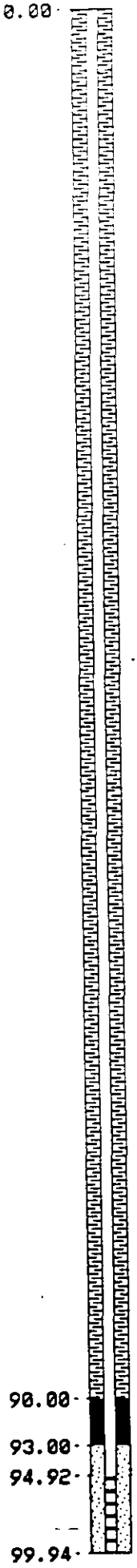
Recovery Data:
Q= S_o =



Comments:

SJC/llr/DAP

SITE NAME HOD Landfill
LOCAL Antioch, Ill.
WC
SUPERVISED BY S. Chillson Tarzyn Inc.



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MONITORING WELL DEVELOPMENT DATA

WELL DEVELOPMENT DATA SHEET

Project HOD | Date 5-6-93 | Page 1 of 1
Project Number 10010201 | Well Number W2D
Diameter of Well 2 inches | Length of Water Column 48.6 ft
Depth of Well 90.35 ft | One Well Volume 7.97 gallons
Initial Water Level 41.75 ft | Time 9:28
Field Personnel Steven Chillson, Terese Burke
Development Method PVC Bailer & Stainless Steel Cable/Keck Pump

WITHDRAWAL OF WELL VOLUMES

	Volume No. 1	Volume No. 52.5	Volume No.	Volume No.	Volume No.
Time End Flushing	10:00	17:30			
Volume Flushed	3 gals	420 gals			
Temperature	--	--			
Conductivity	--	--			
pH	--	--			
Odor	None	None			
Turbidity	Turbid	Clear			
Color	Gr Brown	Clear			
Other	--	--			

	Volume No.	Volume No.	Volume No.	Volume No.	Volume No.
Time End Flushing					
Volume Flushed					
Temperature					
Conductivity					
pH					
Odor					
Turbidity					
Color					
Other					

WELL CASING VOLUMES

GAL/FT			
	1-1/4"	=	0.077
	1-1/2"	=	0.10
	2"	=	0.164
	2-1/2"	=	0.24
	3"	=	0.37
	3-1/2"	=	0.50
	4"	=	0.65
	6"	=	1.46

Remarks:
Purged and surged 3 gallons at 10:00,
10:30 Pumping rate at approximately
1 gal/minute for 420 minutes
Total Volume Flushed = 423 gallons

TAB/rcs/SJC
[CHI 805 78]
10010201

WELL DEVELOPMENT DATA SHEET

Project HOD | Date 5-5-93 | Page 1 of 1
Project Number 10010201 | Well Number W3SA
Diameter of Well 2 inches | Length of Water Column 14.25 ft
Depth of Well 17.65 ft | One Well Volume 2.4 gallons
Initial Water Level 3.4 ft | Time 15:24
Field Personnel Terese Burke, Steven Chillson
Development Method SS Bailer & Nylon Rope

WITHDRAWAL OF WELL VOLUMES

	Volume No. 2	Volume No. 4	Volume No. 6	Volume No. 8	Volume No. 10
Time End Flushing	16:12	16:19	16:30	16:37	16:46
Volume Flushed	4.8 gals	4.8 gals	4.8 gals	4.8 gals	4.8 gals
Temperature		10°c	9°c	9°c	9°c
Conductivity		600	650	700	700
pH		7.11	7.19	7.17	7.19
Odor	None	None	None	None	None
Turbidity	Turbid	Turbid	Turbid	Turbid	Turbid
Color	Brown	Brown	Brown	Brown	Brown
Other					

	Volume No.	Volume No.	Volume No.	Volume No.	Volume No.
Time End Flushing					
Volume Flushed					
Temperature					
Conductivity					
pH					
Odor					
Turbidity					
Color					
Other					

WELL CASING VOLUMES

GAL/FT			
	1-1/4"	=	0.077
	1-1/2"	=	0.10
	2"	=	0.164
	2-1/2"	=	0.24
	3"	=	0.37
	3-1/2"	=	0.50
	4"	=	0.65
	6"	=	1.46

Remarks:
Surged and purged for 30 minutes
15:35-16:05 purged 5 gallons
Total volume flushed = 24 gallons

TAB/rcs/SJC
[CHI 805 78]
10010201

WELL DEVELOPMENT DATA SHEET

Project HOD | Date 5-5-93 | Page 1 of 1
Project Number 10010201 | Well Number W3SB
Diameter of Well 2 inches | Length of Water Column 28.9 ft
Depth of Well 32.6 ft | One Well Volume 4.7 gallons
Initial Water Level 3.7 ft | Time 15:26
Field Personnel Steven Chillson, Clayton Heffter
Development Method PVC Bailer, Steel Cable

WITHDRAWAL OF WELL VOLUMES

	Volume No. 4	Volume No. 8	Volume No. 12	Volume No. 16	Volume No. 20
Time End Flushing	16:18	16:30	16:45	17:00	17:14
Volume Flushed	20 gals	20 gals	20 gals	20 gals	20 gals
Temperature	10°c	10°c	10°c	10°c	10°c
Conductivity	1000	1000	1000	1000	1000
pH	7.06	7.17	7.19	7.17	7.16
Odor	None	None	None	None	None
Turbidity	Turbid	Turbid	Turbid	Sl Turbid	Sl Turbid
Color	Brown	Brown	Brown	Brown	Brown
Other					

	Volume No. 24	Volume No. 28	Volume No. 32	Volume No. 36	Volume No. 40
Time End Flushing	17:25	17:36	17:48	18:00	18:26
Volume Flushed	20 gals	20 gals	20 gals	20 gals	20 gals
Temperature	10°c	10°c	10°c	10°c	10°c
Conductivity	1000	1000	1000	1000	1000
pH	7.14	7.14	7.14	7.06	7.04
Odor	None	None	None	None	None
Turbidity	Sl Turbid	Sl Turbid	Sl Turbid	Sl Turbid	Sl Turbid
Color	Gray-Br	Gray-Br	Gray-Br	Gray-Br	Gray-Br
Other					

WELL CASING VOLUMES

GAL/FT			
	1-1/4"	=	0.077
	1-1/2"	=	0.10
	2"	=	0.164
	2-1/2"	=	0.24
	3"	=	0.37
	3-1/2"	=	0.50
	4"	=	0.65
	6"	=	1.46

Remarks:
Surged and purged for 30 minutes prior to withdraw of well volumes
Total volume flushed = 200 gallons

TAB/rcs/SJC
[CHI 805 78]
10010201

WELL DEVELOPMENT DATA SHEET

Project HOD
Date 5/27/93 Page 1 of 1
Project Number 10010201
Well Number W3D
Diameter of Well 2 inches
Length of Water Column 47.97
Depth of Well 80.60 TOIC
One Well Volume 7.9 gallons
Initial Water Level 32.63
Time 12:30
Field Personnel David A. Pieczynski
Development Method PVC Bailer & Cable

WITHDRAWAL OF WELL VOLUMES

	Volume No. 2.5	Volume No. 5	Volume No. 7.5	Volume No. 10	Volume No. 12.5
Time End Flushing	13:15	13:45	14:15	14:45	15:15
Volume Flushed	20 gals	20 gals	20 gals	20 gals	20 gals
Temperature	--	--	--	--	--
Conductivity	--	--	--	--	--
pH	--	--	--	--	--
Odor	None	None	None	None	None
Turbidity	Mod Turbid	Sl Turbid	Clear	Clear	Clear
Color	Lt Gray Br	Gray/Brn	Lt Gray Br	Lt Gray Br	Lt Gray Br
Other			--	--	--

	Volume No. 15	Volume No. 17.5	Volume No. 20	Volume No. 22.5	Volume No. 25
Time End Flushing	16:00	16:30	17:00	17:30	18:00
Volume Flushed	20 gals	20 gals	20 gals	20 gals	20 gals
Temperature	--	--	--	--	--
Conductivity	--	--	--	--	--
pH	--	--	--	--	--
Odor	None	None	None	None	None
Turbidity	Clear	Clear	Clear	Clear	Clear
Color	Lt Gray Br	Lt Gray Br	Lt Gray Br	Lt Gray Br	Lt Gray Br
Other					

WELL CASING VOLUMES

GAL/FT	1-1/4"	=	0.077
	1-1/2"	=	0.10
	2"	=	0.164
	2-1/2"	=	0.24
	3"	=	0.37
	3-1/2"	=	0.50
	4"	=	0.65
	6"	=	1.46

Remarks:
Surged & purged 1/2 hour
Removed 5 gals - gray, turbid, no odor
Bailed 200 gallons
Well volume = 7.9 gallons
Total Volume Flushed = 200 gallons

DAP/rcs/SJC
[chi 805 78]
10010201

WELL DEVELOPMENT DATA SHEET

Project HOD
Date 5/27/93 Page 1 of 1
Project Number 10010201
Well Number W4S
Diameter of Well 2 inches
Length of Water Column 8.78
Depth of Well 16.75
One Well Volume Approx. 1.4 gals
Initial Water Level 7.97
Time 10:05 a.m.
Field Personnel David A. Pieczynski
Development Method PVC Bailer & Cable

WITHDRAWAL OF WELL VOLUMES

	Volume No. 1	Volume No. 2	Volume No. 3	Volume No. 4	Volume No. 5
Time End Flushing	10:40	10:45	10:50	10:55	11:00
Volume Flushed	2 gals	2 gals	2 gals	2 gals	2 gals
Temperature	--	--	--	--	--
Conductivity	--	--	--	--	--
pH	--	--	--	--	--
Odor	None	None	None	None	None
Turbidity	Turbid	Turbid	Turbid	Turbid	Turbid
Color	Gray/Brn	Gray/Brn	Gray/Brn	Gray/Brn	Gray/Brn
Other					

	Volume No. 6	Volume No. 7	Volume No. 8	Volume No. 9	Volume No. 10
Time End Flushing	11:05	11:10	11:15	11:20	11:25
Volume Flushed	2 gals	2 gals	2 gals	2 gals	2 gals
Temperature	--	--	--	--	--
Conductivity	--	--	--	--	-
pH	--	--	--	--	--
Odor	None	None	None	None	None
Turbidity	Turbid	Turbid	Turbid	Turbid	Turbid
Color	Gray/Brn	Gray/Brn	Gray/Brn	Gray/Brn	Gray/Brn
Other					

WELL CASING VOLUMES

GAL/FT	1-1/4"	=	0.077
	1-1/2"	=	0.10
	2"	=	0.164
	2-1/2"	=	0.24
	3"	=	0.37
	3-1/2"	=	0.50
	4"	=	0.65
	6"	=	1.46

Remarks:
Surge & purge for 1/2 half hour
Water dark gray brown, turbid - pulled approximately 7 gallons during surge and purge
Purged total of 27 gallons

DAP/rcs/SJC
[chi 805 78]
10010201

WELL DEVELOPMENT DATA SHEET

Project HOD
Date 5-4-93 Page 1 of 2
Project Number 10010201
Well Number W5S
Diameter of Well 2 inches
Length of Water Column 7.0 ft
Depth of Well 17.5 ft
One Well Volume 1.1 gallons
Initial Water Level 10.5 ft
Time 13:21
Field Personnel Terese Burke
Development Method PVC Bailer and Nylon Rope

WITHDRAWAL OF WELL VOLUMES

	Volume No. 4.5	Volume No. 9	Volume No. 13.5	Volume No. 18	Volume No. 22.5
Time End Flushing	14:08	14:16	14:25	14:31	14:46
Volume Flushed	5 gals	5 gals	5 gals	5 gals	5 gals
Temperature	--	--	--	--	--
Conductivity	--	--	--	--	--
pH	--	--	--	--	--
Odor	None	None	None	None	None
Turbidity	Turbid	Turbid	Turbid	Turbid	Turbid
Color	Brown	Brown	Brown	Brown	Brown
Other					

	Volume No. 27	Volume No. 31.5	Volume No. 36	Volume No. 40.5	Volume No. 45
Time End Flushing	14:53	15:00	15:09	15:17	15:25
Volume Flushed	5 gals	5 gals	5 gals	5 gals	5 gals
Temperature	--	--	--	--	--
Conductivity	--	--	--	--	--
pH	--	--	--	--	--
Odor	None	None	None	None	None
Turbidity	Turbid	Turbid	Turbid	Turbid	Turbid
Color	Brown	Brown	Brown	Brown	Brown
Other					

WELL CASING VOLUMES

GAL/FT			
	1-1/4"	=	0.077
	1-1/2"	=	0.10
	2"	=	0.164
	2-1/2"	=	0.24
	3"	=	0.37
	3-1/2"	=	0.50
	4"	=	0.65
	6"	=	1.46

Remarks:
See Page 2 of 2

TAB/rcs/SJC
[CHI 805 78]
10010201

WELL DEVELOPMENT DATA SHEET

Project HOD | Date 5-4-93 | Page 2 of 2
Project Number 10010201 | Well Number W5S
Diameter of Well 2 inches | Length of Water Column 7.0 ft
Depth of Well 17.5 ft | One Well Volume 1.1 gallons
Initial Water Level 10.5 ft | Time 13:21
Field Personnel Terese Burke
Development Method PCB Bailer & Nylon Rope

WITHDRAWAL OF WELL VOLUMES

	Volume No. 45	Volume No. 49.5	Volume No. 54	Volume No.	Volume No.
Time End Flushing	15:48	15:55	16:10		
Volume Flushed	5 gals	5 gals	5 gals		
Temperature	--	--	--		
Conductivity	--	--	--		
pH	--	--	--		
Odor	None	None	None		
Turbidity	Sl Turbid	Sl Turbid	Sl Turbid		
Color	Brown	Brown	Brown		
Other					

	Volume No.	Volume No.	Volume No.	Volume No.	Volume No.
Time End Flushing					
Volume Flushed					
Temperature					
Conductivity					
pH					
Odor					
Turbidity					
Color					
Other					

WELL CASING VOLUMES

GAL/FT			
	1-1/4"	=	0.077
	1-1/2"	=	0.10
	2"	=	0.164
	2-1/2"	=	0.24
	3"	=	0.37
	3-1/2"	=	0.50
	4"	=	0.65
	6"	=	1.46

Remarks:
Total Volume Flushed = 65 gallons
Initially surged and purged for 30 minutes, removing 10 gallons of water
Alconox used to decon development equipment

TAB/rcs/SJC
[CHI 805 78]
10010201

WELL DEVELOPMENT DATA SHEET

Project HOD | Date 5-4-93 | Page 1 of 1
Project Number 10010201 | Well Number W6S
Diameter of Well 2 inches | Length of Water Column 12.77 ft
Depth of Well 17.09 ft | One Well Volume 2.1 gallons
Initial Water Level 4.32 ft | Time 15:26
Field Personnel Steve Chillson
Development Method SS Bailer and Cable and PVC Bailer

WITHDRAWAL OF WELL VOLUMES

	Volume No. 1	Volume No.	Volume No.	Volume No.	Volume No.
Time End Flushing					
Volume Flushed	75 gals				
Temperature	--				
Conductivity	--				
pH	--				
Odor	None				
Turbidity	--				
Color	--				
Other					

	Volume No.	Volume No.	Volume No.	Volume No.	Volume No.
Time End Flushing					
Volume Flushed					
Temperature					
Conductivity					
pH					
Odor					
Turbidity					
Color					
Other					

WELL CASING VOLUMES

GAL/FT	1-1/4"	=	0.077
	1-1/2"	=	0.10
	2"	=	0.164
	2-1/2"	=	0.24
	3"	=	0.37
	3-1/2"	=	0.50
	4"	=	0.65
	6"	=	1.46

Remarks:
37.5 volumes surged & purged

TAB/rcs/SJC
[CHI 805 78]
10010201

WELL DEVELOPMENT DATA SHEET

Project HOD | Date 5-5-93 | Page 1 of 1

Project Number 10010201 | Well Number W7D

Diameter of Well 2 inches | Length of Water Column 50.55 ft

Depth of Well 102.25 ft | One Well Volume 8.29 gallons

Initial Water Level 51.7 ft | Time 9:22

Field Personnel Terese Burke, Steven Chillson

Development Method PVC bailer & steel Cable/Keck pump

WITHDRAWAL OF WELL VOLUMES

	Volume No. 3	Volume No. 6	Volume No. 9	Volume No. 12	Volume No. 13
Time End Flushing	10:38	11:10	11:50	12:48	18:50
Volume Flushed	25 gals	25 gals	25 gals	25 gals	267 gals
Temperature	--	--	--	--	--
Conductivity	--	--	--	--	--
pH	--	--	--	--	--
Odor	--	--	--	--	--
Turbidity	Clear	Clear	Clear	Clear	Clear
Color	None	None	None	None	None
Other					

	Volume No.	Volume No.	Volume No.	Volume No.	Volume No.
Time End Flushing					
Volume Flushed					
Temperature					
Conductivity					
pH					
Odor					
Turbidity					
Color					
Other					

WELL CASING VOLUMES

GAL/FT			
	1-1/4"	=	0.077
	1-1/2"	=	0.10
	2"	=	0.164
	2-1/2"	=	0.24
	3"	=	0.37
	3-1/2"	=	0.50
	4"	=	0.65
	6"	=	1.46

Remarks:
Surged and purged for 30 minutes
and removed 4 gallons of water
Water slightly turbid and brown gray
very little silt.
Keck pump rate = .7 gallons/minute for
382 minutes starting at 12:50
Total Volume removed = 371 gallons

TAB/rcs/SJC
[CHI 805 78]
10010201

J

Results of In-Field Hydraulic Conductivity Testing

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A Q T E S O L V   R E S U L T S
Version 1.10

07/23/93 12:11:59

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TEST DESCRIPTION

Data set........... hodus1s.dat
Data set title..... HODUS1S

Knowns and Constants:
No. of data points.................. 70
Radius of well casing............... 0.083
Radius of well...................... 0.42
Aquifer saturated thickness......... 7
Well screen length.................. 5.7
Static height of water in well...... 10.6
Log(Re/Rw).......................... 2.236
A, B, C............................. 0.000, 0.000, 1.446

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ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

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RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	9.9055E-004	+/-	3.0552E-005
y0 =	2.7259E+000	+/-	2.7130E-002

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
Number of residuals............... 69
Number of estimated parameters.... 2
Degrees of freedom................ 67
Residual mean..................... 0.03595
Residual standard deviation....... 0.1162
Residual variance................. 0.01351

Model Residuals:

Time	Observed	Calculated	Residual	Weight

0.0033	3.22	2.7193	0.50072	1
0.0066	3.03	2.7127	0.31729	1
0.0099	2.85	2.7062	0.14385	1
0.0133	2.8	2.6994	0.10058	1
0.0166	2.78	2.6929	0.087106	1
0.0233	2.74	2.6797	0.060301	1
0.0266	2.72	2.6732	0.046776	1
0.03	2.71	2.6666	0.043431	1
0.0333	2.69	2.6601	0.029875	1
0.05	2.61	2.6278	-0.017755	1
0.0666	2.56	2.596	-0.035969	1
0.0833	2.52	2.5644	-0.04438	1
0.1	2.48	2.5332	-0.053175	1
0.1166	2.44	2.5025	-0.062533	1
0.1333	2.41	2.4721	-0.062081	1
0.15	2.37	2.442	-0.071999	1
0.1666	2.33	2.4125	-0.08246	1
0.1833	2.3	2.3831	-0.083104	1
0.2	2.27	2.3541	-0.084105	1
0.2166	2.24	2.3256	-0.085629	1
0.2333	2.2	2.2973	-0.09733	1
0.25	2.18	2.2694	-0.089374	1
0.2666	2.15	2.2419	-0.091924	1
0.2833	2.12	2.2146	-0.094642	1
0.3	2.09	2.1877	-0.097693	1
0.3166	2.07	2.1612	-0.091231	1
0.3333	2.04	2.1349	-0.094931	1
0.4167	1.91	2.0083	-0.098306	1
0.5	1.8	1.8893	-0.089329	1
0.5833	1.69	1.7774	-0.087401	1
0.6667	1.59	1.672	-0.081981	1
0.75	1.5	1.5729	-0.072929	1
0.8333	1.42	1.4797	-0.059746	1
0.9167	1.35	1.392	-0.04198	1
1	1.27	1.3095	-0.039516	1
1.0833	1.21	1.2319	-0.021937	1
1.1667	1.15	1.1589	-0.0088696	1
1.25	1.09	1.0902	-0.0002155	1
1.3333	1.04	1.0256	0.014371	1
1.4166	0.99	0.96487	0.025132	1
1.5	0.94	0.90764	0.032359	1
1.5833	0.91	0.85387	0.05613	1
1.6667	0.85	0.80323	0.046774	1
1.75	0.82	0.75564	0.064359	1
1.8333	0.77	0.71088	0.059125	1
1.9167	0.74	0.66871	0.071288	1
2	0.71	0.6291	0.080904	1
2.5	0.55	0.43603	0.11397	1
3	0.44	0.30222	0.13778	1
3.5	0.36	0.20947	0.15053	1
4	0.31	0.14519	0.16481	1
4.5	0.24	0.10063	0.13937	1
5	0.22	0.069749	0.15025	1
5.5	0.18	0.048344	0.13166	1
6	0.17	0.033507	0.13649	1
6.5	0.16	0.023224	0.13678	1
7	0.14	0.016097	0.1239	1
7.5	0.12	0.011157	0.10884	1
8	0.12	0.0077331	0.11227	1

8.5	0.12	0.0053599	0.11464	1
9	0.11	0.003715	0.10628	1
9.5	0.11	0.0025749	0.10743	1
10	0.1	0.0017847	0.098215	1
12	0.1	0.00041189	0.099588	1
14	0.11	9.5059E-005	0.1099	1
16	0.1	2.1938E-005	0.099978	1
18	0.11	5.0631E-006	0.10999	1
20	0.09	1.1685E-006	0.089999	1
22	0.1	2.6968E-007	0.1	1

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RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	9.9055E-004
y0 =	2.7259E+000

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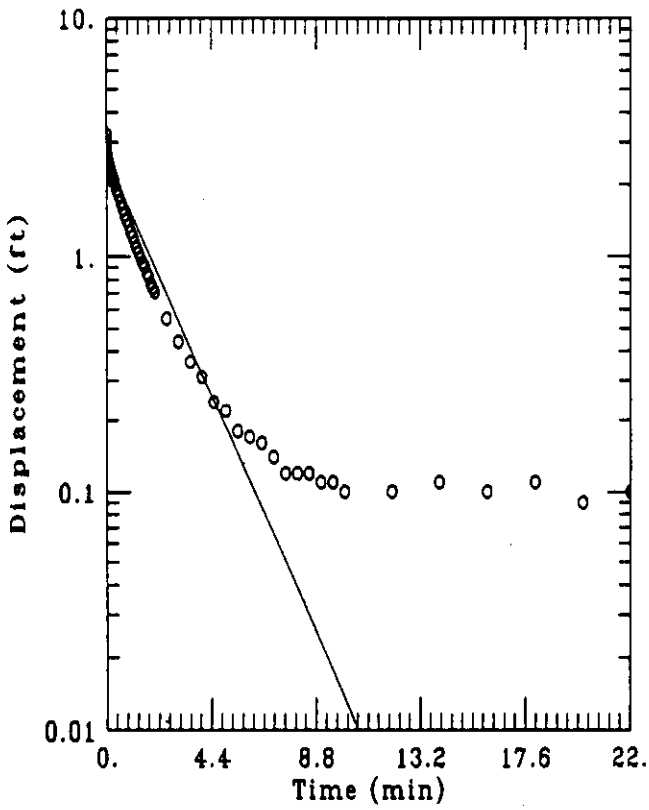
TYPE CURVE DATA

K = 7.10865E-004
y0 = 2.62271E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	2.623E+000	2.200E+001	2.465E-005		

HODUS1S



DATA SET
hodus1s dat
07/23/93

AQUIFER TYPE
Unconfined
SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS
K = 0.0007109 ft/min
y0 = 2.623 ft

TEST DATA:
H0 = 3.22 ft
rc = 0.083 ft
rw = 0.42 ft
L = 5.7 ft
b = 7 ft
H = 10.6 ft

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A Q T E S O L V   R E S U L T S

Version 1.10

07/23/93 10:38:36

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TEST DESCRIPTION

Data set........... hodus3s.dat
Data set title..... HODUS3S

Knowns and Constants:
No. of data points.................. 18
Radius of well casing............... 0.083
Radius of well...................... 0.42
Aquifer saturated thickness......... 23
Well screen length.................. 5.3
Static height of water in well...... 17.22
Log(Re/Rw).......................... 1.959
A, B, C............................. 1.964, 0.283, 0.000

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ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

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RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	4.1747E-002	+/-	3.1394E-003
y0 =	2.9503E+000	+/-	1.2233E-001

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
Number of residuals............... 17
Number of estimated parameters.... 2
Degrees of freedom................ 15
Residual mean..................... -0.008399
Residual standard deviation....... 0.1431
Residual variance................. 0.02047

Model Residuals:

Time	Observed	Calculated	Residual	Weight

0.0033	2.85	2.6476	0.20236	1
0.0066	1.95	2.3761	-0.42608	1
0.0099	2.05	2.1324	-0.082361	1
0.0133	2.05	1.9074	0.14262	1
0.0166	1.87	1.7117	0.15826	1
0.02	1.65	1.5311	0.11886	1
0.0233	1.44	1.3741	0.065912	1
0.0266	1.21	1.2331	-0.023148	1
0.03	1.08	1.103	-0.023041	1
0.0333	0.95	0.9899	-0.039902	1
0.05	0.51	0.57246	-0.062462	1
0.0666	0.27	0.33214	-0.062143	1
0.0833	0.15	0.19208	-0.042079	1
0.1	0.08	0.11108	-0.031079	1
0.1166	0.04	0.064448	-0.024448	1
0.15	0.01	0.021554	-0.011554	1
0.1666	0.01	0.012505	-0.0025054	1

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RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	4.1747E-002
y0 =	2.9503E+000

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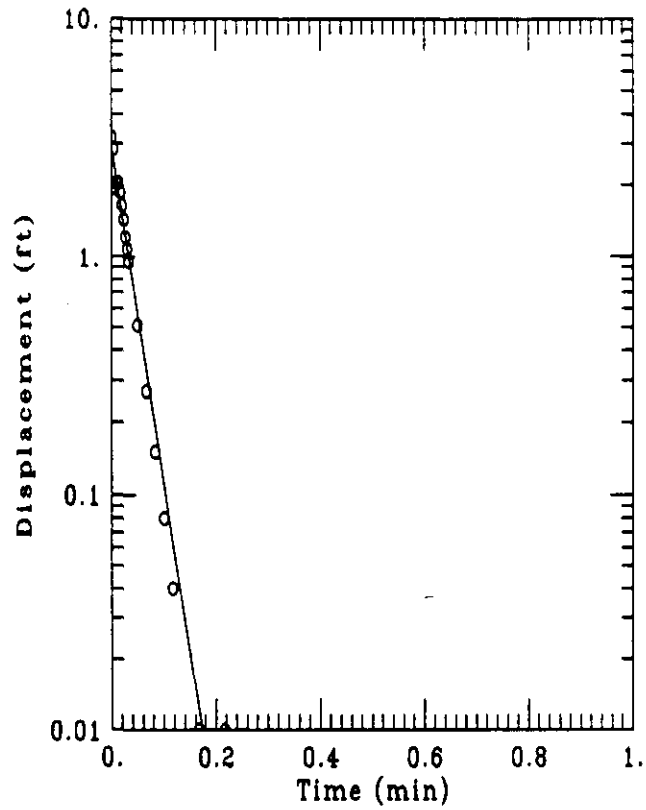
TYPE CURVE DATA

K = 4.17474E-002
y0 = 2.95025E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	2.950E+000	1.000E+000	1.689E-014		

HODUS3S



DATA SET
hodus3s dat
07/23/93

AQUIFER TYPE
Unconfined

SOLUTION METHOD
Bouwer-Rice

ESTIMATED PARAMETERS
K = 0.04175 ft/min
y0 = 2.95 ft

TEST DATA
H0 = 3.19 ft
rc = 0.083 ft
rw = 0.42 ft
L = 5.3 ft
b = 23 ft
H = 17.22 ft

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A Q T E S O L V   R E S U L T S
Version 1.10

7/23/93 09:39:32

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TEST DESCRIPTION

Data set........... hodus3d.dat
Data set title..... HODUS3D

Knowns and Constants:
- No. of data points.................. 73
- Radius of well casing............... 0.083
- Radius of well...................... 0.25
- Aquifer saturated thickness......... 45
- Well screen length.................. 5.3
- Static height of water in well...... 46.3
- Log(Re/Rw).......................... 3.44
- A, B, C.............................. 0.000, 0.000, 1.697

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ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

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RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	3.1761E-004	+/-	6.9269E-006
y0 =	3.3793E+001	+/-	6.6736E-001

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
- Number of residuals............... 23
- Number of estimated parameters.... 2
- Degrees of freedom................ 21
- Residual mean..................... -0.1087
- Residual standard deviation....... 0.3955
- Residual variance................. 0.1565

Model Residuals:

Time	Observed	Calculated	Residual	Weight

3.5	19.77	20.552	-0.78185	1
4	18.98	19.142	-0.16247	1
4.5	17.82	17.83	-0.0097381	1
5	16.62	16.607	0.01297	1
5.5	15.59	15.468	0.12183	1
6	14.52	14.407	0.11259	1
6.5	13.67	13.419	0.2506	1
7	12.78	12.499	0.28086	1
7.5	12.02	11.642	0.37801	1
8	11.06	10.844	0.21639	1
8.5	10.33	10.1	0.23001	1
9	9.66	9.4074	0.25263	1
9.5	8.99	8.7622	0.22776	1
10	8.39	8.1614	0.22865	1
12	6.07	6.1426	-0.072571	1
14	4.56	4.6232	-0.063152	1
16	3.18	3.4796	-0.29958	1
18	2.14	2.6189	-0.47887	1
20	1.43	1.9711	-0.54107	1
22	0.91	1.4835	-0.57351	1
24	0.48	1.1166	-0.63655	1
26	0.22	0.84036	-0.62036	1
28	0.06	0.63249	-0.57249	1

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RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	3.1761E-004
y0 =	3.3793E+001

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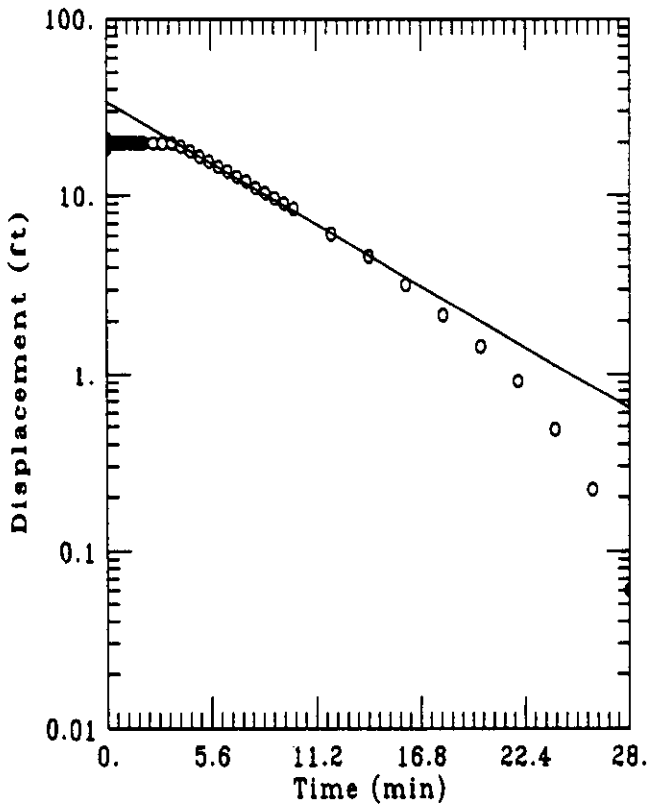
TYPE CURVE DATA

K = 3.17611E-004
y0 = 3.37926E+001

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	3.379E+001	2.800E+001	6.325E-001		

HODUS3D



DATA SET:
hodus3d dat
07/23/93

AQUIFER TYPE
Unconfined
SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS
K = 0.0003176 ft/min
y0 = 33.79 ft

TEST DATA:
H0 = 19.77 ft
rc = 0.083 ft
rw = 0.25 ft
L = 5.3 ft
b = 45. ft
H = 46.3 ft

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A Q T E S O L V   R E S U L T S

Version 1.10

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TEST DESCRIPTION

Data set........... hodus4s.dat
Data set title..... HODUS4S

Knowns and Constants:
No. of data points.................. 62
Radius of well casing............... 0.083
Radius of well...................... 0.42
Aquifer saturated thickness......... 13
Well screen length.................. 5.7
Static height of water in well...... 14.05
Log(Re/Rw).......................... 2.381
A, B, C............................. 0.000, 0.000, 1.446

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ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

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RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

Estimate
K = 4.5331E-002
y0 = 2.6111E+000

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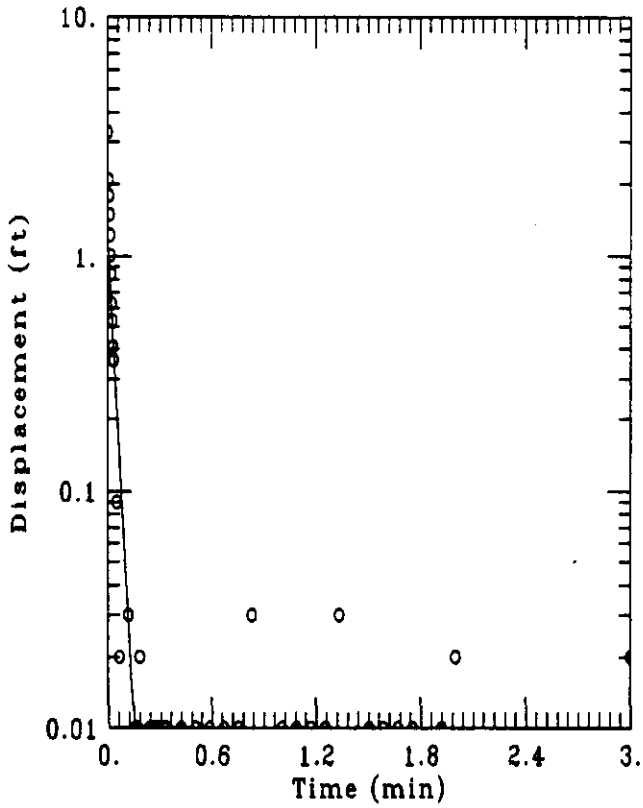
TYPE CURVE DATA

K = 4.53312E-002
y0 = 1.16866E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.169E+000	3.000E+000	1.067E-041		

HODUS4S



DATA SET
hodus4s dat
07/23/93

AQUIFER TYPE
Unconfined

SOLUTION METHOD
Bouwer-Rice

ESTIMATED PARAMETERS
K = 0.04533 ft/min
y0 = 1.169 ft

TEST DATA
H0 = 3.3 ft
rc = 0.083 ft
rw = 0.42 ft
L = 5.7 ft
b = 13 ft
H = 14.05 ft

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A Q T E S O L V R E S U L T S
Version 1.10

07/23/93 12:29:48

TEST DESCRIPTION

Data set........... hodus6s.dat
Data set title..... HODUS6S

Knowns and Constants:
- No. of data points.................. 53
- Radius of well casing............... 0.083
- Radius of well...................... 0.42
- Aquifer saturated thickness......... 36
- Well screen length.................. 5.7
- Static height of water in well...... 37.31
- Log(Re/Rw).......................... 2.843
- A, B, C............................. 0.000, 0.000, 1.446

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	1.0188E-001	+/-	1.2365E-002
y0 =	2.5321E+000	+/-	1.9691E-001

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
- Number of residuals............... 14
- Number of estimated parameters.... 2
- Degrees of freedom................ 12
- Residual mean..................... 0.04055
- Residual standard deviation....... 0.1558
- Residual variance................. 0.02429

Model Residuals:

Time	Observed	Calculated	Residual	Weight

0.0033	1.91	2.0821	-0.17215	1
0.0066	1.75	1.7121	0.037861	1
0.0099	1.6	1.4079	0.19212	1
0.0133	1.3	1.1509	0.14915	1
0.0166	1.03	0.94634	0.083661	1
0.02	0.75	0.77357	-0.02357	1
0.0233	0.52	0.6361	-0.1161	1
0.0266	0.26	0.52306	-0.26306	1
0.1	0.21	0.0067385	0.20326	1
0.1166	0.23	0.0025184	0.22748	1
0.1333	0.1	0.00093565	0.099064	1
0.2166	0.06	6.702E-006	0.059993	1
0.2333	0.06	2.49E-006	0.059998	1
0.25	0.03	9.2508E-007	0.029999	1

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RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	1.0188E-001
y0 =	2.5321E+000

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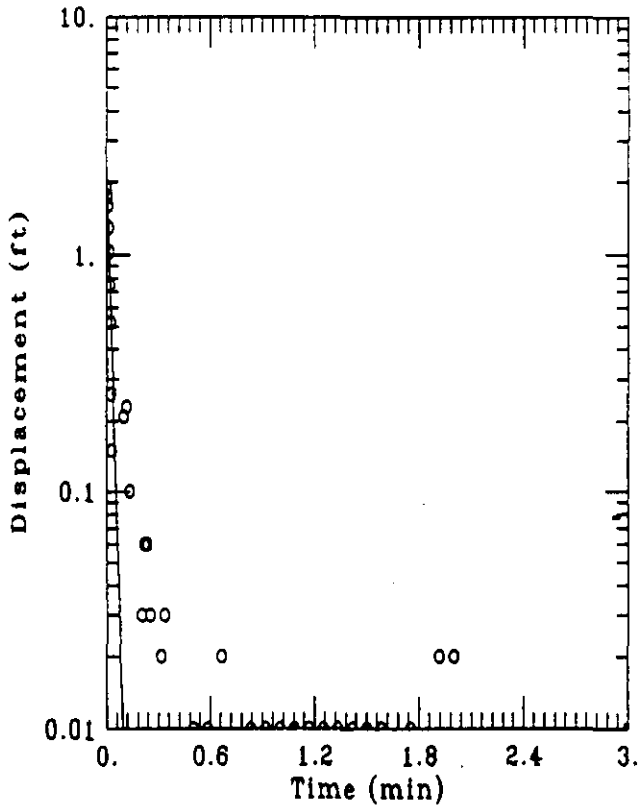
TYPE CURVE DATA

K = 1.01876E-001
y0 = 2.53212E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	2.532E+000	3.000E+000	1.432E-077		

HODUS6S



DATA SET
hodus6s dat
07/23/93

AQUIFER TYPE
Unconfined
SOLUTION METHOD
Bouwer-Rice

ESTIMATED PARAMETERS
K = 0.1019 ft/min
y0 = 2.532 ft

TEST DATA
H0 = 1.91 ft
rc = 0.083 ft
rw = 0.42 ft
L = 5.7 ft
b = 36 ft
H = 37.31 ft

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A Q T E S O L V R E S U L T S

Version 1.10

07/23/93 09:17:40

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TEST DESCRIPTION

Data set........... hodus6d.dat
Data set title..... HODUS6D

Knowns and Constants:
No. of data points.................. 60
Radius of well casing............... 0.083
Radius of well...................... 0.33
Aquifer saturated thickness......... 9.17
Well screen length.................. 5.7
Static height of water in well...... 45.64
Log(Re/Rw).......................... 3.181
A, B, C............................. 0.000, 0.000, 1.575

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ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

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RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	1.5072E-003	+/-	1.1139E-004
y0 =	2.0692E+001	+/-	8.8470E-001

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
Number of residuals............... 28
Number of estimated parameters.... 2
Degrees of freedom................ 26
Residual mean..................... -0.235
Residual standard deviation....... 1.786
Residual variance................. 3.189

Model Residuals:

Time	Observed	Calculated	Residual	Weight

0.0033	18.83	20.639	-1.8089	1
0.0133	18.4	20.478	-2.0777	1
0.0166	18.16	20.425	-2.2648	1
0.15	17.94	18.397	-0.45663	1
0.5	17.91	13.982	3.9279	1
0.5833	16.63	13.098	3.5319	1
0.6667	15.24	12.269	2.9709	1
0.75	13.85	11.493	2.3565	1
0.8333	12.51	10.767	1.7431	1
0.9167	11.42	10.085	1.3346	1
1	10.37	9.4479	0.92215	1
1.0833	9.15	8.8506	0.29943	1
1.1667	8.3	8.2904	0.0095951	1
1.25	7.46	7.7663	-0.3063	1
1.3333	6.51	7.2753	-0.76532	1
1.4166	5.98	6.8154	-0.83539	1
1.5	5.41	6.384	-0.97403	1
1.5833	4.79	5.9804	-1.1904	1
1.6667	4.26	5.6019	-1.3419	1
1.75	3.86	5.2478	-1.3878	1
1.8333	3.45	4.916	-1.466	1
1.9167	2.95	4.6049	-1.6549	1
2	2.69	4.3138	-1.6238	1
2.5	1.18	2.9149	-1.7349	1
3	0.61	1.9696	-1.3596	1
3.5	0.26	1.3309	-1.0709	1
4	0.09	0.8993	-0.8093	1
4.5	0.06	0.60767	-0.54767	1

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	1.5072E-003
y0 =	2.0692E+001

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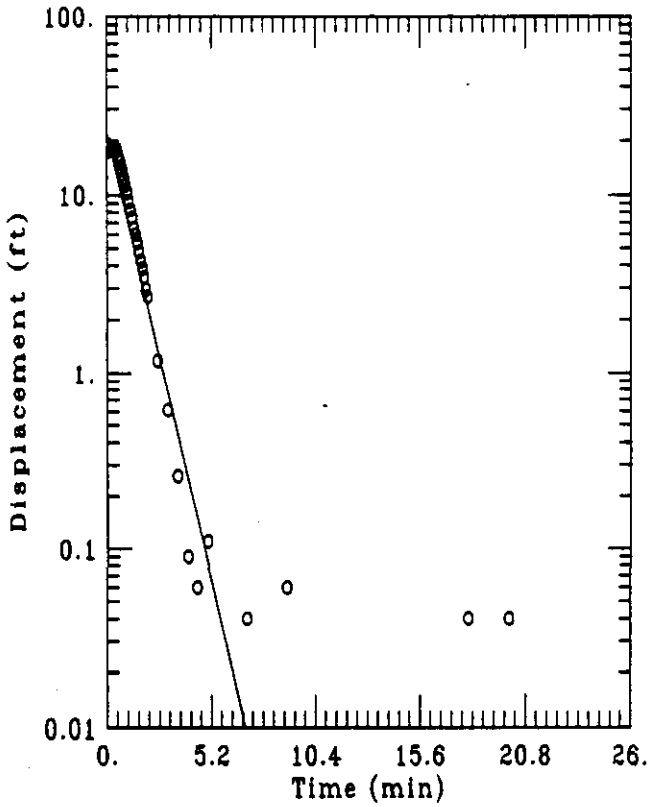
TYPE CURVE DATA

K = 2.14444E-003
y0 = 2.21310E+001

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	2.213E+001	2.600E+001	5.621E-012		

HODUS6D



DATA SET
hodus6d dat
07/23/93

AQUIFER TYPE
Unconfined

SOLUTION METHOD
Bouwer-Rice

ESTIMATED PARAMETERS
K = 0.002144 ft/min
y0 = 22.13 ft

TEST DATA:
H0 = 19.14 ft
rc = 0.083 ft
rw = 0.33 ft
L = 5.7 ft
b = 9.17 ft
H = 45.64 ft

<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<>>

AQTESOLV RESULTS
Version 1.10

)7/21/93 09:53:58

==
TEST DESCRIPTION

Data set........... a:hodw3sb.dat
Data set title..... HODW3SB

Knowns and Constants:
No. of data points.................. 20
Radius of well casing............... 0.083
Radius of well...................... 0.33
Aquifer saturated thickness......... 27.85
Well screen length.................. 4.3
Static height of water in well...... 27.85
Log(Re/Rw).......................... 2.799
A, B, C............................. 0.000, 0.000, 1.424

==
ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

==
RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	1.4052E-001	+/-	9.7995E-003
y0 =	7.5571E+000	+/-	3.7373E-001

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
Number of residuals............... 17
Number of estimated parameters.... 2
Degrees of freedom................ 15
Residual mean..................... 0.01731
Residual standard deviation....... 0.304
Residual variance................. 0.09241

Model Residuals:

Time	Observed	Calculated	Residual	Weight

0.0033	5.61	6.1451	-0.53506	1
0.0066	5.2	4.9968	0.20316	1
0.0099	4.45	4.0632	0.38684	1
0.0133	3.69	3.2833	0.40669	1
0.0166	2.96	2.6698	0.29019	1
0.02	2.22	2.1574	0.062616	1
0.0233	1.62	1.7543	-0.13427	1
0.0266	1.15	1.4265	-0.27648	1
0.03	0.78	1.1527	-0.37269	1
0.0333	0.41	0.93731	-0.52731	1
0.1	0.31	0.014329	0.29567	1
0.1166	0.2	0.0050621	0.19494	1
0.1833	0.07	7.7386E-005	0.069923	1
0.2	0.07	2.7168E-005	0.069973	1
0.2166	0.06	9.5981E-006	0.05999	1
0.2333	0.06	3.3697E-006	0.059997	1
0.25	0.04	1.183E-006	0.039999	1

==

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	1.4052E-001
y0 =	7.5571E+000

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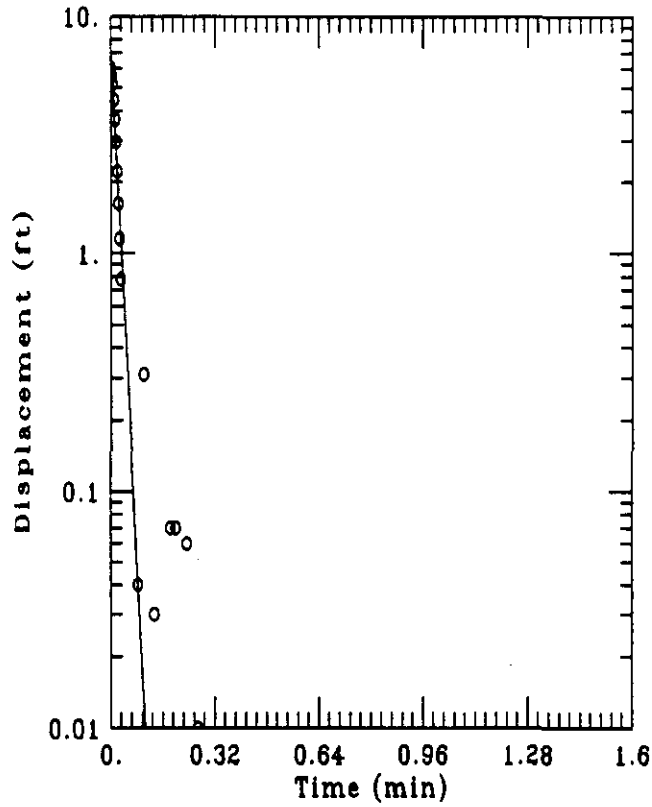
TYPE CURVE DATA

K = 1.40521E-001
y0 = 7.55713E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	7.557E+000	1.600E+000	2.109E-043		

HODW3SB



DATA SET:
a hodw3sb.dat
07/21/93

AQUIFER TYPE
Unconfined

SOLUTION METHOD
Bouwer-Rice

ESTIMATED PARAMETERS:
K = 0.1405 ft/min
y0 = 7.557 ft

TEST DATA:
H0 = 6.02 ft
rc = 0.083 ft
rw = 0.33 ft
L = 4.3 ft
b = 27.85 ft
H = 27.85 ft

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A Q T E S O L V   R E S U L T S
Version 1.10

07/23/93 08:56:05

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TEST DESCRIPTION

Data set........... hodw3d.dat
Data set title..... HODW3D

Knowns and Constants:
  No. of data points.................. 68
  Radius of well casing............... 0.083
  Radius of well...................... 0.33
  Aquifer saturated thickness......... 45
  Well screen length.................. 4.3
  Static height of water in well...... 43.53
  Log(Re/Rw).......................... 2.442
  A, B, C............................. 1.973, 0.286, 0.000

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ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

===

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	7.3898E-004	+/-	4.0658E-006
y0 =	8.7817E+000	+/-	1.4418E-002

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
  Number of residuals............... 61
  Number of estimated parameters.... 2
  Degrees of freedom................ 59
  Residual mean..................... -0.008165
  Residual standard deviation....... 0.06369
  Residual variance................. 0.004056

Model Residuals:

Time	Observed	Calculated	Residual	Weight

0.02	8.91	8.7156	0.19444	1
0.0233	8.85	8.7047	0.1453	1
0.0266	8.85	8.6939	0.15614	1
0.03	8.76	8.6827	0.0773	1
0.0333	8.74	8.6719	0.068118	1
0.05	8.6	8.6173	-0.017343	1
0.0666	8.53	8.5635	-0.033471	1
0.0833	8.46	8.5096	-0.049614	1
0.1	8.42	8.4561	-0.036096	1
0.1166	8.36	8.4032	-0.043231	1
0.1333	8.3	8.3504	-0.050382	1
0.15	8.25	8.2979	-0.047865	1
0.1666	8.19	8.246	-0.05599	1
0.1833	8.14	8.1941	-0.05413	1
0.2	8.14	8.1426	-0.0025958	1
0.2166	8.01	8.0917	-0.081691	1
0.2333	7.92	8.0408	-0.1208	1
0.25	7.95	7.9902	-0.040232	1
0.2666	7.89	7.9403	-0.05028	1
0.2833	7.84	7.8903	-0.050342	1
0.3	7.78	7.8407	-0.060719	1
0.3166	7.75	7.7917	-0.041702	1
0.3333	7.71	7.7427	-0.032698	1
0.4167	7.45	7.5025	-0.05255	1
0.5	7.22	7.2701	-0.050125	1
0.5833	7	7.0449	-0.0449	1
0.6667	6.83	6.8264	0.0036055	1
0.75	6.62	6.6149	0.0050838	1
0.8333	6.42	6.41	0.010011	1
0.9167	6.25	6.2112	0.038824	1
1	6.07	6.0188	0.051243	1
1.0833	5.85	5.8323	0.017701	1
1.1667	5.66	5.6514	0.008596	1
1.25	5.5	5.4763	0.023674	1
1.3333	5.35	5.3067	0.043328	1
1.4166	5.16	5.1423	0.017726	1
1.5	5.03	4.9828	0.047219	1
1.5833	4.84	4.8284	0.011583	1
1.6667	4.73	4.6787	0.051342	1
1.75	4.59	4.5337	0.056284	1
1.8333	4.43	4.3933	0.036736	1
1.9167	4.34	4.257	0.082998	1
2	4.21	4.1251	0.084878	1
2.5	3.45	3.4151	0.034913	1
3	2.8	2.8273	-0.027266	1
3.5	2.35	2.3406	0.0093758	1
4	1.94	1.9377	0.0022548	1
4.5	1.51	1.6042	-0.094212	1
5	1.34	1.3281	0.011913	1
5.5	1.04	1.0995	-0.059491	1
6	0.89	0.91024	-0.020241	1
6.5	0.71	0.75357	-0.043566	1
7	0.56	0.62386	-0.063859	1
7.5	0.47	0.51648	-0.046478	1
8	0.31	0.42758	-0.11758	1
8.5	0.29	0.35398	-0.063982	1
9	0.26	0.29305	-0.033053	1
9.5	0.22	0.24261	-0.022611	1
10	0.14	0.20085	-0.060852	1

12	0.01	0.094349	-0.084349	1
14	0.01	0.04432	-0.03432	1

==

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	7.3898E-004
y0 =	8.7817E+000

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TYPE CURVE DATA

K = 7.38976E-004
y0 = 8.78167E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	8.782E+000	2.200E+001	2.158E-003		

TYPE CURVE DATA

K = 7.38976E-004
y0 = 8.78167E+000

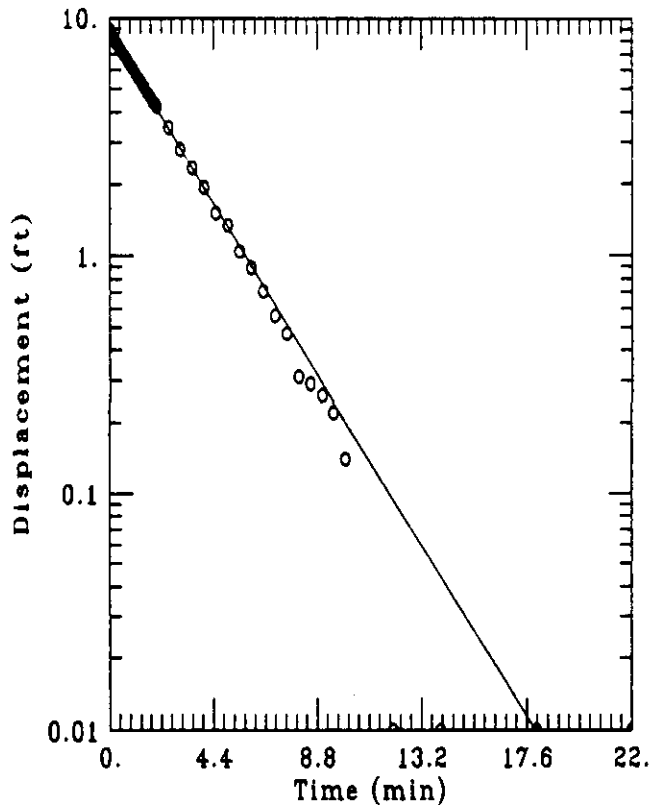
Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	8.782E+000	2.200E+001	2.158E-003		

TYPE CURVE DATA

K = 7.38976E-004
y0 = 8.78167E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	8.782E+000	2.200E+001	2.158E-003		

HODW3D



DATA SET

hodw3a dat

07/23/93

AQUIFER TYPE

Unconfined

SOLUTION METHOD

Bouwer-Rice

ESTIMATED PARAMETERS

K = 0.000739 ft/min

y0 = 8.782 ft

TEST DATA

H0 = 12.99 ft

rc = 0.083 ft

rw = 0.33 ft

L = 4.3 ft

b = 45 ft

H = 43.53 ft

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A Q T E S O L V   R E S U L T S
Version 1.10

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TEST DESCRIPTION

Data set........... HODW4S.DAT
Data set title..... HODW4S

Knowns and Constants:
No. of data points.................. 12
Radius of well casing............... 0.037
Radius of well...................... 0.33
Aquifer saturated thickness......... 9.36
Well screen length.................. 9.25
Static height of water in well...... 9.36
Log(Re/Rw).......................... 2.52
A, B, C............................. 0.000, 0.000, 1.907

==

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

==

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	1.8523E-002	+/-	1.6301E-003
y0 =	7.9727E+000	+/-	7.6883E-001

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
Number of residuals............... 11
Number of estimated parameters.... 2
Degrees of freedom................ 9
Residual mean..................... -0.01285
Residual standard deviation....... 0.2414
Residual variance................. 0.05828

Model Residuals:

Time	Observed	Calculated	Residual	Weight

0.0066	3.81	4.1386	-0.32863	1
0.0099	3.58	2.9818	0.59818	1
0.0133	2.16	2.1271	0.032879	1
0.0166	1.4	1.5326	-0.13256	1
0.02	0.93	1.0933	-0.16327	1
0.0233	0.68	0.78768	-0.10768	1
0.0266	0.53	0.56751	-0.037514	1
0.03	0.39	0.40484	-0.014844	1
0.0333	0.29	0.29168	-0.0016836	1
0.05	0.07	0.055515	0.014485	1
0.0666	0.01	0.010671	-0.00067128	1

==

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	1.8523E-002
y0 =	7.9727E+000

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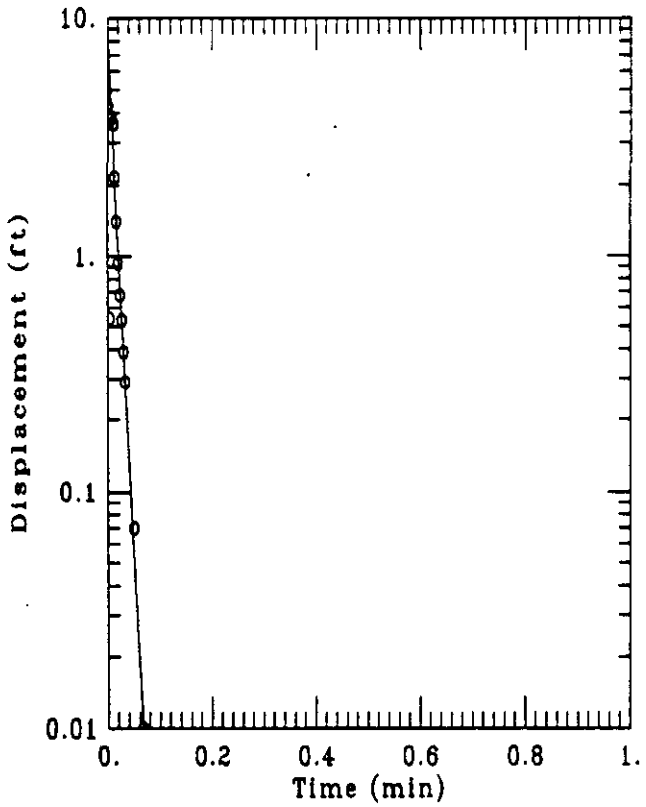
TYPE CURVE DATA

K = 1.85233E-002
y0 = 7.97274E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	7.973E+000	1.000E+000	5.723E-043		

HODW4S



DATA SET
HODW4S.DAT
07/20/93

AQUIFER TYPE
Unconfined

SOLUTION METHOD
Bouwer-Rice

ESTIMATED PARAMETERS
K = 0.01852 ft/min
y0 = 7.973 ft

TEST DATA
H0 = 4.27 ft
rc = 0.037 ft
rw = 0.33 ft
L = 9.25 ft
b = 9.36 ft
H = 9.36 ft

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A Q T E S O L V R E S U L T S

Version 1.10

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TEST DESCRIPTION

Data set........... a:hodw5s.dat
Data set title..... HODW5S

Knowns and Constants:
No. of data points.................. 37
Radius of well casing............... 0.037
Radius of well...................... 0.33
Aquifer saturated thickness......... 6.53
Well screen length.................. 9.12
Static height of water in well...... 6.53
Log(Re/Rw).......................... 2.288
A, B, C............................. 0.000, 0.000, 1.895

==

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

==

RESULTS FROM STATISTICAL CURVE MATCHING

STATISTICAL MATCH PARAMETER ESTIMATES

	Estimate		Std. Error
K =	5.6307E-003	+/-	2.2088E-004
y0 =	1.5763E+000	+/-	3.4140E-002

ANALYSIS OF MODEL RESIDUALS

residual = calculated - observed
weighted residual = residual * weight

Weighted Residual Statistics:
Number of residuals............... 34
Number of estimated parameters.... 2
Degrees of freedom................ 32
Residual mean..................... 0.01546
Residual standard deviation....... 0.04
Residual variance................. 0.0016

Model Residuals:

Time	Observed	Calculated	Residual	Weight

0.0033	1.42	1.4146	0.0053646	1
0.0066	1.26	1.2696	-0.0095595	1
0.0099	1.28	1.1394	0.14064	1
0.0133	0.91	1.0192	-0.10917	1
0.0166	0.85	0.91465	-0.064649	1
0.02	0.82	0.81816	0.0018383	1
0.0233	0.72	0.73426	-0.014256	1
0.0266	0.66	0.65896	0.0010444	1
0.03	0.62	0.58944	0.030558	1
0.0333	0.53	0.52899	0.0010078	1
0.05	0.3	0.30595	-0.0059453	1
0.0666	0.18	0.17753	0.0024738	1
0.0833	0.12	0.10267	0.017327	1
0.1	0.09	0.059382	0.030618	1
0.1166	0.06	0.034456	0.025544	1
0.1333	0.05	0.019928	0.030072	1
0.15	0.04	0.011525	0.028475	1
0.1666	0.03	0.0066877	0.023312	1
0.1833	0.03	0.0038679	0.026132	1
0.2	0.03	0.002237	0.027763	1
0.2166	0.03	0.001298	0.028702	1
0.2333	0.03	0.00075072	0.029249	1
0.25	0.03	0.00043419	0.029566	1
0.2666	0.03	0.00025194	0.029748	1
0.2833	0.03	0.00014571	0.029854	1
0.3	0.03	8.4272E-005	0.029916	1
0.3166	0.02	4.8899E-005	0.019951	1
0.3333	0.02	2.8281E-005	0.019972	1
0.4167	0.02	1.8361E-006	0.019998	1
0.5	0.02	1.196E-007	0.02	1
0.5833	0.02	7.79E-009	0.02	1
0.6667	0.02	5.0575E-010	0.02	1
0.75	0.02	3.2942E-011	0.02	1
0.8333	0.02	2.1457E-012	0.02	1

==

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

	Estimate
K =	5.6307E-003
y0 =	1.5763E+000

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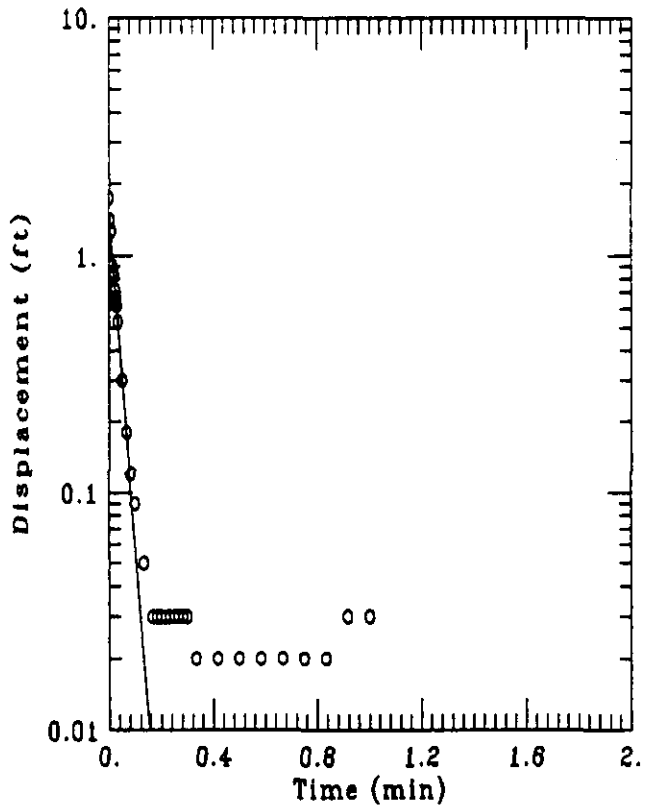
TYPE CURVE DATA

K = 5.63067E-003
y0 = 1.57629E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.576E+000	2.000E+000	5.223E-029		

HODW5S



DATA SET:
a:hodw5s.dat
07/21/93

AQUIFER TYPE
Unconfined

SOLUTION METHOD:
Bouwer-Rice

ESTIMATED PARAMETERS
K = 0.005631 ft/min
y0 = 1.576 ft

TEST DATA:
H0 = 1.75 ft
rc = 0.037 ft
rw = 0.33 ft
L = 9.12 ft
b = 6.53 ft
H = 6.53 ft

K

GROUNDWATER SAMPLING FIELD PARAMETER RESULTS

Field Parameters
HOD Landfill
Groundwater Sampling

	pH	°C Temperature	Specific Conductivity (ohms)[1]	Dissolved Oxygen (mg/l)	Oxidation Reduction (mV)
HD-GWUS1S-01	7.38	10.5	760	5.2 @ 9 °C	204 @ 11.3 °C
HD-GWUS1D-01	7.58	11	694	3.6 @ 10.5 °C	69 @ 12.5 °C
HD-GWUS3S-01	7.34	13.5	1025	4.3 @ 12 °C	224 @ 14 °C
HD-GWUS3I-01	8.12	12.5	626	6.9 @ 12 °C	84 @ 13.5 °C
HD-GWUS3D-01	7.34	14	1153	4.7 @ 14 °C	83 @ 10 °C
HD-GWUS4S-01	7.27	9.5	1144	6.2 @ 9 °C	50 @ 10.5 °C
HD-GWUS4D-01	7.82	12.5	546	3.4 @ 12 °C	40 @ 13.5 °C
HD-GWUS6S-01	7.17	11.5	835	3.5 @ 11 °C	63 @ 13 °C
HD-GWUS6I-01	8.17	12.5	680	5.4 @ 12 °C	65 @ 14 °C
HD-GWUS6D-01	7.68	13	598	3.5 @ 11.5 °C	20 @ 14 °C
*HD-GWW3SB-01	7.27	13.5	1298	8.4 @ 13 °C	91 @ 13 °C
*HD-GWW3D-01	7.47	14	1410	NM	98 @ 13.5 °C
*HD-GWW4S-01	6.92	14	1410	9.6 @ 14 °C	147 @ 14 °C
HD-GWW4S-91	6.91	13	1447	9.5 @ 13 °C	138 @ 13 °C
HD-GWW5S-01	6.79	12.5	1133	5.3 @ 12 °C	76 @ 13 °C
HD-GWW6S-01	6.95	12	2229	6.2 @ 11 °C	91 @ 12.5 °C
HD-GWW7D-01	7.88	12.5	600	3.2 @ 12 °C	65 @ 23.5 °C
HD-GWG11S-01	--	--	--	--	--
HD-GWG11D-01	--	--	--	--	--
HD-GWUS6S-91	7.18	10.5	859	4.8 @ 10 °C	57 @ 12 °C
HD-GWFB01-01	6.70	23	41	5.8 @ 23 °C	25 @ 23.5 °C
HD-GWFB02-01	6.65	20.5	10	10.1 @ 20 °C	8 @ 21.5 °C
HD-GWUS4D-91	7.85	12	NM	3.2 @ 11 °C	67 @ 13 °C
HD-FB03-01	7.85	16	26	9.2 @ 16 °C	76 @ 16 °C
HD-LCLP11-01	6.75	13	3947	4.2 @ 11.5 °C	50 @ 14 °C
HD-LCLP1-01	7.16	10	8714	1.6 @ 10 °C	42 @ 11 °C
HD-LCLP1-91	7.19	10	8714	0.8 @ 10 °C	21 @ 11 °C
HD-LCLP6-01	7.17	19	11931	1.0 @ 19 °C	-50 @ 19 °C
HD-LCFB01-01	6.52	13	13	7.0 @ 12.5 °C	40 @ 13.5 °C
HD-LCLP8-01	7.15	25	12900	1.4 @ 26 °C	82 @ 26.5 °C
HD-LCMHE-01	6.78	16	5121	3.4 @ 16 °C	72 @ 16.5 °C
HD-SWS201-01	7.65	17	595	9.0 @ 17 °C	61 @ 17 °C
HD-SWFB01-01	6.54	19	1	7.0 @ 18 °C	35 @ 19 °C
HD-SWS101-01	8.05	22	500	6.0 @ 22 °C	118 @ 22 °C
HD-SWS301-01	7.79	18.5	597	4.6 @ 18 °C	118 @ 19 °C
HD-SWS301-01	7.77	19	539	8.4 @ 19 °C	110 @ 20 °C
HD-VW03-01	7.45[2]	13	658	NM	NM
HD-VW05-01	7.52	15	750	NM	NM
HD-PW01-01	NR	NR	NR	NM	NM
HD-PW02-01	NS	NS	NS	NS	NS
HD-PW03-01	7.91	15	625	NM	NM
HD-PW04-01	7.59	16	609	NM	NM
HD-PW05-01	8.13[2]	15	625	NM	NM

NOTES:

NM = Parameter not measured
-- = Not enough sample in well for field parameters
* = Wells sampled on June 1, 1993
mg/l = Milligrams per liter (dissolved oxygen readings)
mV = Millivolts (oxidation reduction potential)
(1) = Conductivities corrected to 25°C
+ = Field Parameters not obtained due to lack of enough sample volume
(2) = pH meter not stabilizing, confidence in reading is low
NR = Not recorded
NS = Not sampled

DAP/gmg/SJC
[chi 403 96]
10010201/42225

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METEOROLOGICAL DATA

Meteorological data will
be included in the RI Report.