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OXY

Occidental Chemical Corporation

Industrial & Specialty Chemicals

Olin
CHEMICALS GROUP

MONITORING WELL / BOREHOLE STRATIGRAPHIC & INSTRUMENTATION LOGS

102nd Street Landfill
Remedial Investigation
Niagara Falls, New York

000547

April 1987
Ref. No. 1431
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CRA / WCC
ecology and environment

1.0 INTRODUCTION

This report represents all of the borehole and monitoring well installations undertaken in conjunction with the Remedial Investigation for the 102nd Street Landfill Site. Stratigraphic and instrumentation logs for both the Olin Corporation and the Occidental Chemical Corporation portions of the landfill are enclosed herein.

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102ND STREET LANDFILL

STRATIGRAPHIC AND INSTRUMENTATION LOGS

REMEDIAL INVESTIGATION

OCCIDENTAL CHEMICAL CORPORATION

000549

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: BH1-86 (BOREHOLE)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: DECEMBER 2, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: NEAR WELL OW22-79 (CENTRAL AREA OF SITE)

CRA SUPERVISOR: R. HOEKSTRA GROUND ELEVATION: * TOP OF PIPE ELEVATION: *

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Light brown silty CLAY - much vegetation, some pebbles (FILL)	Moist	4 3/4" Ø BH	1	SS	7	
	Red-brown silty CLAY - much vegetation, grading to sandy clay (FILL)	Moist				14	
	Brown silty SAND - some plastic, pebbles increasing with depth (FILL)	Moist		2	SS	11	
	Black silty CLAY - some white flyash (FILL)	Moist				19	
	Brown silty SAND - some flyash, many large stones, 2" pocket of white waste material at 5.5' (FILL)	Moist		3	SS	22	
5						12	
			CEM/BEN BKFL	4	SS	2	
						2	
	Gray-black sandy SILT - much flyash, many pebbles & stones, some white waste material, trace vegetation, white ceramic material at 7.5', trace wood, trace newspaper, trace glass, becoming saturated with depth (FILL)	Wet		5	SS	4	
						5	
10				6	SS	7	
						10	
				7	SS	5	
	Gray-brown CLAY - some silt, trace vegetation (NATIVE)	Wet				6	
	Gray-brown silty SAND - trace clay, trace vegetation, some black staining 14.0'-16.0'	Wet		8	SS	5	
15						5	
			16.0'				
	NOTES: - Borehole grouted to surface.						
20							

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: BH2-86

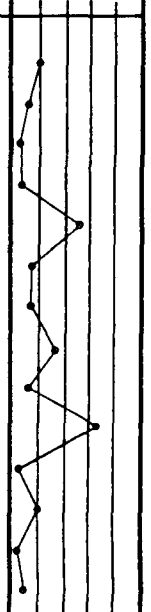
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: NOVEMBER 26, 1986

HOLE TYPE: HOLLOW STEM AUGER (4-3/4" DIAMETER) LOCATION: TOP OF EMBANKMENT WEST OF OW47-85

CRA SUPERVISOR: C. PADGINTON GROUND ELEVATION: * TOP OF PIPE ELEVATION: *

DEPTH (FEET)	STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE NUMBER	TYPE	BLOWS / FOOT
0	Red-brown silty CLAY - some vegetation, some gravel, becoming siltier with depth, brown & black mottling 2.0'-4.0' (FILL)	Wet	4 3/4" Ø BH	1	SS	20
						13
				2	SS	5
						7
				3	SS	52
5	Gray-brown clayey, sandy SILT - some gravel (FILL)	Wet				17
				4	SS	15
	Black-gray sandy SILT - some clay, some crushed red stone (FILL)	Wet				33
			CEM/BEN BKFL	5	SS	13
	Black SILT - some vegetation (FILL)	Wet				65
10	Black sandy SILT - some crushed pink stone, some white waste material (FILL)			6	SS	4
	Black SILT - some vegetation, crushed pink stone, orange brick pieces, small white stones & large stones (FILL)	Wet				20
				8	SS	4
						9
	Dark gray-black silty CLAY - some vegetation, (NATIVE)		14.0'			
15	Brown sandy SILT - trace vegetation, trace black clay					
20						

PENETRATION TEST BLOWS / FOOT



NOTES:
- Auger refusal at 10.8', move rig & auger to 10.0'; second refusal, repeat twice.
- Borehole grouted to surface.

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000551

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: BH3-86 (BOREHOLE)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: NOVEMBER 25, 1986

HOLE TYPE: HOLLOW STEM AUGER (4-3/4" DIAMETER) LOCATION: NORTH OF OW10-79 (WEST SIDE OF SITE)

CRA SUPERVISOR: C. PADGINTON GROUND ELEVATION: * TOP OF PIPE ELEVATION: *

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Dark brown sandy SILT - some clay, some vegetation, trace gravel, rock in end of spoon (FILL)	Wet	4 3/4" Ø BH	1	SS	4, 4	
	Gray gravelly SAND (FILL)	Dry		2	SS	70, 21	
5	Mottled white, brown, black, green, & gray FLYASH - some white waste material, some gravel, some brick, becoming saturated with depth (FILL)	Wet	CEM/BEN BKFL	3	SS	13, 10	
				4	SS	8, 7	
				5	SS	9, 6	
10				6	SS	3, 3	
	Green-black clayey SILT - some vegetation some wood pieces, plastic (FILL)	Wet		7	SS	4, 3	
	Green-black clayey SILT - some vegetation many fine roots (NATIVE)	Wet		8	SS	3, 7	
15	Gray fine silty SAND	Wet	16.0'				
	NOTES: - Borehole grouted to surface.						
20							

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW31-85 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 17, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: NORTHWEST CORNER OF SITE

CRA SUPERVISOR : D. MILLARD GROUND ELEVATION:* 575.8 TOP OF PIPE ELEVATION:* 579.13

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Dark brown TOPSOIL - trace vegetation (FILL)	Moist	579.13 Locking cap; 575.8 13" Ø BH	1	SS	12	
	Brown SILT - some clay, some fine sand, gray stone in spoon tip (FILL)	Moist	CEM/BEN seal			26	
	Gray FLYASH/CINDER material - occasisonal stone (FILL)	Dry	3.0'	2	SS	26	
						17	
	Gray-black CINDERS & FLYASH - occasional gravel, occasional fibrous material (FILL)	Dry	BEN seal 5.0'	3	SS	10	
5						8	
	Black CINDER/FLYASH - some hardened tar, trace fibrous material (FILL)	Dry	BS pipe	4	SS	6	
						3	
	Black CINDER/FLYASH - some fibrous material (FILL)	Dry-moist	Sand pack	5	SS	1	
			Well screen			1	
10	Black FLYASH - irridescent sheen on water (FILL)	Moist-wet		6	SS	1	
	Black TOPSOIL - some silt, some vegetation (NATIVE)	Wet	11.5'			1	
	Dark gray SILT - some clay, some fine sand, some clay, occasional vegetation	Moist	12.0'	7	SS	4	
	Gray very fine SAND - some silt, occasional vegetation	Moist	12.5' BEN seal 14.0'			6	
15							

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length. #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO.: OW32-85 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 21, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: NORTHWEST BOUNDARY OF SITE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 576.6 TOP OF PIPE ELEVATION:* 579.46

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Dark brown TOPSOIL - trace vegetation (FILL)	Moist	579.46 Locking cap; 576.6 13"-Ø BH	1	SS	8	
	Mottled red-brown & brown silty CLAY - trace sand (FILL)	Moist				18	
	Yellow-brown SILT & fine SAND (FILL)	Moist-dry	CEM/BEN seal	2	SS	16	
	Black FLYASH - some cinders, occasional stone, trace fibrous material, trace brick, trace slag (FILL)	Dry				13	
			4.0' BEN seal 5.0'	3	SS	13	
5						7	
	Black FLYASH & CINDERS - occasional slag, occasional brick, trace fibrous material (FILL)	Dry	BS pipe	4	SS	4	
						6	
	Black FLYASH & CINDERS - occasional slag, occasional brick, some cinders, trace fibrous material (FILL)	Dry-moist	Sand pack	5	SS	10	
						3	
10	Black FLYASH - trace glass, occasional vegetation (FILL)	Wet	Well screen	6	SS	1	
						2	
	Dark gray clayey SILT - some fine sand, occasional vegetation (NATIVE)	Wet-moist	12.1'	7	SS	4	
						6	
	Mottled gray & dark gray fine SAND - some silt, occasional vegetation	Moist	13.5' 14.0'	8	SS	1	
15	Gray fine SAND - some silt, occasional vegetation	Moist-wet	BEN/ sand seal 16.0'			3	

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW33-85 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 12, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: SOUTHWEST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 575.4 TOP OF PIPE ELEVATION:* 579.53

PROFILE: DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	TYPE	BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT
0	Dark brown TOPSOIL & VEGETATION (FILL)	Moist-dry	Locking cap; 579.53; 575.4; 13" Ø BH	1	SS	5	
	Brown TOPSOIL & silty SAND - occasional stone, occasional cinder (FILL)	Moist-dry				17	
	Black & white FLYASH (FILL)	Moist	CEM/BEN seal	2	SS	19	
	Gray-white soft WASTE MATERIAL - occasional blue discoloration (FILL)	Moist					
	Light gray FLYASH - occasional stone, fissile red-brown rock fragments in tip (FILL)	Moist	3.9'			26	
				3	SS	23	
5	Mottled black & white WASTE MATERIAL & FLYASH (FILL)	Moist	BEN seal			12	
			5.9'	4	SS	5	
	White chalk-like WASTE MATERIAL - becoming wet at 8.0' (FILL)	Moist	Sand pack			10	
				5	SS	7	
			Well screen			7	
10				6	SS	4	
	Black fibrous VEGETATION & silty TOPSOIL - black wood fragment at 11.5' (NATIVE)	Moist	10.9'			8	
			11.5' 12.0'	7	SS	3	
	Dark gray SILT with fibrous roots	Moist	BEN seal			12	
			14.0'				
15							

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa Sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000555

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO.: OW34-85 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 24, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: TOP OF RIVER BANK - WEST SIDE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 577.4 TOP OF PIPE ELEVATION:* 580.23

DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE NUMBER	TYPE	BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
0	Brown TOPSOIL - some vegetation (FILL)	Moist	580.23 Locking cap; 577.4; 13" Ø BH	1	SS	20	
	Red-brown & black silty CLAY - some stone, some cinders, occasional vegetation, occasional brick (FILL)	Moist				14+	
	Stone or boulder at 1.5', hard augering to 2.1'		CEM/BEN seal	2	SS	6	
	Brown silty CLAY with black CINDERS - occasional stone, trace fine sand (FILL)	Moist	3.1'			13	
	Black FLYASH - occasional brown silty clay, occasional cinder (FILL)	Moist	BEN seal 5.0'	3	SS	5	
5						9	
	Brown, dark brown & black FLYASH, SILT, CLAY, & CINDERS - occasional stone (FILL)	Moist	BS pipe	4	SS	13	
						16	
	Black FLYASH - occasional yellow nodule, occasional gray lense of soft material, piece of wood (FILL)	Moist	Well screen	5	SS	5	
	Black FLYASH - occasional cinder, occasional stone, occasional brown clayey lense, piece of wood (FILL)	Moist	Sand pack			7	
10				6	SS	7	
	Black FLYASH - some sand, occasional brown cinder, occasional stone, trace clay, some gravel at 11.8' (FILL)	Moist				8+	
	Augered through to 13.0'		12.0'; 12.5'				
	Dark gray silty CLAY with vegetation (NATIVE)	Moist	13.0'	7	SS	5	
	Dark gray silty fine SAND with vegetation	Moist	BEN seal			8	
	Dark gray SILT - some fine sand	Wet	15.0'				
15							

NOTES:
Split spoon bouncing at 11.8' and 12.0', augered to 13.0'.

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW35-85 (FILL WELL)

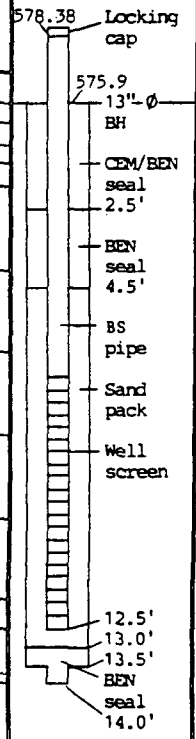
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 28, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: TOP OF RIVER BANK - CENTRAL AREA

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 575.9 TOP OF PIPE ELEVATION:* 578.38

DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE BLOWS / FOOT
0	Brown fine sandy SILT - some vegetation, trace clay (FILL)	Moist-dry	578.38 Locking cap; 575.9; 13"-Ø BH	1	SS	13
	Black FLYASH - occasional stone (FILL)	Moist-dry				21
	Brown sandy SILT - some vegetation (FILL)	Moist-dry	CEM/BEN seal 2.5'			
	Black FLYASH, occasional cinder (FILL)	Dry		2	SS	9
	Black FLYASH (FILL)	Dry	BEN seal 4.5'			9
				3	SS	10
5	Black & rust colored FLYASH & hardened tarlike WASTE MATERIAL - occasional cinder, trace yellow powder (FILL)	Dry	BS pipe			11
				4	SS	6
	Black & red-brown FLYASH - occasional stone, occasional brick fragment, wood & plastic in tip of spoon (FILL)	Moist	Sand pack			6
				5	SS	7
	Black CINDERS & FLYASH - some wood, some tarlike waste material, white waxlike waste material at 9.5' (FILL)	Moist	Well screen			12
10				6	SS	12
	Black conglomerate of FLYASH & VEGETATION - occasional stone (FILL)	Wet				8
	Black FLYASH, WOOD & VEGETATION - occasional stone (FILL)	Wet	12.5'	7	SS	3
	Dark gray silty CLAY - occasional vegetation (NATIVE)	Wet-moist	13.0'			8
	Dark gray fine sandy SILT - occasional vegetation, irridescent sheen on water	Moist	13.5' BEN seal 14.0'			
15						

PENETRATION TEST BLOWS / FOOT: 20 40 60 80



NOTES:
Resampled 10.0-12.0' at EPA request; 1" recovery of stone and flyash.

Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000557

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW36-85 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 29, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: TOP OF RIVER BANK - CENTRAL AREA

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 575.4 TOP OF PIPE ELEVATION:* 579.45

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Brown sandy TOPSOIL - some vegetation, occasional stone (FILL)	Moist-dry	579.45 Locking cap; 575.4; 13" Ø BH	1	SS	10	
	Brown silty CLAY - some sand, some stone (FILL)	Moist-dry	CEM/BEN seal			12	
	Gray-brown fine SAND & SILT - trace vegetation (FILL)	Moist-dry	2.0' BEN seal	2	SS	9	
	Brown-black & white conglomerate of FLYASH, CLAY & SILT - occasional white waste material, trace vegetation, trace stone (FILL)	Moist-dry	14" Ø SC 4.5'	3	SS	WOR	
5	Grinding during augering at 3.0-4.0'.		BS pipe	4	SS	WOR	
	No recovery		Sand pack; Well screen				
10	Black FLYASH - occasional stone, occasional paper, trace oily globules, irridescent sheen on water surface (FILL)	Wet	11.0'	5	SS	2	
	Dark gray clayey SILT with vegetation - trace NAPL in soil partings (NATIVE)	Wet	11.5'; 12.0' BEN seal			4	

NOTES:
Apparent void from 4.0-10.0'; recovered 1" wet black flyash at 9.5'. During well placement began losing sand at 4.6', installed 14" Ø steel casing 6" into sand pack, installed well inside large casing.

Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW37-85 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 31, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 573.7 TOP OF PIPE ELEVATION:* 576.77

PROFILE: DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE NUMBER	TYPE	BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT
0	Dark gray SILT - some gravel, some flyash, trace vegetation (FILL)	Moist	Locking cap; 576.77; 573.7; 13" Ø BH; CEM/BEN seal; 2.0' BEN seal; 3.0' BS pipe; Sand pack; Well screen	1	SS	9	
						13	
				2	SS	12	
	Black CINDERS & FLYASH (FILL)	Moist				87	
				3	SS	53	
5	Black FLYASH & CINDERS - piece of plastic, 1/4" lense of gray material at 5.9' (FILL)	Moist				26	
				4	SS	28	
	Black FLYASH & CINDERS - occasional stone, trace gray material at 6.8', 3" wood at 7.6' (FILL)	Wet				65	
				5	SS	33	
	Dark gray FLYASH & fine SAND - trace fine gravel, wood fibers & steel fragments at 8.0-8.2', 3" concrete at 9.8' (FILL)					2	
10	Mottled dark gray & black clayey SILT & VEGETATION (NATIVE)	Moist	10.0'	6	SS	5	
						8	
	Dark gray sandy SILT	Moist	11.5'; 12.0' BEN seal				

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa Sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000559

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW38-85 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: NOVEMBER 1, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: SOUTH CENTRAL AREA OF SITE ("FORMER DITCH")

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 576.2 TOP OF PIPE ELEVATION:* 579.34

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Red-brown silty CLAY - trace vegetation, trace topsoil (FILL)	Moist	579.34 Locking cap; 576.2; 13"-Ø BH; CEM/BEN seal	1	SS	8	
						19	
	Mottled brown & gray-brown clayey SILT & fine SAND - occasional stone (FILL)	Moist		2	SS	6	
	Gray SILT - occasional cinder, occasional coal pieces, occasional medium stone (FILL)	Moist	BS pipe			19	
				3	SS	3	
5	Black FLYASH (FILL)	Dry	4.5'; BEN seal			3	
				4	SS	1	
	Black FLYASH - trace paper, trace glass, trace stone (FILL)	Wet	6.5'			1	
				5	SS	18	
	Black & red-brown FLYASH - occasional piece of glass, occasional paper (FILL)	Wet	Sand pack			10	
10				6	SS	1	
	Black FLYASH - occasional piece of glass, trace irridescent sheen on water (FILL)	Wet	Well screen			2	
				7	SS	2	
	Black FLYASH - piece of plastic (FILL)					5	
	Black clayey SILT - some fine sand, occasional vegetation (NATIVE)	Moist	14.0'; 14.5'	8	SS	5	
15						6	
	Black fine SAND - some silt	Moist	BEN seal	9	SS	4	
	Black fine SAND & SILT - occasional vegetation, occasional minor lense of saturated coarse sand	Wet				10	
			18.0'	10	SS	4	
	Black fine SAND & SILT - becoming gray at tip, occasional vegetation, occasional saturated lense, irridescent sheen on water	Wet				4	
20			20.0'				

NOTES:
14.0-16.0' split spoon sample lost before EPA examination; made two unsuccessful attempts to resample.

Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length. #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: OW39-85 (FILL WELL)

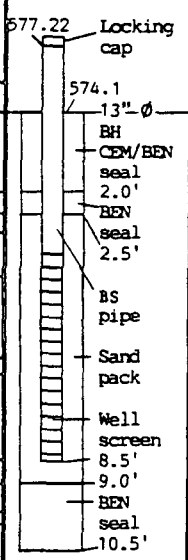
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: NOVEMBER 7, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: NORTH SIDE OF SITE - 200' E. OF FORMER DITCH

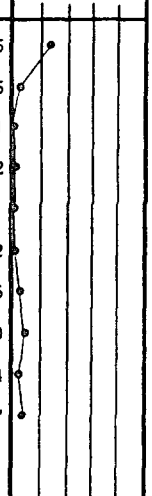
CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 574.1 TOP OF PIPE ELEVATION:* 577.22

PROFILE: DEPTH	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT
0	Brown silty TOPSOIL - occasional vegetation piece of concrete, piece red clay tile (FILL)	Moist	1	SS	25
					6
	White soft WASTE MATERIAL (FILL)	Moist	2	SS	1
	Gray-brown coarse to medium SAND - some stone (FILL)	Moist			2
	Mottled red-brown silty CLAY - trace cinders (FILL)	Moist	3	SS	1
5	Mottled silty CLAY - trace cinders, trace gravel, trace sand (FILL)	Moist			2
	Gray coarse to medium SAND & CINDERS - trace silty clay (FILL)	Wet	4	SS	5
	Gray-white soft WASTE MATERIAL - piece of wood (FILL)	Wet			10
	Black sandy TOPSOIL - occasional vegetation (NATIVE)	Moist	5	SS	4
					7
	Gray silty fine SAND	Moist			
10	Mottled red-brown silty CLAY	Moist			

MONITOR INSTALLATION



PENETRATION TEST BLOWS / FOOT



NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW40-85 (ALLUVIUM WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: NOVEMBER 13, 1985

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID/13" OD) LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 573.7 TOP OF PIPE ELEVATION:* 576.76

DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE TYPE	BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
			Locking cap 576.76				
			573.7				
0	Dark gray SILT - some gravel, some flyash, trace vegetation (FILL)	Moist	BS pipe				
	Black CINDERS & FLYASH (FILL)	Moist	CEM/BEN BKFL				
5	Black FLYASH & CINDERS - piece of plastic, 1/4" lense of gray material at 5.9' (FILL)	Moist	13" Ø BH				
	Black FLYASH & CINDERS - occasional stone, trace gray material at 6.8', 3" wood at 7.6' (FILL)	Wet					
	Dark gray FLYASH & fine SAND - trace fine gravel		8.0'				
	Mottled brown-black TOPSOIL & VEGETATION, becoming clayey silt (NATIVE)	Moist	BEN seal	1	SS	3	
10	Mottled brown & dark gray SAND & SILT with vegetation	Moist				3	
	Mottled brown & dark gray fine sandy SILT with vegetation throughout	Moist-wet	11.0'	2	SS	6	
	Gray-brown fine sandy SILT with vegetation throughout, occasional fine sandy lense	Moist-wet				6	
	Gray fine SAND & SILT -some vegetation throughout, occasional shell fragment	Moist-wet		3	SS	2	
			SD pack			6	
15	Dark gray fine SAND & SILT with occasional black layering	Wet		4	SS	1	
						1	
				5	SS	WOR	
	Gray & dark gray fine SAND & SILT -small stone, trace shell, trace silt	Wet				5	
				6	SS	2	
20						3	
				7	SS	10	
	Gray medium to coarse SAND & GRAVEL - occasional white shell, trace silt	Wet				22	
				8	SS	7	
			SS screen			11	
25				9	SS	6	
						11	
	Dark gray coarse SAND & GRAVEL - occasional white shell	Wet		10	SS	17	
			28.2'			11	
	Red-brown CLAY, plastic - irridescent sheen on water at clay contact	Wet	28.7' 29.0'				
30							

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa Sand

Stratigraphy 0-9.0' from OW37-85.

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000562

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW41-85 (SHALLOW BEDROCK)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: APRIL 2, 1986

HOLE TYPE: HOLLOW STEM AUGER (6-1/4" ID/11" OD) LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST/ENGINEER: D. MILLARD GROUND ELEVATION:* 573.7 TOP OF PIPE ELEVATION:* 576.16

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
			576.16				
0	Dark gray SILT - some gravel, some flyash, trace vegetation (FILL)	Moist	573.7				
	Black CINDERS & FLYASH (FILL)	Moist	CEM/BEN BKFL				
5	Black FLYASH & CINDERS - piece of plastic, 1/4" lense of gray material at 5.9' (FILL)	Moist					
	Black FLYASH & CINDERS - occasional stone, trace gray material at 6.8', 3" wood at 7.6' (FILL)	Wet	5" Ø SC				
	Dark gray FLYASH & fine SAND - trace fine gravel (FILL)						
	Mottled brown-black TOPSOIL & VEGETATION, becoming clayey silt (NATIVE)	Moist					
10	Mottled brown & dark gray SAND & SILT with vegetation	Moist	13" Ø BH				
	Mottled brown & dark gray fine sandy SILT with vegetation throughout	Moist-wet					
	Gray-brown fine sandy SILT with vegetation throughout - occasional fine sandy lense	Moist-wet					
	Gray fine SAND & SILT -some vegetation throughout, occasional shell fragment	Moist-wet					
15	Dark gray fine SAND & SILT with occasional black layering	Wet					
20	Gray & dark gray fine SAND & SILT -small stone, trace shell, trace silt	Wet					
25	Gray medium to coarse SAND & GRAVEL - occasional white shell, trace silt	Wet					
	Dark gray coarse SAND & GRAVEL - occasional white shell	Wet		1	SS	42	
	Red-brown CLAY	Wet				3	
	Augered to 30.0'						
30				2	SS	WOR	
						WOR	
	Red-brown CLAY -occasional silty lenses increasing with depth, occasional small stone	Wet		3	SS	WOR	
						WOR	

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000563

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW41-85 Page 2 of 3

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: NOVEMBER 25, 1985

HOLE TYPE: HOLLOW STEM AUGER (6-1/4" ID/11" OD) LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 573.7 TOP OF PIPE ELEVATION:* 576.16

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
	Red-brown CLAY - occasional silty lenses increasing with depth, occasional small stone Wet	13" Ø BH	4	SS	WOR	
35					4	
	Red-brown SAND, SILT & CLAY -some gravel (TILL) Wet	CEM/BEN BKFL	5	SS	66	
	Brown SAND, SILT & GRAVEL -trace clay Wet				73	
		5" Ø SC	6	SS	36	
					100+	
		39.5'				
40	NOTES: Stratigraphy 0-28.0' from OW40-85. Well Pipe: 5" diameter black steel					

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: OW41-85 PAGE 3 OF 3

PROJECT NO.: 9-1431

DATE COMPLETED: APRIL 2, 1986

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" Ø NX CORE

LOCATION: TOP OF BANK AT SOUTHEAST CORNER OF SITE

CRA SUPERVISOR: D. MILLARD/C. PADGINTON

DEPTH	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	CORE RECOVERY	RQD	DRILLING RATE	WATER PRESSURE TEST	ELEVATION	MONITOR INSTALLATION
ft BG				%	%	%	cm/s	ft AMSL	
									13" Ø BH
40		1	39.7	100	48.6	18		534.0	5" Ø SC; CEM/BEN BKFL
45	DOLOMITE (LOCKPORT GROUP - OAK ORCHARD FORMATION): gray, fine to medium grained, thinly bedded, numerous shaly & carbonaceous partings, vuggy and pitted with some secondary gypsum replacement	2	45.7	91	20.3	12		528.0	3" Ø BH
		3	49.0	110	43.0	75		524.7	
50		4	53.3	96	28.9	83		520.4	
	- bioherm from 54.1'-54.3'								
55			55.3					518.4	

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000565

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: BH42-86

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: MARCH 10, 1986

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID/13" OD) LOCATION: RIPRAP TERRACE, SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION: * 570.4 TOP OF PIPE ELEVATION: *

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT
0			570.4				
	Augered through						
	Red-brown & dark brown SILT - some vegetation, some fine sand, some gravel (FILL)	Wet		1	SS	44	
						81	
5	Gray-green STONE & ROCK -occasional white shell, becoming gray-white at 6.0' (FILL)	Moist		2	SS	100+	
	Black FLYASH & VEGETATIVE MATTER - rotting organic odor (FILL)	Moist				23	
	Dark brown SILT & VEGETATIVE MATTER - strong rotting vegetation odor (NATIVE)	Moist	13" Ø BH			17	
	Gray fine SAND & SILT - vegetation throughout, black mottling decreasing with depth	Moist-wet		3	SS	4	
						3	
10				4	SS	3	
	Gray SILT & fine SAND - occasional vegetation decreasing with depth, occasional pebble	Wet	CEM/BEN BKFL			6	
						5	
				5	SS	WOR	
						WOH	
15				6	SS	2	
						6	
	Gray fine to medium SAND - some silt, occasional pebble, trace vegetation (roots)	Wet				7	
				7	SS	WOR	
	No recovery					WOR	
20				8	SS	13	
						17	
	Dark gray coarse to medium SAND - some sub-rounded gravel, occasional white shell fragment	Wet				34	
				9	SS	7	
						7	
25	Gray, brown & black fine sub-rounded GRAVEL - some coarse sand, occasional white shell fragment	Wet		10	SS	15	
						37	
	Gray & brown-gray medium SAND & sub-rounded GRAVEL - some silt, some white shell fragments, brown-gray fine gravel & coarse sand lense at 27.5', NAPL present in lense only (0.15' depth), chemical odor	Wet				67	
				11	SS	100+	
			29.0'				
30	NOTES: Auger refusal at 28.0'; grinding slow augering to 29.0'. Abandoned borehole and grouted to surface.						

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000566

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW42-85 (DEEP BEDROCK)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: JANUARY 15, 1987

HOLE TYPE: HOLLOW STEM AUGER LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION: * 573.6 TOP OF PIPE ELEVATION: * 577.04

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
0	Dark gray SILT - some gravel, some flyash, trace vegetation (FILL)	Moist	577.04; 573.6				
	Black CINDERS & FLYASH (FILL)	Moist	CEM/BEN BKFL				
5	Black FLYASH & CINDERS - piece of plastic, 1/4" lense of gray material at 5.9' (FILL)	Moist					
	Black FLYASH & CINDERS - occasional stone, trace gray material at 6.8', 3" wood at 7.6' (FILL)	Wet	6"Ø SC				
	Dark gray FLYASH & fine SAND - trace fine gravel (FILL)						
	Mottled brown-black TOPSOIL & VEGETATION, becoming clayey silt (NATIVE)	Moist					
10	Mottled brown & dark gray SAND & SILT with vegetation	Moist					
	Mottled brown & dark gray fine sandy SILT with vegetation throughout	Moist-wet	13" Ø BH				
	Gray-brown fine sandy SILT with vegetation throughout - occasional fine sandy lense	Moist-wet					
	Gray fine SAND & SILT, some vegetation throughout - occasional shell fragment	Moist-wet					
15	Dark gray fine SAND & SILT with occasional black layering	Wet					
	Gray & dark gray fine SAND & SILT, small stone, trace shell, trace silt	Wet					
20			4"Ø SC				
	Gray medium to coarse SAND & GRAVEL, occasional white shell, trace silt	Wet					
25							
	Dark gray coarse SAND & GRAVEL, occasional white shell	Wet					
	Red-brown CLAY	Wet					
30	Augered through						
	Red-brown CLAY, occasional silty lense increasing with depth, occasional small stone	Wet					

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW42-85 Page 2 of 6

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: JANUARY 15, 1987

HOLE TYPE: HOLLOW STEM AUGER LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 573.6 TOP OF PIPE ELEVATION:* 577.04

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
	Red-brown CLAY - occasional silty lenses increasing with depth, occasional small stone Wet					
35	Red-brown SAND, SILT & CLAY, some gravel (TILL) Wet	13" Ø BH				
	Brown SAND, SILT & GRAVEL, trace clay Wet	CEM/BEN BKFL				
		6" Ø SC				
		39.3'				
40	NOTES: Stratigraphy from OW41-85.	39.9'				
		40.2'				
		4"Ø SC				

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000568

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STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: OW42-86

PROJECT NO.: 9-1431

DATE COMPLETED: JANUARY 15, 1987

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" DIA. NX CORE

LOCATION: SOUTHEAST AREA OF SITE

CRA SUPERVISOR: R HOEKSTRA/C PADGINTON

DEPTH	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	CORE RECOVERY	RQD	DRILLING RATE	WATER RETURN	WATER PRESSURE TEST	ELEVATION	MONITOR INSTALLATION
ft BG				%	%	%	cm/s		ft AMSL	
		1	39.3	90	72				534.3 533.7 533.4	13"Ø BH 6"Ø SC CEM/ BEN BKFL
40	DOLOMITE (LOCKPORT GROUP-OAK ORCHARD FORMATION): medium to dark gray, aphanitic to medium grained; some banding, medium bedding, bituminous, few fractures, gypsum filled, trace partings, fossiliferous									
45		2	48.6	74					525.0	
50	- trace weathered fractures									5-3/4" Ø BH
55		3	55.1	131	100	60			518.5	
	- highly fractured, slight weathering									
60										
	- highly fractured 62.9' to 68.75'	4	62.9	100	29	22			510.7	
65	- trace weathered fractures									4"Ø SC
70		5	70.2	102	100	37			503.4	
	- several gypsum masses, stromatolites									
75										
		6	78.3	91	100	23			495.3	
80										
	- calcite & sphlalerite filled vugs at 81.25'									
85		7	85.0	110	100	98			488.6	
90										

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000569

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

PROJECT NO.: 9-1431

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

LOCATION: SOUTHEAST AREA OF SITE

HOLE DESIGNATION: OW42-86

DATE COMPLETED: JANUARY 15, 1987

DRILLING METHOD: 3" DIA. NX CORE

CRA SUPERVISOR: R HOEKSTRA/C PADGINTON

DEPTH	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	RECOVERY	RQD	DRILLING RATE	WATER RETURN	WATER PRESSURE TEST	ELEVATION	MONITOR INSTALLATION
ft BG				%	%	%	cm/s		ft AMSL	
- 90										
	Dolomite (as above)									
		8	93.3	99	100	93			480.3	
- 95										5-3/4"Ø BH
- 100		9	100.0	95	92	97			473.6	
- 105										CEM/BEN BKFL
		10	108.4	102	100	94			465.2	
- 110										
- 115		11	115.0	98	99	87			458.6	4"Ø SC
- 120										
		12	123.3	101	100	93			450.3	
- 125										
- 130		13	130.0	98	70	65			443.6	
			130.5						443.5	
	DOLOMITE (LOCKPORT GROUP - ERAMOSA FORMATION): light to olive gray, fine to medium grained, very thin to medium bedding, frequent carbonaceous partings, trace weathered fractures									
- 135										
		14	139.3	107	100	86			434.3	
- 140										
- 145	- cherty	15	145.0	83	100	67			428.6	

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000570

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: CW42-86

PROJECT NO.: 9-1431

DATE COMPLETED: JANUARY 15, 1987

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" DIA. NX CORE

LOCATION: SOUTHEAST AREA OF SITE

CRA SUPERVISOR: R HOEKSTRA/C PADGINTON

DEPTH ft BG	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	CORE RECOVERY %	RQD %	DRILLING RATE %	WATER PRESSURE TEST cm/s	ELEVATION ft AMSL	MONITOR INSTALLATION
145	- cherty;								5-3/4" Ø BH
150	- massive chert nodules								4" Ø SC
			152.5					421.1	
	DOLOMITE (LOCKPORT GROUP - GOAT ISLAND FORMATION): light to medium gray, fine to medium grained, thick bedded, stylolitic, cherty, vuggy with gypsum or carbonate or limonite coatings, frequent shaly partings	16	154.0	120	100	99		419.6	
155									CEM/ BEN BKFL
160		17	160.0	113	96	88		413.6	
			162.0					411.6	
	- sharp conformable contact								
165	DOLOMITE (LOCKPORT GROUP - GASPORT FORMATION): gray to olive gray, fine to medium grained, thin to thick bedding bituminous, fossiliferous, numerous shaly partings, vuggy & pitted; few fractures	18	169.3	93	52	86		404.3	
170			170.0					403.6	
	DOLOMITIC SHALE: black, very fine to fine grained, thin to thick bedding, vugs with gypsum &/or sphalerite, trace weathering on fractures								3" Ø NX
175									
		19	178.9	75	--	72		394.7	
180		20	179.3	106	86	100		394.3	
		21	184.3	96	100	100		389.3	
185									
			186.0					387.6	
	DOLOMITE: as above, coarse grained, some porosity, banded								
190	- trace limonitic staining								
		22	194.3	40	30	100		379.3	
195	- weathered fracture at 194.75'	23	195.9	112	100	86		377.7	
200									

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000571

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

PROJECT NO.: 9-1431

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

LOCATION: SOUTHEAST AREA OF SITE

HOLE DESIGNATION: OW42-86

DATE COMPLETED: JANUARY 15, 1987

DRILLING METHOD: 3" DIA. NX CORE

CRA SUPERVISOR: R HOEKSTRA/C PADGINTON

DEPTH	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	CORE RECOVERY	RQD	DRILLING WATER RETURN	WATER PRESSURE TEST	ELEVATION	MONITOR INSTALLATION
ft BG				%	%	%	cm/s	ft AMSL	
- 200	Dolomite (as above)								
- 205	- conformable, gradational contact		204.8					368.8	3"Ø NX
- 210	DOLOMITE (CLINTON GROUP - DECEW FORMATION): gray to dark gray, fine to medium grained, argillaceous, massive bedding - few carbonaceous partings from 209.3', occasional vug,	25	209.3	192	100	85		364.3	
- 215	- clay seam		213.8					359.8	
	- clay seam contact		216.8					356.8	
- 220	SHALE (CLINTON GROUP - ROCHESTER FORMATION): black fine grained, dolomitic, massive bedding. several fractured & weathered zones		223.3					350.3	
- 225									

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000572

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: BH43-85

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: DECEMBER 4, 1985

HOLE TYPE: HOLLOW STEM AUGER (3-3/4" ID, 8" OD) LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 577.2 TOP OF PIPE ELEVATION:*

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
0	Brown TOPSOIL - some vegetation (FILL)	Moist	577.2				
	Red-brown & black silty CLAY - some stone, some cinders, occasional vegetation, occasional brick (FILL)	Moist	8" Ø BH				
	Brown silty CLAY with black CINDERS - occasional stone, trace fine sand (FILL)	Moist					
5	Black FLYASH - occasional brown silty clay, occasional cinder (FILL)	Moist					
	Brown, dark brown & black FLYASH, SILT, CLAY, & CINDERS - occasional stone (FILL)	Wet	CEM/BEN BKFL				
	Black FLYASH - occasional yellow nodule, occasional gray lense of soft waste material, piece of wood (FILL)	Moist					
10	Black FLYASH - occasional cinder, occasional stone, occasional brown clayey lense, piece of wood (FILL)	Moist					
	Black FLYASH - some sand, occasional brown cinder, occasional stone, trace clay, some gravel at 11.8' (FILL)	Moist					
	Augered through to 13.0'						
	Dark gray silty CLAY with vegetation (NATIVE)	Moist					
	Dark gray silty fine SAND with vegetation	Moist					
	Dark gray SILT - some fine sand	Wet					
15	Gray clayey SILT - vegetation throughout	Moist-wet		1	SS	7	
	Gray fine sandy SILT - vegetation throughout	Moist-wet				11	
	Gray silty fine SAND - occasional pebble, vegetation throughout	Moist		2	SS	11	
						13	
				3	SS	6	
20	Gray fine SAND - trace silt, trace vegetation	Wet				5	
				4	SS	14	
	Gray medium to coarse SAND & GRAVEL - trace silt	Wet				11	
	Gray SAND - trace silt	Wet		5	SS	12	
						17	
25	Gray fine SAND & SILT	Wet		6	SS	8	
						16	
				7	SS	11	
						14	
				8	SS	10	
30	Gray medium SAND - some shells	Wet				8	
	Brown clayey SILT - trace fine gravel (TILL)	Wet		9	SS	47	
						30	
	Red-brown SAND, SILT & CLAY - fine gravel throughout (TILL)	Wet		10	SS	17	

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000573

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: BH43-85 Page 2 of 2

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: DECEMBER 4, 1985

HOLE TYPE: HOLLOW STEM AUGER (3-3/4" ID, 8" OD) LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 577.2 TOP OF PIPE ELEVATION:*

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
						28	
35	Red-brown SAND, SILT & CLAY - fine gravel throughout (TILL)	Wet	8" Ø BH	11	SS	15	
						30	
				12	SS	42	
						96	
			CEM/BEN BKFL	13	SS	49	
40	Gray-brown silty CLAY - trace fine sand, trace small pebbles	Wet				28	
	Gray medium to fine SAND	Moist		14	SS	26	
	Gray silty, sandy CLAY	Moist					
	Gray SILT, fine to medium SAND & STONE	Moist-wet				63	
	Gray GRAVEL & medium SAND	Wet					
			43.8'	15	SS	100	
	Gray fine to medium SAND & GRAVEL	Wet					
			44.3				
45							

NOTES:
Stratigraphy 0-15.0' from OW34-85.
Grouted borehole to surface.

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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ecology and environment

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW43-86 (ALLUVIUM WELL)

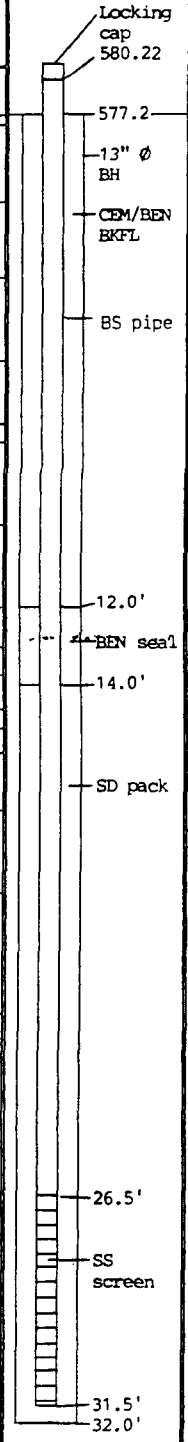
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: JANUARY 30, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

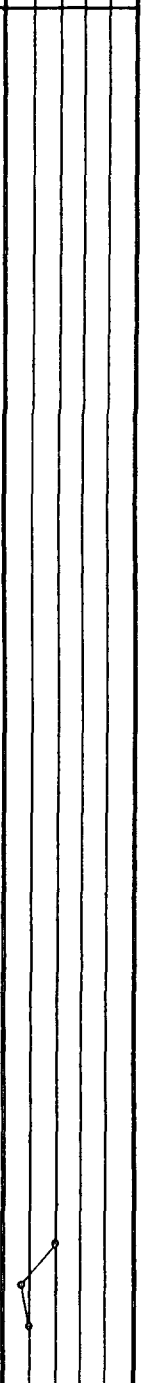
GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION: * 577.2 TOP OF PIPE ELEVATION: * 580.22

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT
0	Brown TOPSOIL - some vegetation (FILL)	Moist			
	Red-brown & black silty CLAY - some stone, some cinders, occasional vegetation, occasional brick (FILL)	Moist			
	Brown silty CLAY with black CINDERS - occasional stone, trace fine sand (FILL)	Moist			
5	Black FLYASH - occasional brown silty clay, occasional cinder (FILL)	Moist			
	Brown, dark brown & black FLYASH, SILT, CLAY, & CINDERS - occasional stone (FILL)	Wet			
	Black FLYASH - occasional yellow nodule, occasional gray lense of soft waste material, piece of wood (FILL)	Moist			
10	Black FLYASH - occasional cinder, occasional stone, occasional brown clayey lense, piece of wood (FILL)	Moist			
	Black FLYASH - some sand, occasional brown cinder, occasional stone, trace clay, some gravel at 11.8' (FILL)	Moist			
	Augered through to 13.0'				
	Dark gray silty CLAY with vegetation (NATIVE)	Moist			
	Dark gray silty fine SAND with vegetation	Moist			
	Dark gray SILT - some fine sand	Wet			
15	Gray clayey SILT - vegetation throughout	Moist-wet			
	Gray fine sandy SILT - vegetation throughout	Moist-wet			
	Gray silty fine SAND - occasional pebble, vegetation throughout	Moist			
20	Gray fine SAND - trace silt, trace vegetation	Wet			
	Gray medium to coarse SAND & GRAVEL - trace silt	Wet			
	Gray SAND - trace silt	Wet			
25	Gray fine SAND & SILT	Wet			
	Gray fine to medium SAND & GRAVEL -	Wet	1	SS	40
30					16
					20
	Red-brown SILT & fine SAND - trace clay, occasional gravel (TILL)	Moist			

MONITOR INSTALLATION



PENETRATION TEST BLOWS / FOOT



* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000575

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO.: OW43-86

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: JANUARY 30, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 577.2 TOP OF PIPE ELEVATION:* 580.20

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
	NOTES: Well Pipe: 2" diameter black steel Well Screen: 2" diameter, 5' length, #6 slot, stainless steel Sand Pack: Special coarse blend Ottawa sand Stratigraphy 0-29.0' from BH43-85.					

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW44-86 (DEEP BEDROCK)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 27, 1986

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID, 13" OD) LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST/ENGINEER: D. MILLARD GROUND ELEVATION:* 577.2 TOP OF PIPE ELEVATION:* 579.93

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
			579.93 577.2				
0	Brown TOPSOIL - some vegetation (FILL)	Moist					
	Red-brown & black silty CLAY - some stone, some cinders, occasional vegetation, occasional brick (FILL)	Moist	13" Ø BH				
	Brown silty CLAY with black CINDERS - occasional stone, trace fine sand (FILL)	Moist					
5	Black FLYASH - occasional brown silty clay, occasional cinder (FILL)	Moist	6" Ø SC				
	Brown, dark brown & black FLYASH, SILT, CLAY, & CINDERS - occasional stone (FILL)	Wet					
	Black FLYASH - occasional yellow nodule, occasional gray lense of soft waste material, piece of wood (FILL)	Moist					
10	Black FLYASH - occasional cinder, occasional stone, occasional brown clayey lense, piece of wood (FILL)	Moist					
	Black FLYASH - some sand, occasional brown cinder, occasional stone, trace clay, some gravel at 11.8' (FILL)	Moist					
	Augered through to 13.0'						
	Dark gray silty CLAY with vegetation (NATIVE)	Moist					
	Dark gray silty fine SAND with vegetation	Moist					
	Dark gray SILT - some fine sand	Wet					
15	Gray clayey SILT - vegetation throughout	Moist-wet					
	Gray fine sandy SILT - vegetation throughout	Moist-wet	CEM/BEN BKFL				
	Gray silty fine SAND - occasional pebble, vegetation throughout	Moist					
20	Gray fine SAND - trace silt, trace vegetation	Wet					
	Gray medium to coarse SAND & GRAVEL - trace silt	Wet					
	Gray SAND - trace silt	Wet	4"Ø SC				
25	Gray fine SAND & SILT	Wet					
	Gray medium SAND - some shells	Wet					
30	Brown clayey SILT - trace fine gravel (TILL)	Wet					
	Red-brown SAND, SILT & CLAY - fine gravel throughout (TILL)	Wet					

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW44-86

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: OCTOBER 27, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 577.2 TOP OF PIPE ELEVATION:* 579.93

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
35	Red-brown SAND, SILT & CLAY - fine gravel throughout (TILL)	Wet	CEM/BEN BKFL 13" Ø BH				
40	Gray-brown silty CLAY - trace fine sand, trace small pebbles	Wet	6" Ø SC				
	Gray medium to fine SAND	Moist					
	Gray silty, sandy CLAY	Moist					
	Gray SILT, fine to medium SAND & STONE	Moist-wet	4" Ø SC				
	Gray GRAVEL & medium SAND	Wet					
	Gray fine to medium SAND & GRAVEL	Wet	44.0' 44.5'				
45							

NOTES:
Well Casing: 4" and 6" diameter black steel

Stratigraphy from BH43-85.

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: CW44-86 PAGE 3 OF 6

PROJECT NO.: 9-1431

DATE COMPLETED: OCTOBER 27, 1986

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" DIA. NX CORE

LOCATION: TOP OF EMBANKMENT, SOUTHWEST QUADRANT

CRA SUPERVISOR: C PADGINTON

DEPTH ft BG	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	RECOVERY CORE %	RQD %	DRILLING RATE %	WATER RETURN %	WATER PRESSURE TEST cm/s	ELEVATION ft AMSL	MONITOR INSTALLATION
		1	44.4	97		32			533.2 532.8	
45	DOLOMITE (LOCKPORT GROUP - OAK ORCHARD FORMATION): dark gray & brown-gray, some banding, weathers light gray, very fine to fine grained, thick bedding, carbonaceous, occasional weathered zone, highly fractured, close to very close spacing, fracture surfaces weathered or with calcareous coatings, slightly pitted, fossiliferous									13" Ø BH 6" Ø SC
50										CEM/ BEN BKFL
55		2	53.7	113	6	0			523.5	
		3	59.4	93	68	43			517.8	
60	- becomes shaly, argillaceous shaly partings, calcite & gypsum coatings, close to very close spacing									5-3/4" Ø BH
65										
	- weathered fractures	4	67.2	102	75	0			510.0	
70	- fine to medium grained inclined medium bedding									
		5	74.4	97	97	03			502.8	
75	- bituminous, saccharoidal stylolitic, thick to massive bedding, banded, fewer fractures, close to moderate spacing									4" Ø SC
80										
		6	83.7	104	100	0			493.5	
85	- secondary galena, fluorite in cavities, highly fossiliferous - less vugs & pitting at 87'									
	- vugs & pitting return	7	89.4	102	100	100			487.8	
90										
95										

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000579

STRATIGRAPHIC AND INSTRUMENTATION LOG
(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: OW44-86

PROJECT NO.: 9-1431

DATE COMPLETED: OCTOBER 27, 1986

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" DIA. NX CORE

LOCATION: TOP OF EMBANKMENT, SOUTHWEST QUADRANT

CRA SUPERVISOR: C PADGINTON

DEPTH	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	RECOVERY	RQD	DRILLING RATE	WATER PRESSURE TEST	ELEVATION	MONITOR INSTALLATION
ft BG				%	%	%	cm/s	ft AMSL	
	DOLOMITE (as above)								
100	- vugs, fossils decrease with depth	8	98.7	70	100	97		478.5	5-3/4" BH
105		9	104.4	115	100	100		472.8	
110									
115		10	113.3	110	100	96		463.9	
120	- vertical fracture/joint, open, secondary calcite coatings (117'-122')	11	119.4	102	100	96		457.8	CEM/ BEN BKFL
125	- calcite filled voids								
130	- calcite & sphalerite deposits 128.4'-140.0'								
135	- occasional stromatolites	13	134.4	91	95	92		442.8	4" Ø SC
140	- lower unit contact, sharp, conformable		140.0					437.2	
145	DOLOMITE (LOCKPORT GROUP - ERAMOSA FORMATION): dark gray, fine grained, thin to medium bedding, saccharoidal, banded, bituminous, frequent shaley partings. occasional galena mineralization	14	142.7	108	100	94		434.5	
150		15	149.4	98	91	97		427.8	

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000580

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: OW44-86 PAGE 5 OF 6

PROJECT NO.: 9-1431

DATE COMPLETED: OCTOBER 27, 1986

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" DIA. NX CORE

LOCATION: TOP OF EMBANKMENT, SOUTHWEST QUADRANT

CRA SUPERVISOR: C PADGINTON

DEPTH	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	RECORE	RECOVERY	RQD	DRILLING WATER RETURN	WATER PRESSURE TEST	ELEVATION	MONITOR INSTALLATION
ft BG				%	%	%	cm/s		ft AMSL	
- 150	DOLOMITE (as above)									
			152.1						425.1	5-3/4" Ø BH
	DOLOMITE (LOCKPORT GROUP - GOAT ISLAND FORMATION): dark gray, fine to medium grained, thin to medium bedded, saccharoidal, carbonaceous, shaly partings, fossiliferous, oolitic									
- 155										
		16	158.7	101	99	84			418.5	
- 160										
		17	163.7	97	86	96			413.5	
	- gradational contact									CEM/ BEN BKFL
- 165	DOLOMITE (LOCKPORT GROUP - GASPORT FORMATION): light to medium gray, fine to medium grained, medium to thick bedded		166.4						410.8	
			167.9						409.3	
- 170	LIMESTONE: medium gray, thin to medium bedding, aphanitic, some gypsum, biohermic									
		18	173.3	61	57	96			403.9	4" Ø SC
			174.2						403.0	
- 175	DOLOMITE: olive gray, fine grained to aphanitic, shaly partings & fractures, stylolites, gypsum seams, bioherm									
		19	179.4	144	100	82			397.8	
- 180										
- 185										
		20	186.9	100	85	88			390.3	
- 190										
			192.7						384.5	
										3" Ø NX
- 195	DOLOMITE: medium to dark gray to brown-gray medium to coarse grained, medium to thick bedding, some pitting, no evidence of fossils, banded - fossiliferous, gypsum replacement (198')									
		21	196.7	99	99	92			380.5	
- 200										
		22	201.7	100	100	87			375.5	

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000581

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

HOLE DESIGNATION: OW44-86 PAGE 6 OF 6

PROJECT NO.: 9-1431

DATE COMPLETED: OCTOBER 27, 1986

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

DRILLING METHOD: 3" DIA. NX CORE

LOCATION: TOP OF EMBANKMENT, SOUTHWEST QUADRANT

CRA SUPERVISOR: C. PADGINTON

DEPTH	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	RECOVERY	RQD	DRILLING RATE	WATER RETURN	WATER PRESSURE TEST	ELEVATION	MONITOR INSTALLATION
ft BG				%	%	%		cm/s	ft AMSL	
205	DOLOMITE (as above)									
210	- conformable, sharp contact		210.0						367.2	3" Ø NX
	DOLOMITE (CLINTON GROUP-DECEW FORMATION): medium to dark gray, thick to massive bedding fine to medium grained, few partings, trace fossils	23	211.7	60	100	87			365.5	
215		24	216.7	124	100	71			360.5	
220	- void with gypsum & sphalerite	25	221.7	91	79	90			355.5	
	- gradational contact		224.0						353.2	
225	SHALE (CLINTON GROUP - ROCHESTER FORMATION): black, fine grained, dolomitic, massive bedding, several fractured & weathered zones									
230			230.7						346.5	
235										

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000582

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW45-86 (SHALLOW BEDROCK)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: APRIL 1, 1986

HOLE TYPE: HOLLOW STEM AUGER (6-1/4" ID/11" OD) LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION: * 577.2 TOP OF PIPE ELEVATION: * 579.10

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
			579.10				
			577.2				
0	Brown TOPSOIL - some vegetation (FILL)	Moist					
	Red-brown & black silty CLAY - some stone, some cinders, occasional vegetation, occasional brick (FILL)	Moist	11"Ø BH				
	Brown silty CLAY with black CINDERS - occasional stone, trace fine sand (FILL)	Moist					
5	Black FLYASH - occasional brown silty clay, occasional cinder (FILL)	Moist	5" Ø SC				
	Brown, dark brown & black FLYASH, SILT, CLAY, & CINDERS - occasional stone (FILL)	Wet					
	Black FLYASH - occasional yellow nodule, occasional gray lense of soft waste material, piece of wood (FILL)	Moist					
	Black FLYASH - occasional cinder, occasional stone, occasional brown clayey lense, piece of wood (FILL)	Moist					
10	Black FLYASH - some sand, occasional brown cinder, occasional stone, trace clay, some gravel at 11.8' (FILL)	Moist					
	Augered through to 13.0'						
	Dark gray silty CLAY with vegetation (NATIVE)	Moist					
	Dark gray silty fine SAND with vegetation	Moist					
	Dark gray SILT - some fine sand	Wet					
15	Gray clayey SILT - vegetation throughout	Moist-wet					
	Gray fine sandy SILT - vegetation throughout	Moist-wet	CEM/BEN BKFL				
	Gray silty fine SAND - occasional pebble, vegetation throughout	Moist					
20	Gray fine SAND - trace silt, trace vegetation	Wet					
	Gray medium to coarse SAND & GRAVEL - trace silt	Wet					
	Gray SAND - trace silt	Wet					
25	Gray fine SAND & SILT	Wet					
30	Gray medium SAND - some shells	Wet					
	Brown clayey SILT - trace fine gravel (TILL)	Wet					
	Red-brown SAND, SILT & CLAY - fine gravel throughout (TILL)	Wet					

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000583

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW45-86 Page 2. of 3

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 5, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: ALONG TOP OF BANK AT SOUTHEAST CORNER OF SITE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 577.2 TOP OF PIPE ELEVATION:* 579.10

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 00 80
35	Red-brown SAND, SILT & CLAY - fine gravel throughout (TILL)	Wet	11" Ø BH				
			5" Ø SC				
40	Gray-brown silty CLAY - trace fine sand, trace small pebbles	Wet	CEM/BEN BKFL				
	Gray medium to fine SAND	Moist					
	Gray silty, sandy CLAY	Moist					
	Gray SILT, fine to medium SAND & STONE	Moist-wet					
	Gray GRAVEL & medium SAND	Wet					
	Gray fine to medium SAND & GRAVEL	Wet					
45			45.0'				

NOTES:
Well Casing: 6" diameter black steel

Stratigraphy from BH43-85

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

PROJECT NO.: 9-1431

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

LOCATION: TOP OF BANK AT SOUTHEAST CORNER OF SITE

HOLE DESIGNATION: OW45-86 PAGE 3 OF 3

DATE COMPLETED: APRIL 1, 1986

DRILLING METHOD: 3" Ø NX CORE

CRA SUPERVISOR: D. MILLARD/C. PADGINTON

DEPTH ft BG	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	CORE RECOVERY %	RQD %	DRILLING WATER RETURN %	WATER PRESSURE TEST cm/s	ELEVATION ft AMSL	MONITOR INSTALLATION
45		1	45.7	93	0	0		531.5	11" Ø BH; 5" Ø; SC; CEM/BEN BKFL
50	DOLOMITE (LOCKPORT GROUP - OAK ORCHARD FORMATION): brown-gray, medium grained, thinly bedded, numerous weathered partings, few shaly laminations, few vugs, occasional thin zones with weathered dolostone or stromatolite fragments	2	47.4	93	15.6	0		529.8	
		3	52.4	95	13.3	0		524.8	
55									3" Ø BH
		4	57.4	87.5	12.6	0		519.8	
60			60.9					516.3	
65									
70									

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000585

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW46-85 (SHALLOW BEDROCK)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: DECEMBER 7, 1985

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID/13" OD) LOCATION: NORTHWEST CORNER OF SITE

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION: * 575.6 TOP OF PIPE ELEVATION: * 578.89

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT
			578.89				
			575.6				
0	Dark brown TOPSOIL - trace vegetation (FILL)	Moist	13" Ø BH				
	Brown SILT - some clay, some fine sand, gray stone in spoon tip (FILL)	Moist					
	Gray FLYASH/CINDER material - occasional stone (FILL)	Dry					
5	Gray-black CINDERS & FLYASH - occasional gravel, occasional fibrous material (FILL)	Dry					
	Black CINDER/FLYASH - some hardened tar, trace fibrous material (FILL)	Dry					
	Black CINDER/FLYASH - some fibrous material (FILL)	Dry-moist					
10	Black FLYASH - irridescent sheen on water (FILL)	Moist-wet	5" Ø SC				
	Black TOPSOIL - some silt, some vegetation (NATIVE)	Wet					
	Dark gray SILT - some clay, some fine sand, some clay, occasional vegetation	Moist					
	Gray fine SAND - some silt, occasional vegetation	Moist		1	SS	WOR	
						8	
	Gray SILT & fine SAND	Wet					
15				2	SS	8	
	Gray SILT & fine SAND - becoming black, occasional vegetation decreasing with depth	Wet				7	
			CEM/BEN BKFL	3	SS	3	
						7	
				4	SS	5	
20						5	
				5	SS	WOR	
	Red-brown CLAY - highly plastic, occasional gray silty lense	Wet				WOR	
				6	SS	WOR	
						WOR	
25				7	SS	WOR	
	Brown & red-brown CLAY	Wet				6	
				8	SS	WOR	
						35	
	Red-brown SILT, fine SAND & GRAVEL, trace clay (TILL)	Moist		9	SS	47	
30						87	
				10	SS	72	
						91	
				11	SS	40	

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000586

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW46-85

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: DECEMBER 7, 1985

HOLE TYPE: HOLLOW STEM AUGER LOCATION: NORTHWEST CORNER OF SITE OF SITE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 575.6 TOP OF PIPE ELEVATION:* 578.89

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
35	Red-brown & brown-gray SILT, fine SAND & GRAVEL - trace clay (TILL) Moist	36.2'	12	SS	44 41 100	
	Augered to 37.0'					
	Brown-gray silty SAND Wet					
	Augered to 37.6'					
	Gray angular GRAVEL (Dolomite) Wet	38.6'				
	Augered to 38.6'					

NOTES:
Well Casing: 5" diameter black steel

Stratigraphy 0-13.0' from OW31-85.

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

recycled paper

ecology and environment

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

PROJECT NO.: 9-1431

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

LOCATION: NORTHWEST CORNER OF SITE

HOLE DESIGNATION: OW46-85 PAGE 3 OF 3

DATE COMPLETED: APRIL 4, 1986

DRILLING METHOD: 3" Ø NX CORE

CRA SUPERVISOR: D. MILLARD/C. PADGINTON

DEPTH ft BG	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	RECOVERY %	RQD %	DRILLING WATER RETURN %	WATER PRESSURE TEST cm/s	ELEVATION ft AMSL	MONITOR INSTALLATION
35									13" Ø BH; 5" Ø SC
		1	38.0	90	0	100		537.6	CEM/BEN BKFL
		2	39.2	100	48.5	100		536.4	
40	DOLOMITE (LOCKPORT GROUP - OAK ORCHARD FORMATION): medium gray, thinly bedded, shaly laminations & partings, occasional calcereous shale pebbles								
45	- becomes brown-gray, fine to medium grained								3" Ø BH
		3	49.2	94.2	10.4	100		526.4	
50			53.2					522.4	
55									

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000588

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW47-85 (ALLUVIUM WELL)

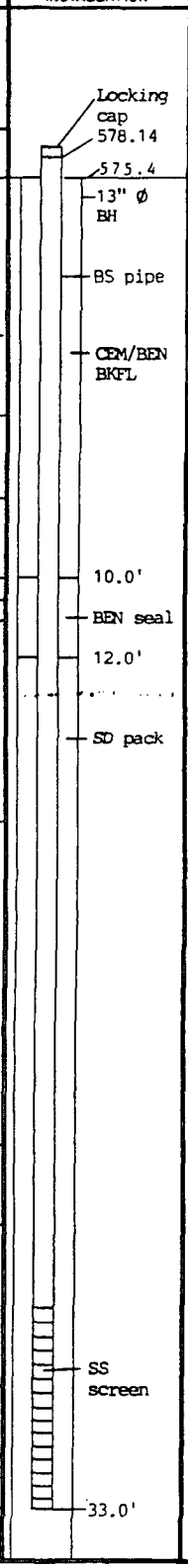
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: DECEMBER 14, 1985

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID/13" OD) LOCATION: SOUTHEAST CORNER OF SITE

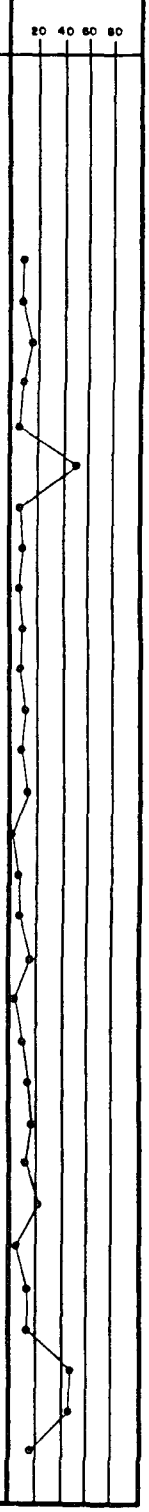
GEOLOGIST/ENGINEER: D. MILLARD GROUND ELEVATION:* 575.4 TOP OF PIPE ELEVATION:* 578.14

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT
0	Augered through				
5	Dark gray CINDERS & FLYASH - wood chips brick fragments (FILL)	Moist-wet	1	SS	10, 8
	Dark gray CINDERS & SLAG - some flyash, white brine sludge (FILL)	Wet	2	SS	17, 9
	Dark gray CINDERS, SAND & GRAVEL (FILL)	Wet	3	SS	5, 50+
10	Dark gray CINDERS - fibrous waste material (FILL)	Wet	4	SS	5, 10
	Dark gray to black SILT - vegetation throughout (NATIVE)	Wet	5	SS	6, 10
	Dark gray to black fine to medium SAND - some silt	Wet	6	SS	7, 13
15			7	SS	8, 14
	Dark gray to black SILT & fine to medium SAND - trace vegetation	Moist	8	SS	1, 5
20			9	SS	6, 17
			10	SS	2, 11
	Gray fine to medium SAND - some silt, trace vegetation	Wet	11	SS	15, 18
25			12	SS	12, 21
	Gray medium SAND - some fine sand	Wet	13	SS	3, 14
30	Gray medium to coarse SAND & GRAVEL - trace silt, irridescent sheen on water, trace brown oily liquid, strong chemical odor (NAPL)	Wet	14	SS	15, 45
			15	SS	43, 17
	Red-brown CLAY	Wet			

MONITOR INSTALLATION:



PENETRATION TEST BLOWS / FOOT (20 40 60 80)



* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000589

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW47-85

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: DECEMBER 14, 1985

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID/13" OD) LOCATION: SOUTHEAST CORNER OF SITE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 575.4 TOP OF PIPE ELEVATION:* 578.14

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
35	Red-brown CLAY Wet	SD pack 13" Ø BH 35.5'				

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO: BH47B-86 (BOREHOLE)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: APRIL 30, 1986

HOLE TYPE: HOLLOW STEM AUGER (3-3/4" ID) LOCATION: 50' WEST OF OW47-86

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 574.7 TOP OF PIPE ELEVATION:*

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Red-brown silty CLAY, VEGETATION & GRAVEL (FILL)	Moist	574.7	1	SS	13	
	Dark gray & white FLYASH - some sand, some gravel (FILL)	Moist				22	
	Mottled brown & yellow-brown SILT - some clay, some sand, occasional gravel (FILL)	Dry				30	
	Dark gray FLYASH & white WASTE MATERIAL - piece of slag or steel in tip of spoon (FILL)	Dry		2	SS	12	
	White WASTE MATERIAL - dark gray & dark brown flyash, some dark brown sand (FILL)	Moist-dry				6	
5			13" Ø BH	3	SS	WOR	
	No recovery Water level encountered at approximately 5.0', irridescent sheen on water surface					1	
						2	
				4	SS	WOR	
						WOR	
10	Black & gray FLYASH & white WASTE MATERIAL - irridescent sheen, piece of plastic (FILL)	Wet		5	SS	6	
	Dark gray mat of ROOTS & LEAVES decreasing with depth - some silt, trace sand, trace clay (NATIVE)	Moist				12	
						22	
	Gray-brown SILT - some sand, occasional pebble, occasional root fiber	Moist		6	SS	4	
	Mottled golden brown & gray-brown fine SAND & SILT, vegetation throughout	Moist				7	
15	Gray fine SAND - some silt, occasional rounded & sub-rounded pebble, occasional root fibers decreasing with depth	Wet		7	SS	10	
						10	
						15	
				8	SS	5	
			CEM/BEN BKFL				
	Gray fine SAND - trace silt	Wet				3	
20				9	SS	7	
						6	
						10	
				10	SS	8	
						14	
25	Gray fine SAND - trace silt, white shell fragments (23-25'), occasional fine gravel lense (25-28'), occasional pebble (28-30')	Wet		11	SS	16	
						29	
			8" Ø BH			39	
				12	SS	14	
						36	
30				13	SS	12	
	Fine, medium & coarse SAND & fine GRAVEL - occasional fine gravel lense, occasional white shell fragments, trace NAPL at tip, trace red-brown silt	Wet				54	
						100	
	Coarse SAND & GRAVEL - occasional white shell fragment, brown NAPL	Wet		14	SS	12	
	Red-brown CLAY - some silt, highly plastic	Wet				13	
35			35.0'				

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

recycled paper

ecology and environment

000591

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: BH47B-86

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: APRIL 30, 1986

HOLE TYPE: HOLLOW STEM AUGER (3-3/4" ID) LOCATION: 50' WEST OF OW47-86

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 574.7 TOP OF PIPE ELEVATION:*

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
	NOTES: Borehole terminated at 35.0' grouted to surface.					

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

recycled paper

ecology and environment

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: BH47C-86 (BOREHOLE)

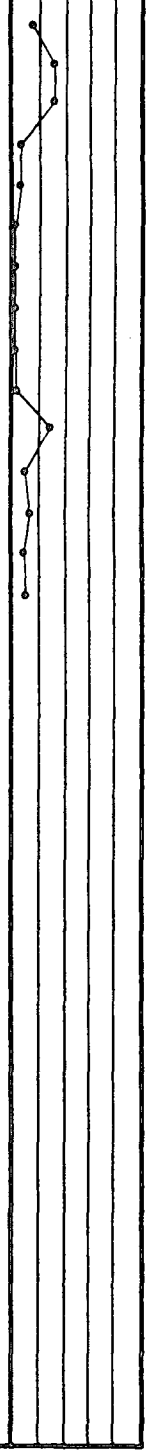
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: MAY 2, 1986

HOLE TYPE: HOLLOW STEM AUGER (3-3/4" ID) LOCATION: 50' EAST OF OW47-86

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION: * 575.1 TOP OF PIPE ELEVATION: *

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT
			575.1				
0	Brown & red-brown CLAY - vegetation & silty topsoil at surface, occasional stone & brick fragment, some fine sand (FILL)	Moist	8" Ø BH	1	SS	16	
						31	
						33	
	Gray FLYASH - occasional stone (FILL)	Dry		2	SS	6	
						4	
5	Gray & dark gray FLYASH &/or FOUNDRY SAND - occasional small stone, light brown NAPL (10-13') similar to hydraulic fluid	Wet	CEM/BEN BKFL	3	SS	2	
						2	
						2	
				4	SS	2	
						3	
10				5	SS	28	
						10	
						16	
	Gray fine SAND - some silt, occasional yellow & dark gray mottling, some root fibers, occasional rounded pebble (NATIVE)	Moist		6	SS	7	
						11	
15			15.0'				

NOTES:
Borehole terminated at 15.0', grouted to surface.



* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000593

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW48-86 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 12, 1986

HOLE TYPE: HOLLOW STEM AUGER (8¼"ID, 13"OD) LOCATION: NORTHEAST CORNER OF GRIFFON PARK

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 572.6 TOP OF PIPE ELEVATION:* 572.28

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Mottled brown SILT, trace clay, trace vegetation	Dry	Protective cover; Locking cap; 572.6; 572.28	1	SS	17	
	Black, brown & white FLYASH & CINDERS, some green glass, some slag, trace coal (FILL)	Dry	CEM/BEN BKFL			6	
	Brown, red-brown & black SILT & CINDERS, slag & flyash throughout, occasional stone, some glass, trace fine sand, wet at 3.8' (FILL)	Dry	BS pipe 3.0'; BEN seal 4.0'	2	SS	25	
						35	
	Black & dark gray CINDERS & FLYASH, occasional brown silt, some fine sand, some stone, trace glass (FILL)	Moist	13" Ø BH; SD PK	3	SS	6	
5						2	
	Black FLYASH, some stone, piece red clay tile, trace irridescent sheen on water (FILL)	Wet	SS screen	4	SS	1	
						3	
	Black FLYASH, trace stone, trace glass, trace irridescent sheen on water (FILL)	Wet		5	SS	5	
	Dark gray fine sandy SILT, trace vegetation (NATIVE)	Moist	9.5'			13	
10	Mottled brown & gray-brown silty CLAY, plastic stiff	Moist	10.0'				

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW49-86 (FILL WELL)

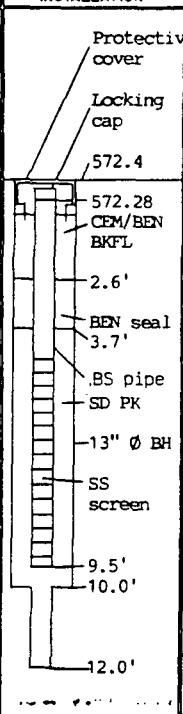
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 18, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: EAST CENTRAL AREA OF GRIFFON PARK

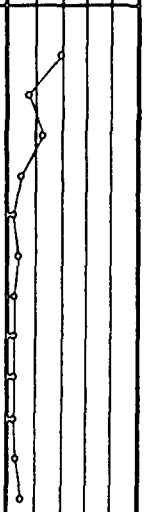
GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 572.4 TOP OF PIPE ELEVATION:* 572.28

PROFILE: DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE: NUMBER	TYPE	BLOWS / FOOT
0	Brown SILT - some fine sand, some gray rock, red clay tile fragments, trace vegetation (FILL)	Dry	1	SS	39
					15
	Black, dark gray, brown, & white FLYASH & CINDERS - some glass, silt, wood fragments, piece of porcelain, rusty metal fragments, piece of concrete in tip (FILL)	Dry			24
			2	SS	10
	Red-brown, white, gray, & black FLYASH & CINDERS - some glass, occasional wood fragments occasional piece of rusted metal, moist at 4.0' (FILL)	Dry			4
5					7
	Black CINDERS & FLYASH - some glass & wood fragments, irridescent sheen on water, asphalt odor (FILL)	Wet	3	SS	4
					3
					3
	Dark gray SILT - fibrous roots & vegetation, rotting odor (NATIVE)	Wet	4	SS	4
10	Gray SILT - dark gray discoloration along some root channels, some fine sand, root fibers & occasional small stone	Wet			5
					11

MONITOR INSTALLATION:



PENETRATION TEST BLOWS / FOOT



NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa Sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000595

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW50-86 (ALLUVIUM WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 20, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: EAST CENTRAL AREA OF GRIFFON PARK

GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION:* 572.4 TOP OF PIPE ELEVATION:* 572.19

PROFILE: DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	TYPE	BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT
0	Brown SILT - some fine sand, some gray rock, red clay tile fragments, trace vegetation (FILL)	Dry	Protective cover; Locking cap; 572.4; 572.19; 13" Ø BH				
	Black, dark gray, brown, & white FLYASH & CINDERS - some glass, silt, wood fragments, piece of porcelain, rusty metal fragments, piece of concrete in tip (FILL)	Dry	CEM/BEN BKFL				
5	Red-brown, white, gray, & black FLYASH & CINDERS - some glass, occasional wood fragments occasional piece of rusted metal, moist at 4.0' (FILL)	Dry	BS pipe				
	Black CINDERS & FLYASH - some glass & wood fragments, irridescent sheen on water asphalt odor (FILL)	Wet	7.3'				
	Dark gray SILT - fibrous roots & vegetation, rotting odor (NATIVE)	Wet	BEN seal				
10	Gray SILT - dark gray discoloration along some root channels, some fine sand, root fibers & occasional small stone	Wet	10.0'				
	Dark gray SILT - root fibers throughout with slight yellow mottling along root fibers to 13.0', fine sand & silt occasional pebble	Wet	SD PK	1	SS	10	
						12	
						12	
15				2	SS	4	
						5	
	Dark gray fine SAND & SILT - occasional darker gray lenses, occasional small pebble, trace root fibers, increasing sand with depth, irridescent sheen on water	Wet	SS screen	3	SS	5	
						8	
						12	
20	Dark gray coarse SILT & fine SAND - some gravel at 21.0', trace red-brown silt & sand (TILL) at tip, alluvium/till contact at ± 21.5' based on increasing blow counts	Wet	21.5'; 22.0'	4	SS	2	
						70+	

NOTES:
- Sampled 20.0-22.0' interval twice; once with 2' spoon and once with 3' spoon.
- Stratigraphy 0-12.0' from OW49-86.
- Stainless steel tape weight was lost in the well installation during sand placement.

Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa Sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000596

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW51-86 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 20, 1986

HOLE TYPE: HOLLOW STEM AUGER (8¼"ID, 13"OD) LOCATION: SOUTHEAST SECTOR OF GRIFFON PARK

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 572.2 TOP OF PIPE ELEVATION:* 572.00

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Brown & red-brown SILT, some sand, some clay, some vegetation, occasional pebble, metal fragments, cinders (FILL)	Moist	Protective cover; Locking cap; 572.2; 572.00; BS pipe; CEM/BEN BKFL 2.7'; BEN seal 3.7'; SD pack; SS screen; 13" Ø BH; 9.5'; 10.0'	1	SS	16	
						11	
				2	SS	5	
	Red-brown SILT, cinders, some stone, piece of glass (FILL)	Wet				3	
				3	SS	WOR	
5	Gray, black & brown FLYASH, PAPER, & SILT, piece of tinfoil (FILL)	Wet				4	
	Black PAPER, multilayered & very thin, piece of wood (FILL)	Dry		4	SS	6	
						6	
	Black SILT, flyash, some wood, some paper, some glass fragments, trace irridescent sheen odor (asphalt) (FILL)	Wet		5	SS	3	
						4	
10	Dark brown sandy SILT, vegetation (NATIVE)	Moist					

NOTES:
- Augers became entangled in steel cable at 5.0', moved ahead 3.0'; resampled 2.0-4.0' interval.

Well Pipe: 2" diameter, black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa sand.

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW52-86 (ALLUVIUM WELL)

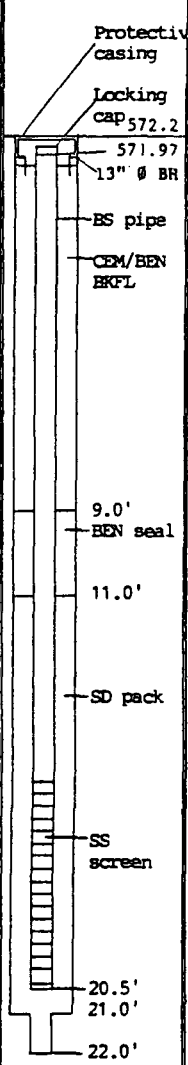
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 21, 1986

HOLE TYPE: HOLLOW STEM AUGER (8¼"ID, 13"OD) LOCATION: SOUTHEAST SECTOR OF GRIFFON PARK

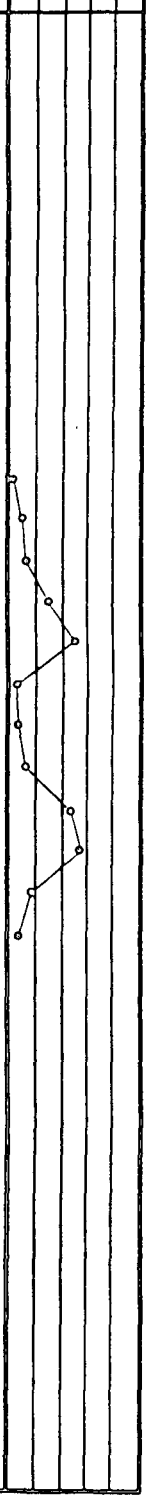
CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 572.2 TOP OF PIPE ELEVATION:* 571.97

DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE NUMBER	SAMPLE TYPE	BLOWS / FOOT
0	Brown & red-brown SILT, some sand, some clay, some vegetation, occasional pebble, metal fragments, cinders (FILL)	Moist			
	Red-brown SILT, cinders, some stone, piece of glass (FILL)	Wet			
5	Gray, black & brown FLYASH, PAPER & SILT, piece of tinfoil (FILL)	Wet			
	Black PAPER, multilayered & very thin, piece of glass, piece of wood (FILL)	Dry			
	Black SILT, flyash, some wood, some paper, some glass fragments, trace irridescent sheen odor (asphalt) (FILL)	Wet			
10	Dark brown sandy SILT, vegetation (NATIVE)	Moist	1	SS	3
	Dark brown SILT & fine sand increasing with depth, vegetation throughout, occasional small pebble, irridescent sheen on water	Wet			11
			2	SS	15
	Gray-brown medium-coarse SAND & silt, occasional root fiber, shell fragment	Wet			30
					47
15			3	SS	4
	Gray fine to medium SAND & silt, occasional pebble, occasional black coarse sand lense	Wet			6
			4	SS	12
					45
	Dark brown coarse SAND & gravel, some silt occasional shell fragment	Wet			55
20			5	SS	18
	Red-brown sandy SILT, occasional gravel (TILL)	Wet			7

MONITOR INSTALLATION



PENETRATION TEST BLOWS / FOOT



NOTES:
- Stratigraphy 0-10.0' from well OW51-86. Augered to 10.0' and began split spoon sampling.
- At ± 17.0' a steel pipe wrench was lost in the borehole, recovery attempts were unsuccessful.

Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000598

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW53-86 (BEDROCK WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: JANUARY 31, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: SOUTH SECTOR OF GRIFFON PARK

GEOLOGIST / ENGINEER: D MILLARD/D OSCAR GROUND ELEVATION:* 571.6 TOP OF PIPE ELEVATION:* 571.10

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT
0	Dark gray SILT - some sand, some vegetation (FILL)	Moist	1	SS	39
					30
	Orange & dark gray SILT & FLYASH - some slag (FILL)	Moist			16
			2	SS	3
	Dark gray & orange SILT & flyash, trace gravel (FILL)	Moist-wet			4
5	Black & dark gray SILT, sand & gravel, some clay, cloth (FILL)		3	SS	17
					19
	Black & dark gray coarse SAND & GRAVEL, some silt, some concrete fragments, some paper (FILL)	Wet			20
			4	SS	6
					5
10	Dark gray-brown SILT, some sand, trace vegetation, increasing sand with depth, trace gravel, occasional dropstone (NATIVE)	Wet	5	SS	11
					12
					11
			6	SS	3
					6
15	Dark gray fine to medium SAND, some silt, some gravel, trace shell fragments	Wet	7	SS	6
					8
					12
			8	SS	23
					5
20	Dark gray medium to coarse SAND & fine gravel, trace white shell fragments	Wet	9	SS	8
					13
			10	SS	9
					20
			11	SS	39
25					64
					94
	Red-brown fine sandy SILT, some gravel trace clay, increasing gravel with depth (TILL) Large stone blocking spoon at 31.3', auger to 31.5', becoming dry at 31.5'	Moist	12	SS	30
					62
30			13	SS	100+
					100+
			14	SS	100+
					100+
			15	SS	100+

MONITOR INSTALLATION:
- Protective cover
- Locking cap 571.6
- 571.10
- 11" Ø BH
- 5" Ø SC
- CEM/BEN BKFL

PENETRATION TEST BLOWS / FOOT: 20 40 60 80

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000590

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ecology and environment

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW53-86

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: JANUARY 31, 1986

HOLE TYPE: HOLLOW STEM AUGER (6¼"ID, 11"OD) LOCATION: SOUTH SECTOR OF GRIFFON PARK

CRA SUPERVISOR: D MILLARD/D OSCAR GROUND ELEVATION:* 571.6 TOP OF PIPE ELEVATION:* 571.10

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
35	Red-brown fine sandy SILT, some gravel, trace clay. Spoon refusals at 36.8', 38.3', 39.4', 40.8', & 41.3' Dry	11" Ø BH 5" Ø SC CEM/BEN BKFL	16	SS	100+	
			17	SS	100+	
			18	SS	100+	
40	Red-brown fine sandy SILT & gravel, becoming gray rock fragments Wet	40.9' 41.3'	19	SS	100+	
			20	SS	100+	
	Auger refusal - 41.3'					

NOTES:
Well Casing: 5" diameter black steel

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

(BEDROCK)

PROJECT NAME: 102ND STREET LANDFILL

PROJECT NO.: 9-1431

CLIENT: OCCIDENTAL CHEMICAL CORPORATION

LOCATION: SOUTH SECTOR OF GRIFFON PARK

HOLE DESIGNATION: CH53-86

DATE COMPLETED: APRIL 8, 1986

DRILLING METHOD: 3" DIAMETER NX CORE

CRA SUPERVISOR: D OSCAR/C PADGINTON

DEPTH (ft BG)	DESCRIPTION OF STRATA	RUN NO.	INTERVAL	RECOVERY %	RQD %	DRILLING WATER RETURN %	WATER PRESSURE TEST (cm/s)	ELEVATION (ft AMSL)	MONITOR INSTALLATION
40									13" Ø BH; 5" Ø SC
		1	41.3	100	0.76	0		530.3	CEM/BEN BKFL
45	DOLOMITE (LOCKPORT GROUP - OAK ORCHARD FORMATION): brownish-gray, medium grained argillaceous, numerous shaly partings, very thin to medium bedding, few thin gypsum seams								3" Ø BH
50		2	50.0	100	0.46	0			
55			57.3					514.3	
60									

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND STATIC WATER LEVEL

NM - NOT MEASURED

000601

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW54-86 (FILL WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 17, 1986

HOLE TYPE: HOLLOW STEM AUGER (8¼"ID, 13"OD) LOCATION: SOUTHWEST SECTOR OF GRIFFON PARK

CRA SUPERVISOR: D BLACK/D MILLARD GROUND ELEVATION:* 571.0 TOP OF PIPE ELEVATION:* 570.71

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Brown silty TOPSOIL, some vegetation, some pebbles (FILL)	Dry	Protective cover; Locking cap; 571.0; 570.71; 13" Ø BH	1	SS	15	
						14	
	Brown SILT, some slag, some orange coloring, some cinders, some wood, becoming wet (FILL)	Dry	CEM/BEN BKFL 3.0'; BEN seal 4.0'	2	SS	7	
						5	
				3	SS	3	
5	Black burned PAPER, some ashes, some silt (FILL)	Wet	BS pipe; SD pack			3	
				4	SS	18	
	Black CINDERS & silt, some pebbles, some wood (FILL)	Wet				6	
			SS screen	5	SS	2	
	Brown fine sandy SILT, some vegetation (NATIVE)	Wet	9.5' 10.0'			5	
10							

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW55-86 (ALLUVIUM WELL)

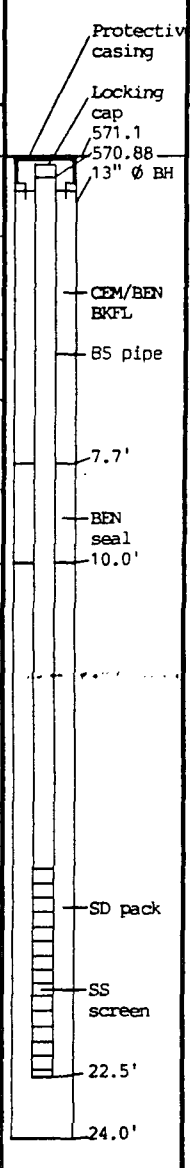
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 19, 1986

HOLE TYPE: HOLLOW STEM AUGER LOCATION: SOUTHWEST SECTOR OF GRIFFON PARK

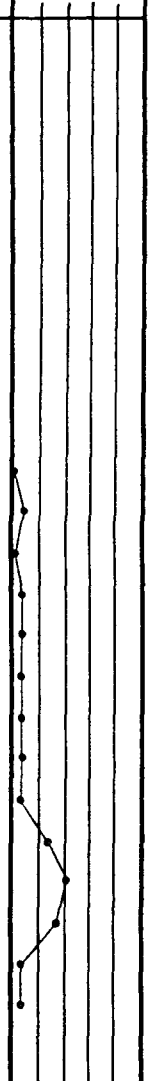
GEOLOGIST / ENGINEER: D. MILLARD GROUND ELEVATION: * 571.1 TOP OF PIPE ELEVATION: * 570.88

PROFILE: DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE: NUMBER	TYPE	BLOWS / FOOT
0	Brown silty TOPSOIL - some vegetation, some pebbles (FILL)	Dry			
	Brown SILT - some slag, some orange coloring, some cinders, some wood, becoming wet with depth (FILL)	Dry			
5	Black burned PAPER - some ashes, some silt (FILL)	Wet			
	Black CINDERS & SILT - some pebbles, some wood (FILL)	Wet			
	Brown fine sandy SILT - some vegetation (NATIVE)	Wet			
10	Dark gray SILT & fine SAND - occasional root fiber	Wet	1	SS	1
					9
			2	SS	2
					8
			3	SS	7
15					6
			4	SS	6
					6
			5	SS	6
	Dark gray fine to medium SAND - some silt	Wet			26
20	Dark gray coarse to medium SAND - some silt, occasional shell fragment, occasional pebble	Wet	6	SS	41
					36
	Light gray fine to medium SAND - some silt, some small pebbles, occasional shell fragment	Wet	7	SS	6
	Dark gray fine to medium SAND & SILT	Wet			6
	Red-brown SILT - some fine sand, trace pebbles, trace clay (TILL)	Wet			
25					

MONITOR INSTALLATION:



PENETRATION TEST BLOWS / FOOT



NOTES:
- Stratigraphy 0-10.0' from well OW54-86.

Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa Sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000603

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO.: OW56-86 (FILL WELL)

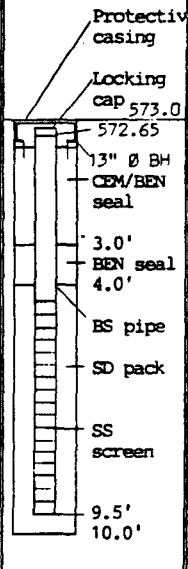
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 14, 1986

HOLE TYPE: HOLLOW STEM AUGER (8¼"ID, 13"OD) LOCATION: WEST SIDE GRIFFON PARK

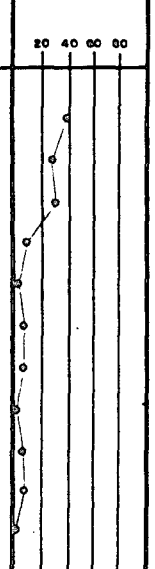
CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 573.0 TOP OF PIPE ELEVATION:* 572.65

PROFILE: DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS		SAMPLE: NUMBER	TYPE	BLOWS / FOOT
0	Brown & dark brown SILT & fine SAND, some vegetation, some glass, occasional stone some flyash, some cinders (FILL)	Dry	1	SS	39
	Brown & rust-brown CINDERS, flyash, fine sand & silt, increasing flyash & cinder at 2.6' (FILL)	Dry			26
					28
	Brown SILT, gray plastic, some glass, piece of net fabric, some stone (FILL)	Dry	2	SS	8
					3
5	Piece of gray PLASTIC, some CINDERS, some flyash (FILL)	Wet	3	SS	8
					5
					3
	Black & dark gray FLYASH & cinders, some glass, some wood, some plastic, some blue paper (FILL)	Wet	4	SS	5
					5
10	Dark gray fine sandy SILT, occasional vegetation (NATIVE)	Moist	5	SS	1

MONITOR INSTALLATION:



PENETRATION TEST BLOWS / FOOT: 20 40 60 80



NOTES:
Stratigraphy from OW57-86.
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' long, Ø6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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000604

STRATIGRAPHIC AND INSTRUMENTATION LOG

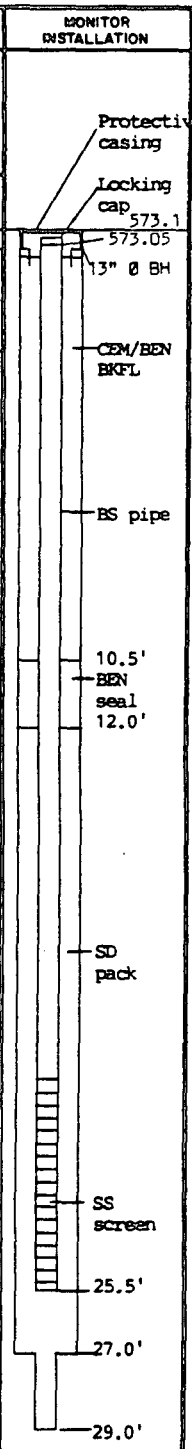
PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO.: OW57-86 (ALLUVIUM WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 14, 1986

HOLE TYPE: HOLLOW STEM AUGER (8¼"ID, 13"OD) LOCATION: WEST SIDE GRIFFON PARK

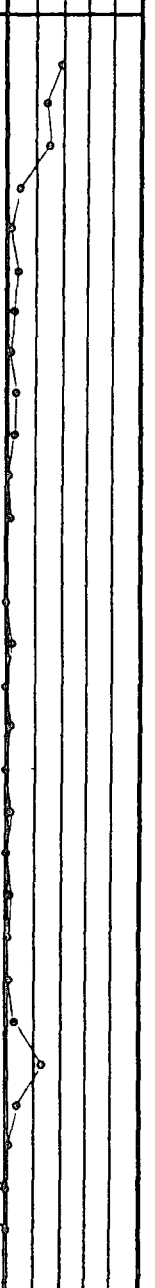
CRA SUPERVISOR: D MILLARD/C DUNNIGAN GROUND ELEVATION:* 573.1 TOP OF PIPE ELEVATION:* 573.05

DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS	
0	Brown & dark brown SILT & fine SAND, some vegetation, some glass, occasional stone some flyash, some cinders (FILL)	Dry
	Brown & rust-brown CINDERS, flyash, fine sand & silt, increasing flyash & cinder at 2.6' (FILL)	Dry
	Brown SILT, gray plastic, some glass, piece of net fabric, some stone (FILL)	Dry
5	Piece of gray PLASTIC, some cinders, some flyash (FILL)	Wet
	Black & dark gray FLYASH & CINDERS, some glass, some wood, some plastic, some blue paper (FILL)	Wet
10	Dark gray sandy SILT, increasing fine sand trace small pebbles, trace root fibers (NATIVE)	Wet
15	Gray fine SAND & silt, trace vegetation	Wet
20		
	Gray fine to medium SAND, some stone, occasional white shell	Wet
25	Gray coarse to medium SAND, some shell, occasional pebble	Wet
	Red-brown SILT, occasional pebble, trace fine sand (TILL)	Wet
30		



SAMPLE NUMBER	TYPE	BLOWS / FOOT
1	SS	39
		26
		28
2	SS	8
		3
3	SS	8
		5
		3
4	SS	5
		5
5	SS	1
		3
6	SS	WOH
		3
7	SS	WOR
		3
8	SS	WOR
		3
9	SS	WOR
		3
10	SS	1
		2
11	SS	4
		25
12	SS	8
		2
13	SS	WOR
		WOR

PENETRATION TEST BLOWS / FOOT



NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000605

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW58-86 (ALLUVIUM WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 5, 1986

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID/13" OD) LOCATION: SOUTH SIDE BUFFALO AVENUE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 573.7 TOP OF PIPE ELEVATION:* 573.56

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Dark brown SILT - some fine sand, trace red-brown clay, occasional vegetation, trace wood fragments (FILL)	Moist-dry	Protective cover; Locking cap; 573.7; 573.56; CEM/BEN; BKFL; 2.0'; 2.5'	1	SS	9	
						14	
	Black & dark gray FLYASH - some slag, occasional red brick fragment, piece of glass (FILL)	Moist		2	SS	18	
	White WASTE MATERIAL -chunky, loose (FILL)	Moist				25	
	Yellow-brown & red-brown layered SILT - slight mottling, some fine sand, occasional roots (NATIVE)	Moist	BEN seal; BS pipe	3	SS	8	
5	Mottled brown, red-brown & yellow CLAY - occasional thin silt lense	Moist	SD pack			24	
	Red-brown silty CLAY - occasional gray silty lense	Moist	SS screen	4	SS	23	
						50	
			13" Ø BH	5	SS	21	
	Red-brown silty CLAY - occasional gray silty lense, occasional pebble, becoming more plastic with depth	Moist				39	
10			9.5'; 10.0'				

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' long, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

000606

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO.: OW59-86 (ALLUVIUM WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 7, 1986

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID/13" OD) LOCATION: NORTHWEST AREA OF SITE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 573.1 TOP OF PIPE ELEVATION:* 576.11

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Dark brown silty TOPSOIL & VEGETATION - trace fine sand, occasional gravel (FILL)	Moist	576.11 Locking cap; 573.1 CEM/BEN BKFL; BS pipe 1.9'; BEN seal 3.0'; 13" Ø BH; SD pack; SS screen 8.5'; 9.0'; 10.0'	1	SS	7	
	Gray-brown sandy SILT - trace clay, occasional gravel, trace vegetation, trace white waste material at tip (FILL)	Moist				8	
	Light brown sandy SILT - trace clay, occasional vegetation (FILL)	Moist		2	SS	6	
	White WASTE MATERIAL with black & yellow layers, silt size particles (FILL)	Moist				21	
5	Black CINDERS & FLYASH -trace red brick fragments (FILL)	Wet		3	SS	7	
	Dark brown CINDERS & black FLYASH -some fine sand & silt, some red brick fragments (FILL)	Wet				4	
	Dark gray FLYASH, CINDER, SILT & fine to coarse SAND -trace brick fragment (FILL)	Moist		4	SS	3	
	Slightly mottled brown & gray-brown silty CLAY, plastic (NATIVE)	Moist				2	
10				5	SS	12	
						26	

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

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000607

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW60-86 (ALLUVIUM WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 5, 1986

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID, 13" OD) LOCATION: SOUTH SIDE BUFFALO AVENUE

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 573.4 TOP OF PIPE ELEVATION:* 573.18

PROFILE			MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS			NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Dark brown SILT & CINDERS - some slag, occasional piece of glass & stone, trace root fibers (FILL)	Moist	Protective - cover; Locking cap; 573.4; 573.18; CEM/BEN; BKFL	1	SS	7	
						6	
	Gray-brown SILT & STONE - some cinders, occasional wood fragment, (FILL)	Moist	2.0'; 2.5'; BEN seal	2	SS	17	
	Mottled gray & yellow-brown clayey SILT - layering, occasional vegetation (FILL)	Moist				22	
	Mottled brown & yellow-brown clayey SILT - occasional root fiber (NATIVE)	Moist	BS pipe	3	SS	6	
5	Brown & red-brown silty CLAY - occasional silty nodule	Moist	SD pack			26	
				4	SS	30	
			13" Ø BH			60	
	Red-brown CLAY, very stiff - some silt, moisture & plasticity increasing with depth	Moist	SS screen	5	SS	21	
						43	
			9.5'; 10.0'				
10							

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot,. stainless steel
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO.: OW61-86 (ALLUVIUM WELL)

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: FEBRUARY 11, 1986

HOLE TYPE: HOLLOW STEM AUGER (8-1/4" ID, 13" OD) LOCATION: NORTHEAST SECTOR OF LANDFILL

CRA SUPERVISOR: D. MILLARD GROUND ELEVATION:* 573.6 TOP OF PIPE ELEVATION:* 576.95

PROFILE				MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH	STRATIGRAPHY DESCRIPTION & REMARKS				NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
0	Dark brown sandy SILT & VEGETATION - occasional pebble (FILL)	Dry-moist		576.95 Locking cap; 573.6; 13" Ø BH; CEM/BEN BKFL; 2.5'; BEN seal; 3.5'; BS pipe; SD pack; SS screen; 9.5'; 10.0'	1	SS	13	
	White WASTE MATERIAL - silt size (FILL)	Dry					17	
	Red-brown fine SAND & SILT - occasional pebble & cinder (FILL)	Dry			2	SS	2	
	White WASTE MATERIAL - occasional black, yellow & brown color, trace silt, trace fine sand, occasional root fiber, becoming wet (FILL)	Moist-dry					2	
					3	SS	3	
5	Gray CINDERS & FLYASH - occasional red brick fragment (FILL)	Wet					2	
	Dark gray CINDERS & FLYASH - trace white waste material (FILL)	Wet			4	SS	2	
	Gray-brown silty CLAY - trace root fibers, increasing plasticity with depth (NATIVE)	Dry-moist					13	
					5	SS	14	
	Brown silty CLAY, plastic	Moist					38	
10								

NOTES:
Well Pipe: 2" diameter black steel
Well Screen: 2" diameter, 5' length, #6 slot, stainless steel
Sand Pack: Special coarse blend Ottawa sand

Well could not be installed in original borehole due to repeated bridging of sand in augers. Moved approximately 5' south, reaugered and installed well. Grouted original borehole.

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

recycled paper

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW62-87

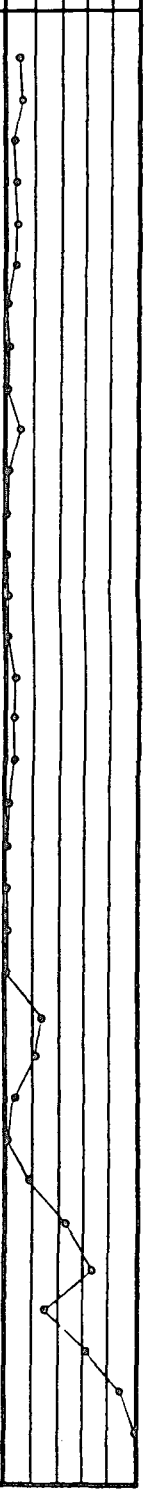
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: MARCH 16, 1987

HOLE TYPE: HOLLOW STEM AUGER LOCATION: WEST SIDE OF LANDFILL

GEOLOGIST / ENGINEER: D. OSCAR GROUND ELEVATION: * TOP OF PIPE ELEVATION: *

DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE TYPE	BLOWS / FOOT
			Locking cap			
0	Gray fine to coarse GRAVEL - some sand, trace silt (FILL)	Wet		1	SS	9
	Black SILT - some fine sand, trace gravel, occasional sand & silt nodule (FILL)	Moist	13" Ø BH			12
	Mottled red-brown CLAY - some silt, trace fine sand, gravel, pebbles (FILL)	Moist-wet		2	SS	4
						7
	Black FLYASH - trace brick fragments, vegetation, gravel (FILL)	Dry		3	SS	8
	Light brown WASTE MATERIAL - trace gravel ceramic fragments (FILL)	Moist				6
5	Black FLYASH - trace gravel, stone fragment, brick fragment (FILL)	Moist		4	SS	1
	Black FLYASH - some vegetation, trace gravel, brick fragments, paper (FILL)	Wet	BS pipe			3
				5	SS	1
	Black & dark brown FLYASH - some stone fragments, trace vegetation, gravel (FILL)	Wet				10
10				6	SS	1
	Black FLYASH - trace gravel, brick fragments (FILL)	Wet				1
				7	SS	1
	Black VEGETATION - some wood, flyash, one stone fragment (FILL)	Wet	CEM/BEN BKFL			3
	Black FLYASH - trace sand, vegetation (FILL)	Wet		8	SS	2
15	Mottled gray & olive-gray fine SAND - some silt, trace vegetation (NATIVE)	Moist-wet				5
				9	SS	4
	No recovery					4
				10	SS	3
						2
	Gray fine to medium SAND - some silt, trace vegetation, trace pebbles at 22.0'-24.0'	Wet		11	SS	1
						2
				12	SS	1
						25
	Gray fine to coarse SAND & fine to medium GRAVEL - some silt, trace shells & shell fragments, stone fragments, gravel is angular to rounded	Wet		13	SS	22
25			25.0' BEN seal			4
	Red-brown SILT - some clay, fine to medium subangular gravel, trace fine to medium sand increasing with depth	Wet		14	SS	2
			27.1'			19
	Dark gray fine to medium SAND - some silt, trace gravel & shell fragments	Wet		15	SS	44
	Red-brown SILT - some fine to medium sand, stone fragments, trace clay, fine to medium gravel, stone & gravel ranges from angular to rounded at 30.0'-33.2', layer of stone fragments at 32.2'-32.3'	Wet	SS screen			67
30			SD pack	16	SS	29
						63
				18	SS	88
						100
	Spoon refusal - 33.2'; auger refusal - 33.3'		33.3'			

PENETRATION TEST BLOWS / FOOT



* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

recycled paper

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO.: 9-1431 HOLE NO.: OW62-87

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: MARCH 16, 1987

HOLE TYPE: HOLLOW STEM AUGER LOCATION: WEST SIDE OF LANDFILL

GEOLOGIST / ENGINEER: D. OSCAR GROUND ELEVATION: * TOP OF PIPE ELEVATION: *

PROFILE		MONITOR INSTALLATION	SAMPLE			PENETRATION TEST BLOWS / FOOT
DEPTH (ELEVATION)	STRATIGRAPHY DESCRIPTION & REMARKS		NUMBER	TYPE	BLOWS / FOOT	20 40 60 80
	NOTES: Well Pipe: 2" diameter black steel Well Screen: 2" diameter stainless steel, #6 slot, 5' length Sand Pack: Special coarse blend Ottawa sand					

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS

▼ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

STRATIGRAPHIC AND INSTRUMENTATION LOG

PROJECT NAME: 102ND STREET LANDFILL JOB NO: 9-1431 HOLE NO.: OW63-87

CLIENT: OCCIDENTAL CHEMICAL CORPORATION DATE COMPLETED: MARCH 18, 1987

HOLE TYPE: HOLLOW STEM AUGER LOCATION: WEST SIDE OF LANDFILL

GEOLOGIST / ENGINEER: D. OSCAR GROUND ELEVATION: * TOP OF PIPE ELEVATION: *

PROFILE: DEPTH (ELEVATION)	PROFILE: STRATIGRAPHY DESCRIPTION & REMARKS		MONITOR INSTALLATION	SAMPLE: NUMBER	SAMPLE: TYPE	SAMPLE: BLOWS / FOOT	PENETRATION TEST BLOWS / FOOT (20 40 60 80)
0	Gray fine to coarse GRAVEL - some sand, trace silt (FILL)	Wet	Locking cap; 13" Ø BH				
	Black SILT - some fine sand, trace gravel, occasional sand & silt nodule (FILL)	Moist					
	Mottled red-brown CLAY - some silt, trace fine sand, gravel, pebbles (FILL)	Moist-wet	BS pipe				
	Black FLYASH - trace brick fragments, vegetation, gravel (FILL)	Dry	CEM/BEN BKFL 4.4'				
5	Light brown WASTE MATERIAL - trace gravel ceramic fragments (FILL)	Moist	BEN seal 5.8				
	Black FLYASH - trace gravel, stone fragment, brick fragment (FILL)	Moist					
	Black FLYASH - some vegetation, trace gravel, brick fragments, paper (FILL)	Wet	SD pack				
	Black & dark brown FLYASH - some stone fragments, trace vegetation, gravel (FILL)	Wet					
10	Black FLYASH - trace gravel, brick fragments (FILL)	Wet	SS screen				
	Black VEGETATION - some wood, flyash, one stone fragment (FILL)	Wet					
	Black FLYASH - trace sand, vegetation (FILL)	Wet	14.4'				
15			14.5'				

NOTES:
Stratigraphy from OW62-87

Well Pipe: 2" diameter black steel
Well Screen: 2" diameter stainless steel, #6 slot, 5' length
Sand Pack: Special coarse blend Ottawa sand

* REFER TO "WATER ELEVATIONS" TABLE FOR CURRENT REFERENCE ELEVATIONS
▽ WATER FOUND ▽ STATIC WATER LEVEL (37) GRAIN SIZE ANALYSIS

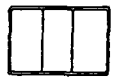
102ND STREET LANDFILL

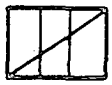
STRATIGRAPHIC AND INSTRUMENTATION LOGS

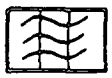
REMEDIAL INVESTIGATION

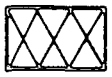
OLIN CORPORATION

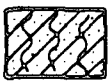
Key to Symbols

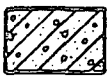

FILL

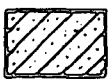

FILL, WITH RUBBLE


CHEMICAL WASTE FILL


SEWER BEDDING MATERIAL

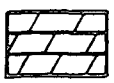

ALLUVIUM WITH VEGATIVE MATTER


ALLUVIUM - POORLY GRADED SAND AND GRAVELLY SAND


ALLUVIUM - SAND/SILT MIXTURES

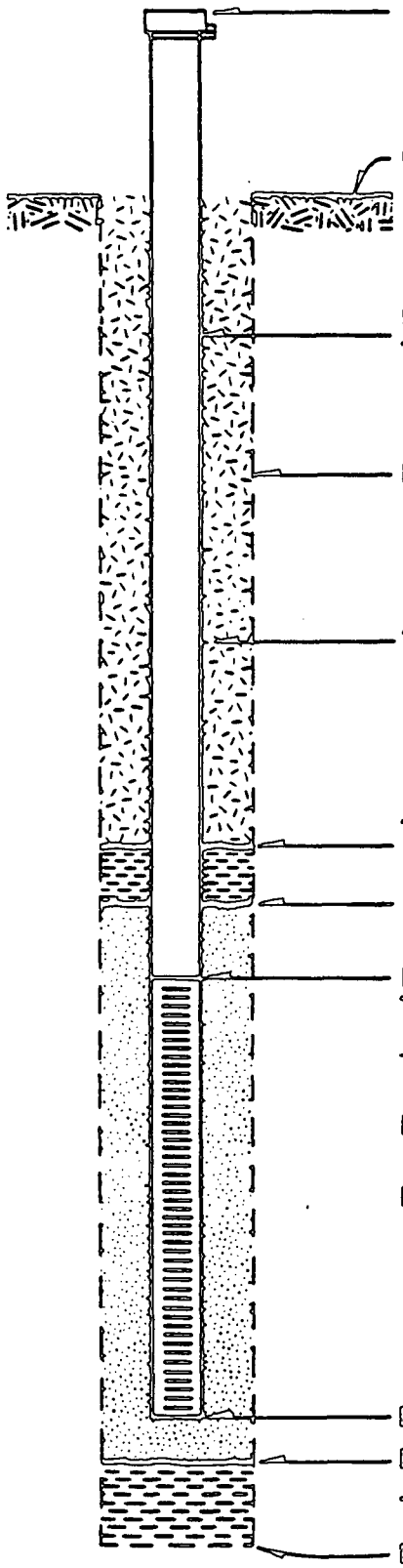
GLACIAL TILL

GLACIOLUCUSTRINE CLAY


LOCKPORT DOLOMITE

WATER ELEVATION AT TIME OF DRILLING

000614



Elev. of top of well casing 579.09

Ground Elevation 576.24

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 573.0

Elev. of top of sand pack 571.0

Elev. of top of screen 569.0

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 564.0

Elev. of tip of sand pack 563.5

Type of backfill Bentonite

Elev. of bottom of borehole 562.2

REPORT OF MONITORING WELL NO. MW-1

000615

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-1

102nd St. Landfill

DATE 11/8/85 SURFACE ELEVATION 576.24 LOCATION Niagara Falls, NY

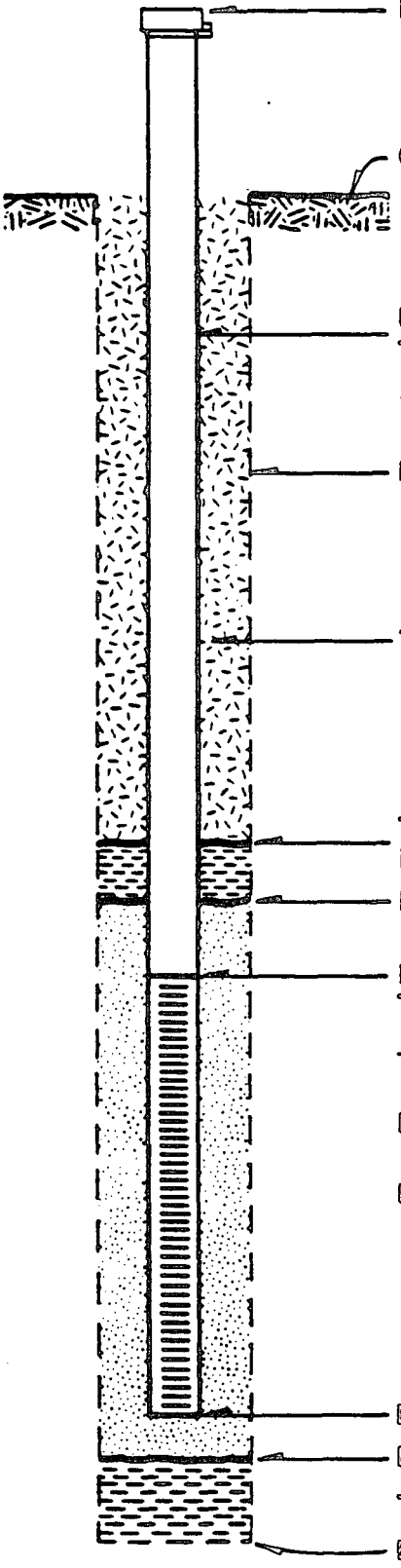
DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0	16	Stiff, medium brown to medium red-brown SILTY CLAY with cinders, brick chips and subrounded gravel, moist, low plastic (CL CLAY CAP FILL)	573.74	
	10	Very stiff medium red brown SILTY CLAY with trace coarse sand and cinders, moist, medium to high plastic (CL Clay Cap Fill)	572.74	
5	53			
	80/3"			
	7	Dense, light gray to light gray-brown FLYASH, very fine grained with 1 mm laminations, dry (FILL)		
10	10	- becoming dark gray and moist at 9 feet to 10 feet - brick chips and gravel at 12 feet, becoming saturated	▽564.9	
	12		563.74	
	2	Soft, olive brown SILTY CLAY with abundant vegative matter and trace fine sand, saturated, low plastic (CL ALLUVIUM)		
15				

000616

Completion Depth 562.24 Feet Water Depth 564.9 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

WCC-RP 2



Elev. of top of well casing 578.54

Ground Elevation 575.81

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 572.8

Elev. of top of sand pack 571.8

Elev. of top of screen 571.1
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 566.1

Elev. of tip of sand pack 565.6

Type of backfill Bentonite

Elev. of bottom of borehole 563.0

REPORT OF MONITORING WELL NO. MW-2

000617

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

LOG of BORING No. MW-2

DATE 8-19-86 SURFACE ELEVATION 575.81 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0				574.81	
		11	Stiff medium yellow brown SILTY CLAY with trace fine sand, brick chips, cinders, slightly moist, low plastic (CL CLAY CAP FILL)		
		67	Very stiff becoming firm dark grey to black fine sandy SILTY CLAY containing chemical waste, brick chips and wood, low plastic, wet to saturated (Fill)	571.81	
5		9		▽ 569.81	
		13	Firm, dark gray to black very fine grained FLY ASH with medium to coarse sand and fine gravel, wood fragments, metal drum shrap, and fiberous material, wet becoming saturated. Samples have oily sheen (Fill) - At 8 feet to 10 feet becoming very black, oily sludge with abundant metal shrap		
10		25		565.41	
		13			
			Stiff light to medium mottled olive gray to olive brown SANDY SILT with trace clay, wet to saturated, low plastic (SM ALLUVIUM)		
15					

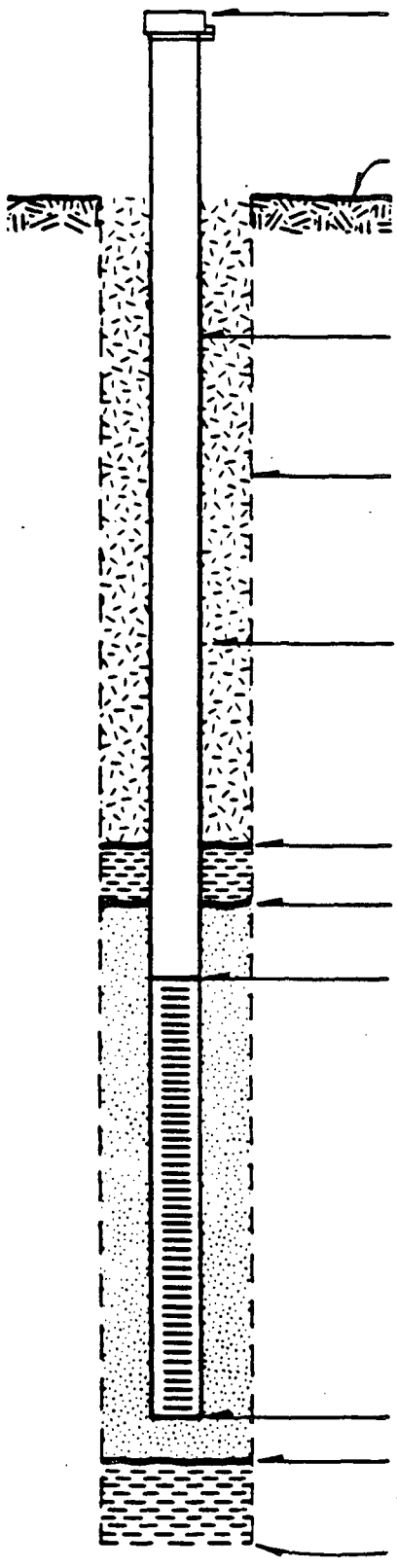
000618

Completion Depth 563.81 Feet Water Depth 569.81 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

Woodward-Clyde Consultants

WCC-HP 2



Elev. of top of well casing 579.49

Ground Elevation 576.07

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 565.1

Elev. of top of sand pack 561.6

Elev. of top of screen 558.6

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 553.6

Elev. of tip of sand pack 553.1

Type of backfill Bentonite

Elev. of bottom of borehole

REPORT OF MONITORING WELL NO. MW-3 000619

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

LOG of BORING No. MW-3

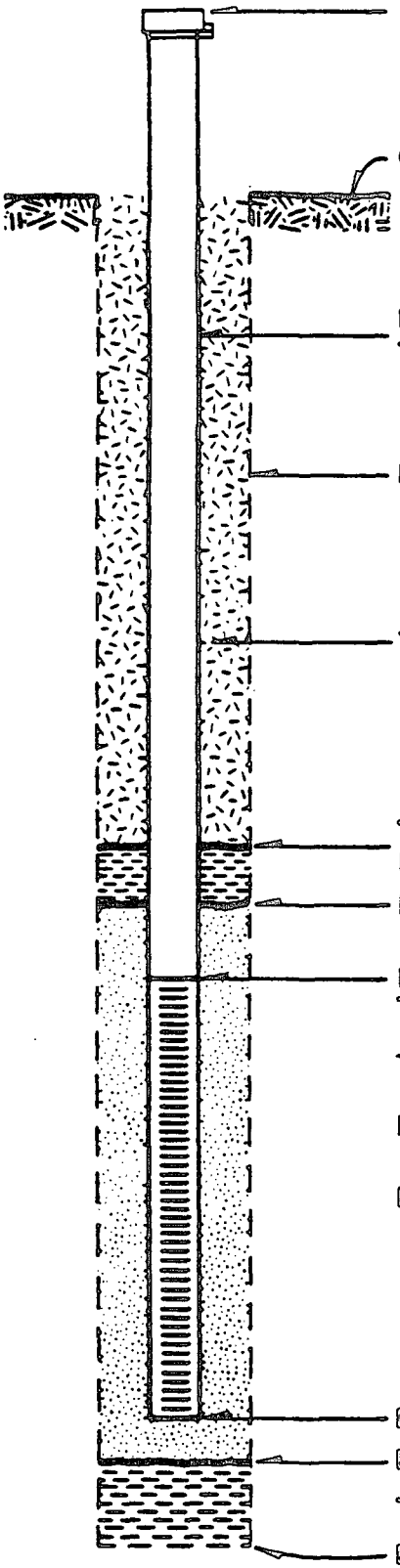
DATE 12/16/85 SURFACE ELEVATION 576.07 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION
0		20	Stiff, dark red-brown SILTY CLAY with brick chips, moist, low to medium plastic (CL CLAY CAP FILL)	574
		14	Firm to stiff, dark red-brown to dark brown SILTY CLAY with abundant 1 to 2 cm angular rock clasts, wood and plactic, Brick chips and cement fragments, moist, low plastic (CL DEMOLITION DEBRIS FILL)	
5		7		
		6		567.8
		10	Firm dark gray to black SLAG (chemical waste), moist nonplastic (FILL)	▽566.0
10		71	Hard, dark gray to black very fine grained FLY AND with brick, rock and wood fragments, dry, nonplastic(FILL)	563.5
		3	Firm, medium gray-brown to medium gray, fine SILTY SAND with trace clay, wet, low plastic, abundant vegative matter in upper 2 feet (SM ALLUVIUM)	
15		13		
		9		
		4		556.0
20		39	Medium dense, dark gray fine to coarse SAND with rounded fine gravel, saturated (SP/SW ALLUVIUM)	555.2
		4	Firm to stiff, salmon, SANDY SILTY CLAY with 1 mm to 2 mm angular to sub-angular gravel, saturated, low to medium plastic (CL, GLACIAL TILL)	
25		4		

000620

Completion Depth 549.5 Feet Water Depth 566.0 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136



Elev. of top of well casing 578.30

Ground Elevation 575.19

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 572.2

Elev. of top of sand pack 571.2

Elev. of top of screen 570.2
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 565.2

Elev. of tip of sand pack 564.7

Type of backfill Bentonite

Elev. of bottom of borehole 560.7

REPORT OF MONITORING WELL NO. MW-4

000621

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

LOG of BORING No. MW-4

DATE 12-17-85 SURFACE ELEVATION 575.19 LOCATION Niagara Falls New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0	37	Hard, dark gray CLAYEY SILT with fly ash intermixed and rock fragments, moist, low plastic (CL CLAY CAP FILL)	571.9	
	90			
5	5	Firm, dark gray to black CLAYEY SILT with fly ash, rounded pebbles, concrete fragments, brick fragments, moist, low plastic, oily sheen (FILL)	▽568.2	
	12			
10	1	Soft, black oily SLUDGE with concrete and paper fragments, wet, strong odor (FILL)	564.2	
	6	Firm, brown to red brown organic SILTY CLAY with trace fine sand, wet, low plastic (CL/OL ALLUVIUM)		
	3			
15				

000622

Completion Depth 561.20 Feet Water Depth 568.2 Feet ATO Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

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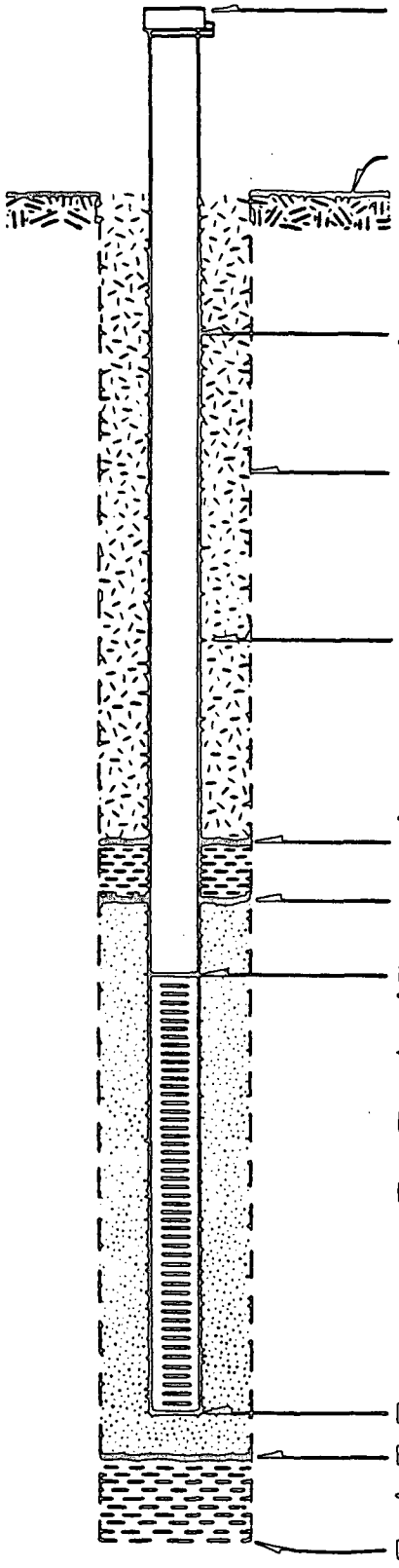
Woodward-Clyde Consultants

WCC-RP 2



Elev. of top of well casing 578.89

Ground Elevation 575.92

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 568.1

Elev. of top of sand pack 566.1

Elev. of top of screen 564.9
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.0 ft.

Elev. of tip of screen 562.9

Elev. of tip of sand pack 562.4

Type of backfill Bentonite

Elev. of bottom of borehole 561.4

REPORT OF MONITORING WELL NO. MW-5

000623

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-5

DATE 12-19-86 SURFACE ELEVATION 575.92 LOCATION Niagara Falls New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0	22	Hard, red brown to orange, sandy SILTY CLAY with brick, coal and rock fragments, moist, low plastic (CL CLAY CAP FILL)	573.4	
	11	Firm, dark gray to black fine grained FLY ASH with coal brick fragments and cinders intermixed with black sludge, moist, nonplastic (FILL)		
5	10		569.9	
	42	Hard, dark gray very fine grained FLY ASH with brick, coal and cinder fragments, dry (FILL)		
	37		565.9	
10	17	Wood fragments, clay tile fragments, brick chips and gravel (SEWER BEDDING MATERIAL)	564.91	
	4	Soft, black SILTY SAND with vegative matter, wet, low plastic, NAPL present in upper 1 to 1.5 feet (SM ALLUVIUM)		
15				

000624

Completion Depth 561.9 Feet Water Depth 565.9 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

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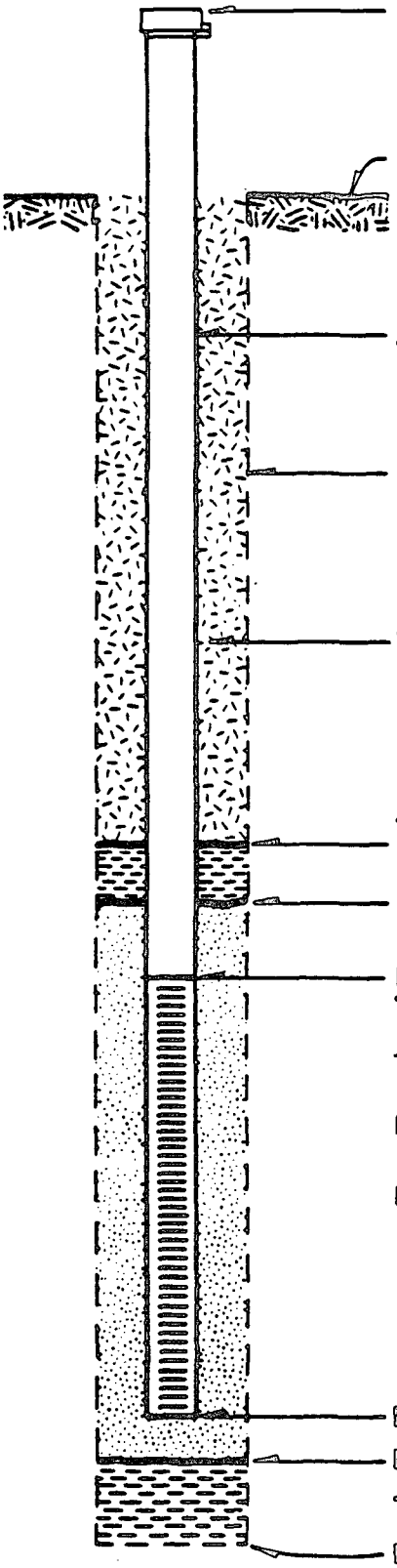
Woodward-Clyde Consultants

WCC-RP 2



Elev. of top of well casing 578.06

Ground Elevation 574.91

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 568.9

Elev. of top of sand pack 566.9

Elev. of top of screen 564.9
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.0 ft.

Elev. of tip of screen 562.9

Elev. of tip of sand pack 562.4

Type of backfill Bentonite

Elev. of bottom of borehole 561.9

REPORT OF MONITORING WELL NO. MW-6

000625

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

LOG of BORING No. MW-6

DATE 1-7-86 SURFACE ELEVATION 574.91 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		18	Stiff, medium red brown to medium brown SILTY CLAY with trace coarse sand, moist, low plastic (CL CLAY CAP FILL)	572.5	
		18	Stiff, medium brown SILTY CLAY with trace medium to coarse sand and root debris, moist, low plastic(CL Fill)	570.4	
5		15	Firm to stiff, dark gray with red brown mottling SILTY CLAY with fly ash, rock fragments, cement fragments and abundment demolition rubble, moist, low plastic (CL LEVY FILL WITH RUBBLE)		
		65/3"		565.1	
10		30	2 inches fine to coarse sand over whole brick (SEWER BEDDING)	564.4	
15			Firm to stiff, dark gray to blue gray SILTY CLAY with trace fine sand, abundant vegative matter, moist to wet, low plastic (CL/OH ALLUVIUM)		

000626

Completion Depth 562.9 Feet Water Depth NONE Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

WCC-RP 2

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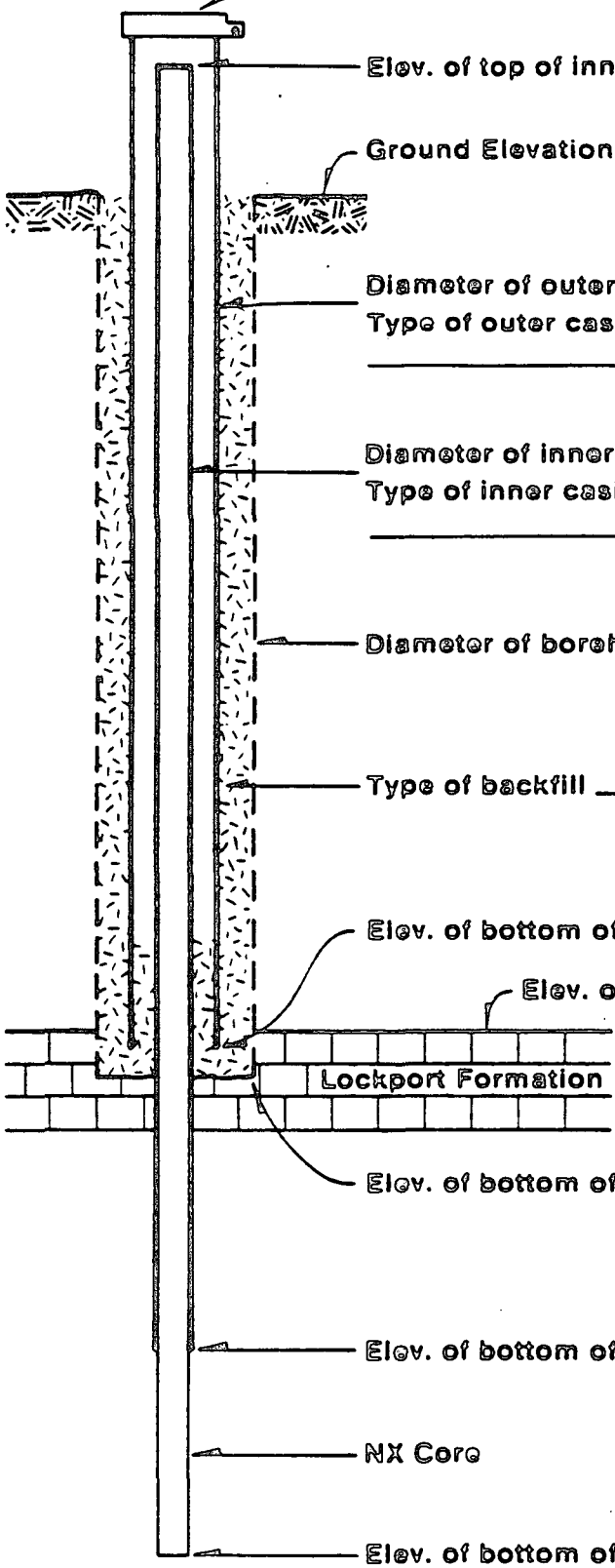

Elev. of top of outer casing 579.14

Elev. of top of inner casing N/A

Ground Elevation 576.30

Diameter of outer casing 0.42 ft.

Type of outer casing Steel pipe

Diameter of inner casing N/A

Type of inner casing N/A

Diameter of borehole 0.8 ft.

Type of backfill Cement/Bentonite Grout

Elev. of bottom of outer casing 535.54

Elev. of top of rock 535.80

Elev. of bottom of borehole 534.80

Elev. of bottom of inner casing N/A

NX Core

Elev. of bottom of corehole 520.20

REPORT OF MONITORING WELL NO. MW-7000627

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-7

DATE 1-13-86 SURFACE ELEVATION 576.30 LOCATION Niagara Falls New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION
0		Clean crushed limestone GRAVEL (DRILLING PLATFORM BERM FILL) - Augers advanced to 4 feet without sampling	572.3
5	27	Firm to stiff, medium red brown SILTY CLAY with demolition debris and large riprap rock intermixed, moist, low plastic (LEVY FILL)	
	11		
10	60/3"	- split spoon refusal from 9.5 feet to 13 feet due to large debris	▽ 563.3
15	13	Soft to firm, dark gray to olive gray very fine SANDY SILTY, wet, low plastic, abundant vegative matter in upper portions (SM ALLUVIUM)	
	12		
20	3		554.8
	9	Loose, dark gray fine SAND and fine to medium, well rounded gravel with trace silt, wet (SP ALLUVIUM)	553.8
25	9	Firm, red brown to salmon, sandy SALTY CLAY with 1 to 5 cm. sub angular gravel, wet, low plastic (CL GLACIAL TILL)	
	10		
30	19	Becoming firm to stiff at 29 feet. Becoming hard at 32 feet.	
	48		
35	137		
	56		
40	53		535.8
		Lockport Dolomite	

000628

Completion Depth 535.8 Feet Water Depth 563.3 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

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WCC-RP 2

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FIELD ROCK DESCRIPTION LC

Sheet 1 of 3

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB Olin 102nd St. NO. 84C2136-5	BORING NUMBER MW-7
At 564.85 Ft. after 18 hrs.	DRILLING RIG CME 55 w/10'NX Barrel	BORING OFFSET N/A
At _____ Ft. after _____ hrs.	OPERATOR Darryl Altrogge	SURFACE ELEVATION 576.30
At _____ Ft. after _____ hrs.	INSPECTOR R. Karr	DATE START 4-16-86 FINISH 4-16-

DEPTH BELOW SURFACE	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BE DI
								39.6'	Airspace in casing			
40	39.6/ 44.6		43%		96%		NX					
							13 min./ft.		Grout at casing bottom	N/A		
41								41.4'				
42							7 min./ft.		Dolomite, medium gray to dark gray brown, slight weathering in first 18 inches, thin to very thin bedding, numerous solution vugs, gypsum crystals in vugs, very fine crystalline structure	8	—	
								42.9'				
43							17 min./ft.		Becoming light to olive-gray, fewer fractures, solution vugs and gypsum crystals absent, bedding thin, non-weathered	2.6	—	
44												
45	44.6/ 54.6		59.5%		98%		17 min./ft.		Medium gray, thin bedded, non-weathered, fracture surfaces are oxidized, a very fine crystalline texture, gypsum lining some fractures.	5	—	
45												

GENERAL NOTES:

Fracture and bedding dip is near horizontal or very slight

Total Depth _____

'ROCK' Drilling _____

000629

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Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

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FIELD ROCK DESCRIPTION L

Sheet 2 of 3

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB Olin 102nd St. NO. 84C2136	BORING NUMBER MW-7
At _____ Ft. after _____ hrs.	DRILLING RIG CME 55 w/NX 10'	BORING OFFSET N/A
At _____ Ft. after _____ hrs.	OPERATOR Darryl Altrogge	SURFACE ELEVATION 576.30
At _____ Ft. after _____ hrs.	INSPECTOR R. Karr	DATE START 4/16/86 FINISH 4/1

DEPTH BELOW SURFACE	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP
							NX				
46										5	
47											
									Some very small solution pits or vugs at fracture boundaries	1	
48											
										4	
49											
										1	
50											
										3	
51									Massive, with -Solution pits and vugs throughout		
										5	
52											

GENERAL NOTES:

Total Depth ____

'ROCK' Drilling ____

000630

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

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HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION L

Sheet 3 of 3

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB Olin 102nd St. NO. 84C2136	BORING NUMBER MW-7
At _____ Ft. after _____ hrs.	DRILLING RIG CME 55W/10' NX	BORING OFFSET N/A
At _____ Ft. after _____ hrs.	OPERATOR Darryl Attrogge	SURFACE ELEVATION 576.30
At _____ Ft. after _____ hrs.	INSPECTOR R. Karr	DATE START 4/16/86 FINISH 4/1

DEPTH BELOW SURFACE	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP
							NX				
52										4	
53										2	
54										5	
							NX				
55	54.6/ 56.1		39%		120%					7	
56									Bottom of core at 56.1 feet	3	

GENERAL NOTES:

000631

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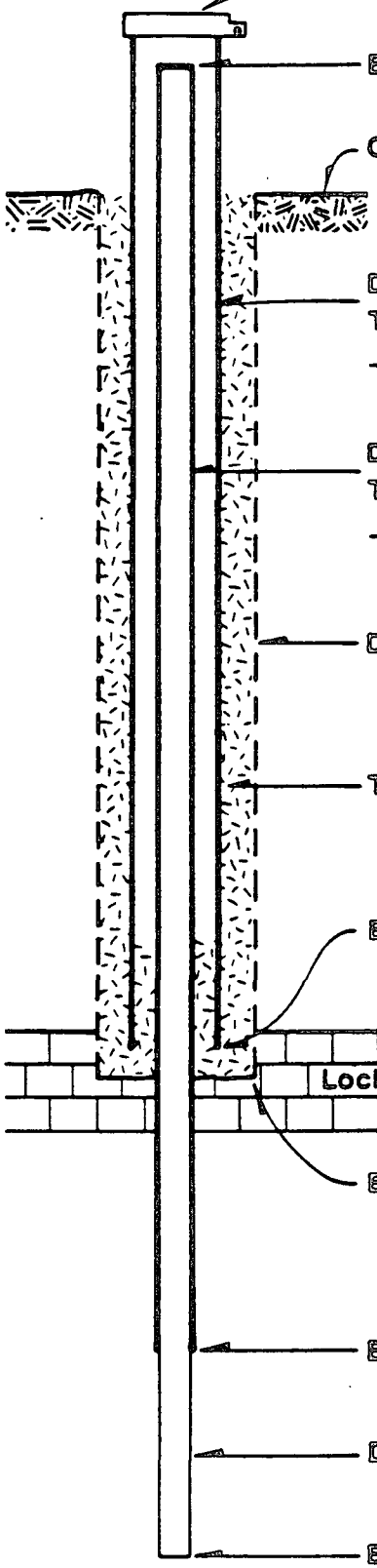
Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%



Elev. of top of outer casing	578.55
Elev. of top of inner casing	578.50
Ground Elevation	576.5
Diameter of outer casing	0.5 ft.
Type of outer casing	Steel pipe
Diameter of inner casing	4 in.
Type of inner casing	Black steel pipe
Diameter of borehole	1.1 ft.
Type of backfill	Cement/Bentonite Grout
Elev. of bottom of outer casing	535.6
Elev. of top of rock	536.0
Elev. of bottom of borehole	535.0
Elev. of bottom of inner casing	403.0
Diameter of Core	NX
Elev. of bottom of corehole	347.5

000632

REPORT OF MONITORING WELL NO. MW-8

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

LOG of BORING No. MW-8

DATE 1/20/86 SURFACE ELEVATION 576.5 LOCATION Niagara Falls New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		Clean crushed limestone GRAVEL (DRILLING PLATFORM BERM FILL)	572.3	
5, 10		Firm to stiff, medium red-brown SILTY CLAY with demolition debris and large riprap rock intermixed, moist, low plastic (LEVY FILL)	▽ 563.3	
15, 20		Soft to firm, dark gray to olive gray very fine SANDY SILT, wet, low plastic, abundant vegative matter in upper postions (SM ALLUVIUM)	554.8	
		Loose, dark gray fine SAND and fine to medium well rounded gravel with trace silt, wet (SP ALLUVIUM)	553.8	
25, 30, 35		Firm, red-brown to salmon, sandy SILTY CLAY with 1 to 5cm subangular gravel, wet, low plastic (CL GLACIAL TILL) -Becoming firm to stiff at 29 feet -Becoming hard at 32 feet	536.0	
40		Lockport Dolomite		

000633

Completion Depth 535.0 Feet Water Depth 563.3 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

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WCC-RP 2

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FIELD ROCK DESCRIPTION LC

GROUND WATER OBSERVATION
At _____ Ft. at Completion
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.

JOB 102nd Street NO. 84C2136
DRILLING RIG Acker AD3
OPERATOR Russell Waddel - PA Drlg
INSPECTOR Tim Giles

BORING NUMBER MW-8
BORING OFFSET
SURFACE ELEVATION 576.5
DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP
40											
41	Run 1 40.5' - 49.2' Interval A		5.6'/8.7' = 64%		8.7'/8.7' = 100%		4 3/4"		Light to medium gray, medium to fine grained, thin to thick bedded uniform Dolomite with some gypsum healed fractures and occasional stylolites	4	
42										3	
43										4	
44									Oak Orchard	9	
45										2	15'
46										1	
47										1	
48										6	
49	Run 2 49.2' - 55.5' Interval A		2.2"/6.3" = 35%		5.2'/6.3' = 83%					6	
50										5	
51										1	
52											

GENERAL NOTES:
Bedding dip horizonital unless otherwise noted

Total Depth _____
'ROCK' Drilling _____

000634

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Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

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FIELD ROCK DESCRIPTION LO

Sheet 3 of 17

GROUND WATER OBSERVATION
At _____ Ft. at Completion
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.

JOB 102nd Street NO. 83C2136
DRILLING RIG Acker AD3
OPERATOR Russell Waddel-PA Drlg.
INSPECTOR Tim Giles

BORING NUMBER MW 8
BORING OFFSET _____
SURFACE ELEVATION 576.5
DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BE D
52							4 3/4"					
53										1		
54										5		
55									Oak Orchard	3		
56	Run 3 55.5' - 61.5' Interval B		31.5" / 72" = 44%		5.6' / 6.0" = 93%					4		
57										6		
58										6		
59										6		
60										3		
61										2		
62	Run 4 61.5' - 70.5' Interval B		48" / 108" = 44%		9.6' / 9.0' = 107%					3		
63										4		15
64										4		15

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted

Total Depth _____
'ROCK' Drilling _____

000635

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ecology and environment

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LC

Sheet 4 of 17

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 84C2136	BORING NUMBER MW 8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel-PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BE DI
							4 3/4"					
64									Light to medium gray, fine to medium grained, thinly bedded stromatolitic Dolomite with gypsum and carbonaceous partings Oak Orchard	5		15
65												15
										3		
66										8		15
												15
67										5		
												15
68									Light gray, medium grained, thinly bedded uniform Dolomite with minor stromatolites Oak Orchard	1		
69												
										5		
70												
										3		
71	Run 5 70.5'		102"/102" = 100%		8.5'/8.5' = 100%				Dark gray to black, coarse grained massive bedded, uniform Dolomite with stylolites and gypsum filled fractures. Locally some areas of stromatolites Oak Orchard	1		45°
72	- 79.0'									1		
	Interval C											
73										1		
74										2		15°
75										0		
76												

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted

Total Depth _____

'ROCK' Drilling _____

000636

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

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FIELD ROCK DESCRIPTION L.

Sheet 5 of 17

GROUND WATER OBSERVATION	JOB 102nd Street NO. 84C2136	BORING NUMBER MW 8
At _____ Ft. at Completion	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel-PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/21
At _____ Ft. after _____ hrs.		

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BE D.
76							4 3/4"			0		
77										0		
78										1		
79	Run 6								Oak Orchard	2		15
80	79.0' - 82.2'		36"/38.4" = 94%		3.2'/3.2' = 100%					1		15
81	Interval C									2		30
82										1		
83	Run 7									4		
84	82.2' - 85.5'		31.2"/39.6" = 79%		3.3'/3.3' = 100%					2		
85	Interval C									2		
86	Run 8									0		
87	85.5' - 93.8'		99.6"/99.6" = 100%		8.6'/8.3' = 104%				Medium gray fine to medium grained, massively bedded, porous Dolomite with stylolites and calcite crystals in vugs	0		
88	Interval D											

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted

Total Depth _____

'ROCK' Drilling _____

000637

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Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LC

Sheet 6 of 17

GROUND WATER OBSERVATION
At _____ Ft. at Completion
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.

JOB 102nd Street NO. 84C2136
DRILLING RIG Acker AD3
OPERATOR Russell Waddel-PA Drlg.
INSPECTOR Tim Giles

BORING NUMBER MW-8
BORING OFFSET
SURFACE ELEVATION 576.5
DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BE DI
88									Oak Orchard	1		
89									Dark gray, medium grained, massive bedded stylolitic Dolomite	0		
90										0		
91									Oak Orchard	0		
92												
93									Dark gray to brown, medium to coarse grained porous Dolomite with Favosites, gypsum, sphalarite and stylolites	1		
94	Run 9 93.8' - 100.5' Interval D		78" / 80.4" = 97%		6.5' / 6.7' = 97%					1		
95									Oak Orchard	0		
96										0		
97										1		
98									Dark gray to black, medium to coarse grained, thick to massive bedded uniform Dolomite with stylolites, calcite healed vertical fractures and pinhole porosity	0		
99										0		
100									Oak Orchard	1		

GENERAL NOTES:

Bedding dip horitzontal unless otherwise noted

000638

Total Depth _____
'ROCK' Drilling _____

HOLE NO.

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ecology and environment

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

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FIELD ROCK DESCRIPTION L.

GROUND WATER OBSERVATION
At _____ Ft. at Completion
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.

JOB 102nd Street NO. 83C2136
DRILLING RIG Acker AD3
OPERATOR Russell Waddel-PA Drlg.
INSPECTOR Tim Giles

BORING NUMBER MW-8
BORING OFFSET _____
SURFACE ELEVATION 576.5
DATE START 12/5/86 FINISH 1/2

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP
100										1	
101	Run 10 100.5'	- 108.8'	84" / 102" = 82%		8.3' / 8.5' = 98%					0	
102										1	
103	Interval E									5	
104									Light gray, coarse grained, thinly bedded uniform Dolomite	3	
105									Oak Orchard		
106									Medium gray and brown, medium to coarse grained, thick to massive bedded Dolomite with locally abundant stromatolites, carconaceous partings, stylolites, calcite and occasional vugs	3	
107										0	
108									Oak Orchard	1	
109	Run 11 108.8'	- 115.5'	80.4" / 80.9" = 100%		6.9' / 6.7' = 103%					0	
110										0	
111	Interval E									1	
112										0	

GENERAL NOTES:
Bedding dip horizontal unless otherwise noted

Total Depth _____
'ROCK' Drilling _____

000639

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Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

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FIELD ROCK DESCRIPTION LOG

Sheet 8 of 17

GROUND WATER OBSERVATION		
At [illegible] Ft. at Completion	JOB 102nd Street NO. 84C2136	BORING NUMBER MW-8
At ____ Ft. after ____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET ____
At ____ Ft. after ____ hrs.	OPERATOR Russell Waddel - PA Drlg.	SURFACE ELEVATION 576.5
At ____ Ft. after ____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BED DIP
112												
113										1		
14										1		
15										3		20°
										1		
16	Run 12 115.5' [illegible] - 124.0' Interval F		99.6" / 102" = 98%		8.5' / 8.5' = 100%				Medium gray and white, medium to coarse grained, massive bedded fossiliferous Dolomite with calcite	0		
17										1		
18									Oak Orchard	0		
19										1		
20										1		
21										0		
22										0		
23										0		
24												

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted

Total Depth ____

'ROCK' Drilling ____

000640

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ecology and environment

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION L.

GROUND WATER OBSERVATION
At _____ Ft. at Completion
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.

JOB 102nd Street NO. 86C2136
DRILLING RIG Acker AD3
OPERATOR Russell Waddel - PA Drlg.
INSPECTOR Tim Giles

BORING NUMBER MW-8
BORING OFFSET
SURFACE ELEVATION 576.5
DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BE D
124										1		
	Run 13 124.0'-130.5' Interval F		70.8"/78" =91%		6.5'/6.5' =100%				Medium grey, medium to coarse grained, thin to thick wavy bedded, gypsum Dolomite with stylolites, calcite and sphalerite	0		
125												
126										1		
127									Oak Orchard	1		
128										1		
129										4		
130										0		
131	Run 14 130.5'-139.0' Interval G		112"/102" =89%		8.3'/8.5' =98%					2		
132										2		
133										2		
134										3		
135										1		
136												

GENERAL NOTES:
Bedding dip horizontal unless otherwise noted

000641

Total Depth _____
'ROCK' Drilling _____

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

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FIELD ROCK DESCRIPTION L(

Sheet 10 of 17

GROUND WATER OBSERVATION		
At _____ Ft. at Completion	JOB 102nd Street NO. 84C2136	BORING NUMBER MW-8
At _____ Ft. after _____ hrs.	DRILLING RIG Acker AD3	BORING OFFSET _____
At _____ Ft. after _____ hrs.	OPERATOR Russell Waddel - PA Drlg.	SURFACE ELEVATION 576.5
At _____ Ft. after _____ hrs.	INSPECTOR Tim Giles	DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BE D
136										2		
137										2		15
138										0		
139									Medium grey, medium grained. medium to thick bedded mottled Dolomite with stylolites Oak Orchard	1		
140	Run 1 139.0'-145.5' Interval G		72.5" / 78.0" =93%		7.0' / 6.5' =108%					1		
141									Medium to light grey, medium grained medium bedded, sparsely Crynoidal Dolomite with stromatoliteo and carbonaceous seams Eramosa	3		
142										1		
143										2		
144										3		1. 4.
145										1		
146	Run 16 145.5'-154.0' Interval H		99.2" / 102" =98%		7.9 / 8.5 =93%					0		
147										0		
148												

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted.

Total Depth _____

'ROCK' Drilling _____

000642

recycled paper

ecology and environment

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LC

Sheet 11 of 17

GROUND WATER OBSERVATION
At _____ Ft. at Completion
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.

JOB 102nd Street NO. 84C2136
DRILLING RIG Acker AD3
OPERATOR Russell Waddel - PA Drlg.
INSPECTOR Tim Giles

BORING NUMBER MW-8
BORING OFFSET _____
SURFACE ELEVATION 576.5
DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BE D.
148										2		
149										1		
150										1		
151										0		
152										0		
153										1		
154	Run 17 154.0'- 150.5' Interval H		84" / 78" =108%		7.0' / 6.5' =108%				Light to medium grey, medium grained, thick to massive bedded gypsum and cherty Dolomite with stylolites	1		
155										1		
156									Goat Island	0		
157										2		
158										1		
159										1		
160												

NERAL NOTES:
Bedding dip horizontal unless other wise noted

Total Depth _____
'ROCK' Drilling _____

000643

recycled paper

ecology and environment

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LC

GROUND WATER OBSERVATION
At _____ Ft. at Completion
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.

JOB 102nd Street NO. 84C2136
DRILLING RIG Acker AD3
OPERATOR Russell Waddel - PA Drlg.
INSPECTOR Tim Giles

BORING NUMBER MW-8
BORING OFFSET
SURFACE ELEVATION 576.5
DATE START 12/5/86 FINISH 1/2

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BE D
160												
161	Run 18 160.5'-169.0' Interval I		98.4" / 102" =96%		8.5' / 8.5' =100%					1		
162										2		
163										4		
164										3		
165										1		
166										1		
167									Light brown. medium brown. thick bedded porous Dolomite with	0		
168									Goat Island	1		
169										1		
170	Run 19 169.0'-173.3' Interval I		42" / 51.6" =81%		4.3' / 9.3" =100%					0		
171									Black, medium to fine grained medium bedded fossile ferous cherty Dolomite	3		
172									Gasport	3		

GENERAL NOTES:
Bedding dip horizontal unless otherwise noted

Total Depth _____
'ROCK' Drilling _____

000644

recycled paper

ecology and environment

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION LC

GROUND WATER OBSERVATION
At _____ Ft. at Completion
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.

JOB 102nd Street NO. 84C2136
DRILLING RIG Acker AD3
OPERATOR Russell Waddel - PA Drlg.
INSPECTOR Tim Giles

BORING NUMBER MW-8
BORING OFFSET _____
SURFACE ELEVATION 576.5
DATE START 12/5/86 FINISH 1/2

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP
172										2	
173											
174	Run 20 173.3'-175.5'		28.8" / 26.4" =109%		2.4' / 2.2 =109%					2	
175	Interval I									2	
176	Run 21 175.5'-184.0'		96" / 102" =94%		8.3 / 8.5 =92%		NX			0	
177	Interval J								Medium grey, medium grained, medium to thick bedded uniform Dolomite with carbonaceous partings	2	
178										1	
179									Gasport	2	
180										1	
181										0	
182										1	
183										1	
184										0	

GENERAL NOTES:
Bedding dip horizontal unless otherwise noted.

Total Depth _____
'ROCK' Drilling _____

recycled paper

ecology and environment

000645

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION L

GROUND WATER OBSERVATION
At _____ Ft. at Completion
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.

JOB 102nd Street NO. 84C2136
DRILLING RIG Acker AD3
OPERATOR Russell Waddel - PA Drlg.
INSPECTOR Tim Giles

BORING NUMBER MW-8
BORING OFFSET
SURFACE ELEVATION 576.5
DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP
184											
	Run 22 184.0'-190.5' Interval J		79.2" / 78" ≈102%		6.8' / 6.5' =105%				Medium grey and white, medium grained, thick to massive bedded fossiliferous Dolomite with stylolites	1	
185											
										2	
186									Gasport		
										1	
187											
										1	
188											
										2	
189											
										0	
190											
										1	
191	Run 23 190.5'-199.0' Interval K		94.8" / 102" =93%		7.9' / 8.5' =93%						
										0	
192											
										0	
193											
										0	
194											
										0	
195											
										0	
196											

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted.

Total Depth _____
'ROCK' Drilling _____

000646

recycled paper ecology and environment

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION L

Sheet 15 of 17

GROUND WATER OBSERVATION
At _____ Ft. at Completion
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.

JOB 102nd Street NO. 84C2136
DRILLING RIG Acker AD3
OPERATOR Russell Waddel - PA Drlg.
INSPECTOR Tim Giles

BORING NUMBER MW-8
BORING OFFSET
SURFACE ELEVATION 576.5
DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BE D
196										0		
197										1		
198									Gasport	1		
199												
	Run 24		64.8"		5.4'					0		
	199.0'-		78"		6.5'							
200	205.5'		=83%		=83%							
	Interval									0		
201	K											
202										1		
203										0		
204										0		
205										1		
206	Run 25		118.8"		9.9					0		
	205.5'-		108"		9.0							
	214.5'		=110%		=110%					0		
207	Interval									0		
	L											
208												

GENERAL NOTES:

Lost care in run #24 (204.35 to 205.5)
recovered in run #25

Total Depth _____
'ROCK' Drilling _____
000647

recycled paper ecology and environment

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION L

GROUND WATER OBSERVATION
At _____ Ft. at Completion
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.

JOB 102nd Street NO. 86C2136
DRILLING RIG Acker AD3
OPERATOR Russell Waddel - PA Drlg.
INSPECTOR Tim Giles

BORING NUMBER MW-8
BORING OFFSET
SURFACE ELEVATION 576.5
DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BE DI
208												
209									Medium grey, medium to fine grained, massive bedded uniform Dolomite	1		
210									DECEW	0		
211										1		
212										0		
213										0		
214										0		
215	Run 26 214.5'- 220.5'	85.8" / 72" =119%	7.15 / 6.0 =119%							0		
216	Interval L									0		
217										0		
218										0		
219										1		
220										1		15

GENERAL NOTES:
Bedding dip horizontal unless otherwise noted

Total Depth _____
'ROCK' Drilling _____
000648

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

HOLE NO.

recycled paper
ecology and environment

Woodward-Clyde Consultants

FIELD ROCK DESCRIPTION L

Sheet 17 of 17

GROUND WATER OBSERVATION
At _____ Ft. at Completion
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.
At _____ Ft. after _____ hrs.

JOB 102nd Street NO. 86C2136
DRILLING RIG Acker AD3
OPERATOR Russell Waddel - PA Drlg.
INSPECTOR Tim Giles

BORING NUMBER MW-8
BORING OFFSET _____
SURFACE ELEVATION 576.5
DATE START 12/5/86 FINISH 1/20

DEPTH	CORE RUN From	CORE RUN To	RQD Inch	RQD %	RECOVERY Inch	RECOVERY %	Core Type & Resist.	STRATA CHANGE DEPTH	FIELD IDENTIFICATION, TYPE AND COLOR WEATHERING, SEAMS IN ROCK, etc.	FRACTURES No./Ft.	FRACTURES DIP	BE D.
							NX					
220												
221	Run 27 220.5'-229.0'		72" / 102" =70%		6.5 / 8.5 =76%				Black, fine grained, thinly bedded dolomite shale	4		
222	Interval M								Rochester Shale	4		
223										2		
224										3		
225										1		
226										2		
227										2		
228										1		
229												
230									Bottom of Boring at 229.0			
231												
232												

GENERAL NOTES:

Bedding dip horizontal unless otherwise noted

Total Depth _____
'ROCK' Drilling _____

000649

Proportions used: trace 0-10%, little 10-20%, some 20-35%, and 35-50%

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ecology and environment

HOLE NO.

top of well casing 577.43

Elevation 574.34

ell casing 0.17 ft.
well casing Black steel

r of borehole 1.1 ft.

backfill Cement/Bentonite Grout

seal Bentonite
top of seal 567.8
top of sand pack 564.9

top of screen 559.8
screened section
rslot stainless steel

reened section 0.17 ft.

f screened section 5.0 ft.

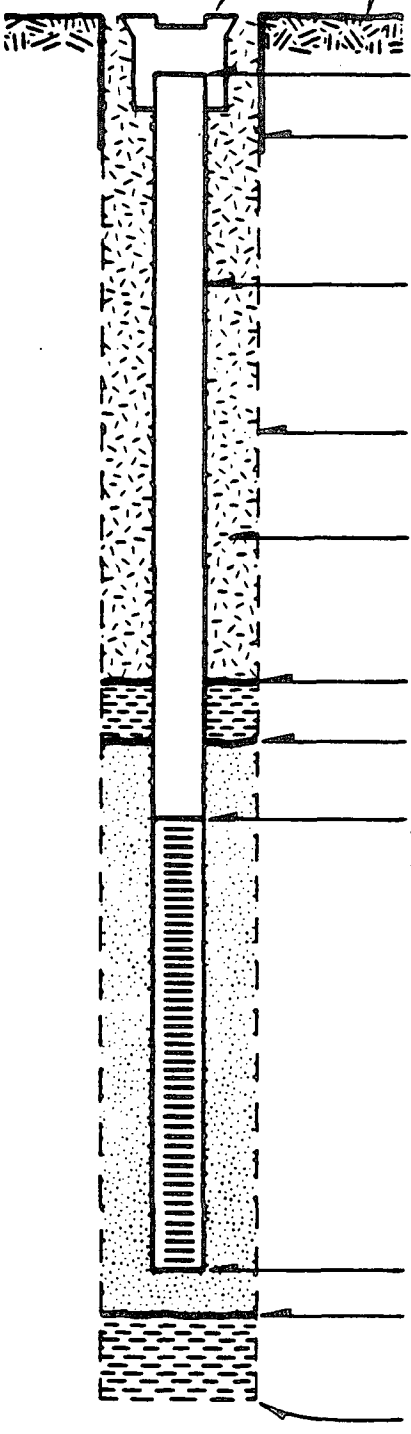
ip of screen 554.8
ip of sand pack 554.3
ackfill Bentonite
ottom of borehole 551.3

RING WELL NO. MW-9

DRAWN BY: C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

ecology and environment



JV type water tight cover

Ground Elevation 574.95

Elev. of top of well casing 574.52

I.D. of protective casing 1.0 ft.

Type of protective casing Steel pipe

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 569.0

Elev. of top of sand pack 567.0

Elev. of top of screen 565.0

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.0 ft.

Elev. of tip of screen 563.0

Elev. of tip of sand pack 562.5

Type of backfill Bentonite

Elev. of bottom of borehole 561.5

000651

REPORT OF MONITORING WELL NO. MW-10

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-10

Niagara Falls

DATE 1/14/86 SURFACE ELEVATION 575 LOCATION New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
		Clean crushed limestone GRAVEL (DRIVEWAY FILL)	574	
	31	Hard, dark red brown fine sandy SILTY CLAY with abundant fine to medium gravel and brick chips, moist, low plastic (DRIVEWAY FILL)	573.5	
	17	Stiff, medium yellow brown with orange and light gray mottling, fine sandy SILTY CLAY, moist becoming saturated, low plastic (CL ALLUVIUM)	▽ 570	
		Very stiff, red brown with white and yellow brown mottling, SILTY CLAY, varved, moist, high plastic (CL/CH GLACIOLACUSTRINE CLAY)	567.5	

000652

Completion Depth 567 Feet Water Depth 570 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

LOG of BORING No. MW-10A

Niagara Falls

DATE 1/14/86 SURFACE ELEVATION 575 LOCATION New York

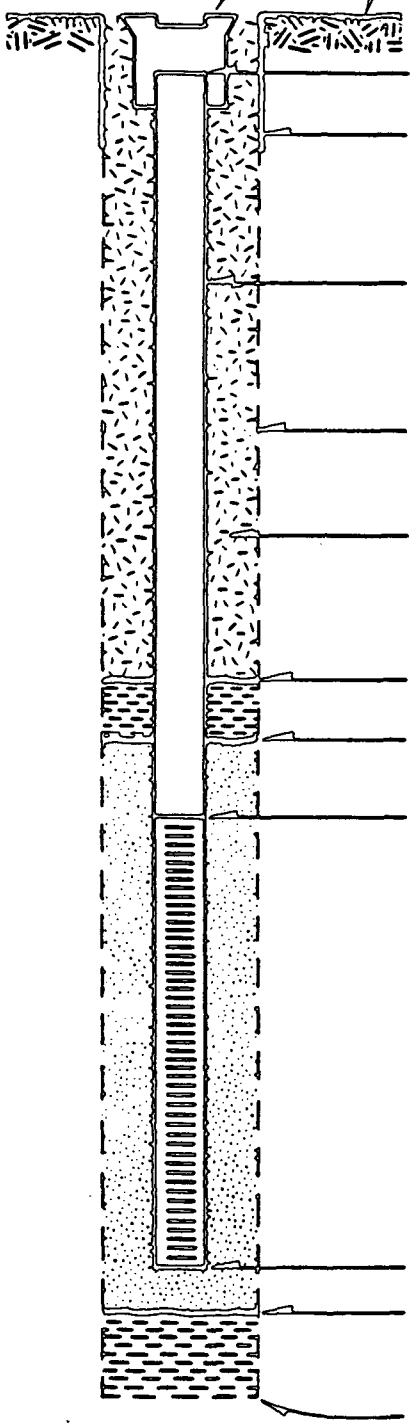
DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		Clean crushed limestone GRAVEL (DRIVEWAY FILL)	573	
		Hard, dark red brown sandy SILTY CLAY with abundant rock fragments and brick chips, moist, low plastic (CL DRIVEWAY FILL)	572.5	
5	41			
	14	Stiff, medium yellow brown with gray mottling, fine sandy SILTY CLAY with pockets of silty sand intermixed, moist, medium to high plastic (CL with SM SEWER BACK-FILL)		
10	18		▽ 563.5	
	20	Very stiff, medium red brown SILTY CLAY, varved, moist, medium to high plastic (CL/CH GLACIOLACUSTRINE CLAY)		
15	19			

000653

Completion Depth 561.5 Feet Water Depth 563.5 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

WCC-RP 2



JV type water tight cover

Ground Elevation 574.69

Elev. of top of well casing 574.32

I.D. of protective casing 1.0 ft.

Type of protective casing Steel pipe

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 568.7

Elev. of top of sand pack 566.7

Elev. of top of screen 565.7

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.0 ft.

Elev. of tip of screen 563.7

Elev. of tip of sand pack 563.2

Type of backfill Bentonite

Elev. of bottom of borehole 561.7

REPORT OF MONITORING WELL NO. MW-11

000654

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

LOG of BORING No. MW-11

DATE 1/24/86 SURFACE ELEVATION 574.7 LOCATION Niagara Falls New York

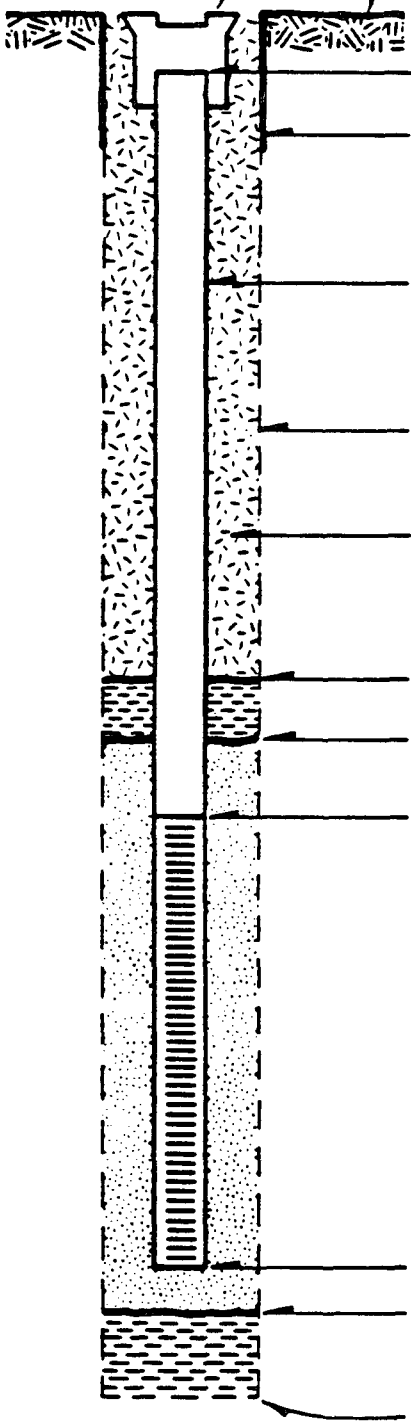
DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0			Clean crushed limestone GRAVEL over geotextile (DRIVE-WAY FILL)	574.2	
		17	Red brown to black, CINDER with Fly ash intermixed (FILL)	572.7	
5		7	Firm, medium yellow brown with gray mottling, fine sandy SILTY CLAY, moist, low plastic, contaminated materials at base (CL SEWER BACKFILL)		
		4		▽567.7	
10		9		563.7	
		13	Stiff, red brown with gray mottling, SILTY CLAY varved, moist, high plastic (CH GLACIOLACUSTRINE CLAY)		
15					

000655

Completion Depth 561.7 Feet Water Depth 567.7 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

WCC-RP



JV type water tight cover

Ground Elevation 574.24

Elev. of top of well casing 573.95

I.D. of protective casing 1.0 ft.

Type of protective casing Steel pipe

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 571.2

Elev. of top of sand pack 570.2

Elev. of top of screen 569.2

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.0 ft.

Elev. of tip of screen 567.2

Elev. of tip of sand pack 566.7

Type of backfill Bentonite

Elev. of bottom of borehole 566.2

REPORT OF MONITORING WELL NO. MW-12

000038

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

LOG of BORING No. MW-12

Niagara Falls
New York

DATE 1-16-86 SURFACE ELEVATION 574.2 LOCATION

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		36	Stiff, medium red brown, SILTY CLAY with cinders asphalt fragments, sand, moist, low plastic (CL ROAD FILL)	573.2	
5		11	Firm, olive gray with gray brown mottling SILTY CLAY with charcoal and wood debris, moist, low plastic (CL ALLUVIUM)	▽570.2 / 568.2	
		46	Dense, medium gray becoming yellow brown, fine to coarse SILTY SAND with trace clay, wet, nonplastic (SM ALLUVIUM)		
10			Very stiff, medium red brown with grey mottling SILTY CLAY, varved, moist, high plastic, (CH GLACIOLACUSTRINE CLAY)		

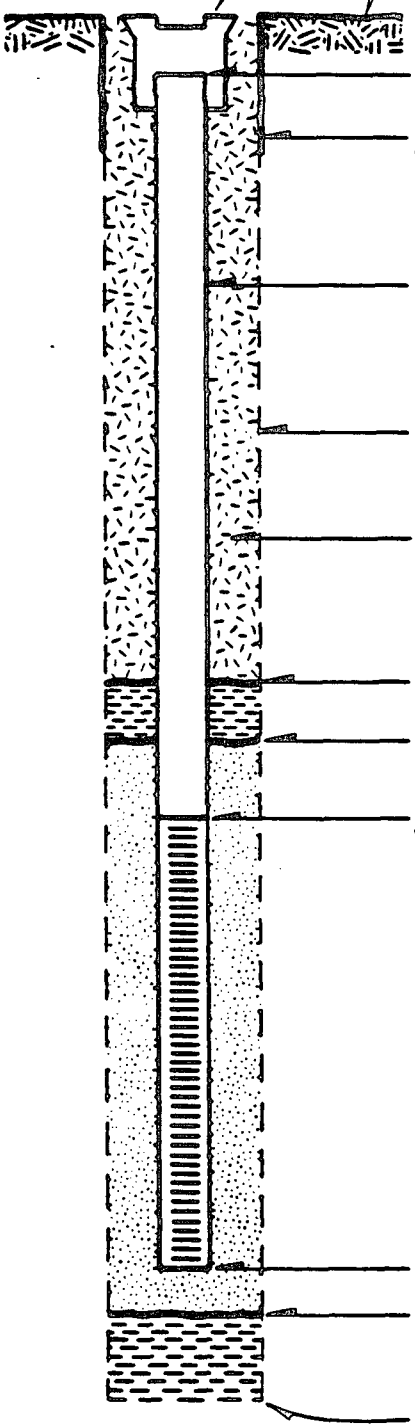
000657

Completion Depth 566.2 Feet Water Depth 570.2 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

WCC-RP 2

Woodward-Clyde Consultants



JV type water tight cover

Ground Elevation 572.50

Elev. of top of well casing 572.40

I.D. of protective casing N/A

Type of protective casing N/A

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 569.5

Elev. of top of sand pack 568.5

Elev. of top of screen 567.5

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.5 ft.

Elev. of tip of screen 565.0

Elev. of tip of sand pack 564.5

Type of backfill Bentonite

Elev. of bottom of borehole 564.0

REPORT OF MONITORING WELL NO. MW-13 000658

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

LOG of BORING No. MW-13

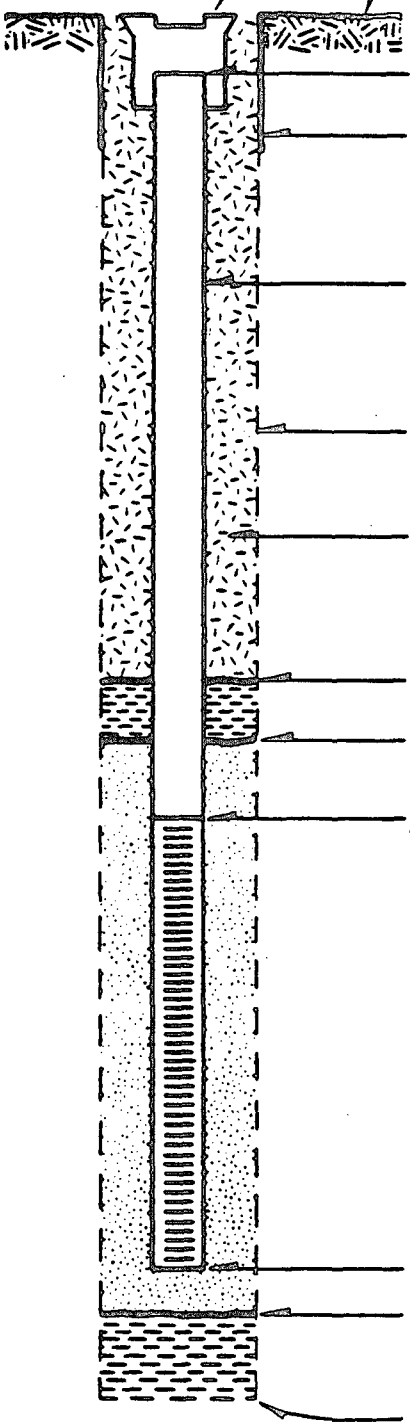
DATE 4/11/86 SURFACE ELEVATION 572.5 LOCATION Niagara Falls New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		Soft, dark gray, sandy SILTY CLAY with vegative matter (CL CLAY CAP FILL)	572.0	
5		Firm to stiff, brown and dark gray SILTY CLAY with coarse gravel; wood, glass, rubber, roofing shingles fragments, and tar debris; low plastic, moist becoming wet and hard at 5 feet (DEMOLITION RUBBLE FILL)	▽ 567.5	
			564.5	
10		Firm, tan to gray, with brown mottling, fine very SILTY SAND, nonplastic wet		
15				
20				
25				
30				
35				

000659

Completion Depth 564.0 Feet Water Depth 567.5 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136



JV type water tight cover

Ground Elevation 572.53

Elev. of top of well casing 572.22

I.D. of protective casing N/A

Type of protective casing N/A

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 565.9

Elev. of top of sand pack 563.9

Elev. of top of screen 563.0

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 558.0

Elev. of tip of sand pack 557.5

Type of backfill Bentonite

Elev. of bottom of borehole 554.5

000660

REPORT OF MONITORING WELL NO. MW-14

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-14

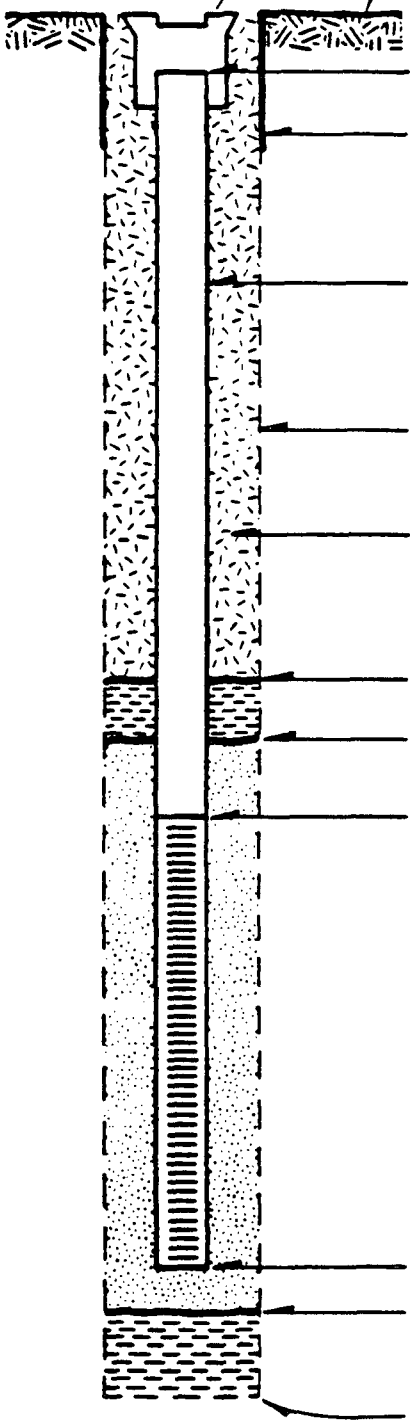
DATE 4-11-86 SURFACE ELEVATION 572.5' LOCATION Niagara Falls, New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		Soft, dark gray, sandy SILTY CLAY with vegative matter. (CL CLAY CAP FILL)	572.0	
	17	Firm to stiff, brown and dark gray SILTY CLAY with coarse gravel; wood, glass, rubber, roofing shingles fragments, and tar debris; low plastic, moist, becoming wet and hard at 5 feet. (DEMOLITION RUBBLE FILL)		
5	32		▽ 567.5	
	54		564.5	
10	6	Firm, tan to grey, with brown mottling, fine very SILTY SAND, nonplastic wet. - vegative matter below 9.5 feet - becoming more silty with depth (SM, ALLUVIUM)		
	6			
	3		557.3	
15	10	Very stiff, medium red-brown, CLAY with small silty pockets, medium to high plastic, wet. (CH GLACIOLACUSTRINE CLAY)	555.3	
20		Firm to stiff, red-brown, SILTY SANDY CLAY with angular medium gravel, low plastic, wet. (SC/CL GLACIAL TILL)		
25				
30				
35				

000661

Completion Depth 554.5 Feet Water Depth 567.5 Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136



JV type water tight cover

Ground Elevation 569.87

Elev. of top of well casing 569.67

I.D. of protective casing N/A

Type of protective casing N/A

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 567.4

Elev. of top of sand pack 566.9

Elev. of top of screen 566.4

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.5 ft.

Elev. of tip of screen 563.9

Elev. of tip of sand pack 563.4

Type of backfill Bentonite

Elev. of bottom of borehole 562.9

REPORT OF MONITORING WELL NO. MW-15

000662

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

LOG of BORING No. MW-15

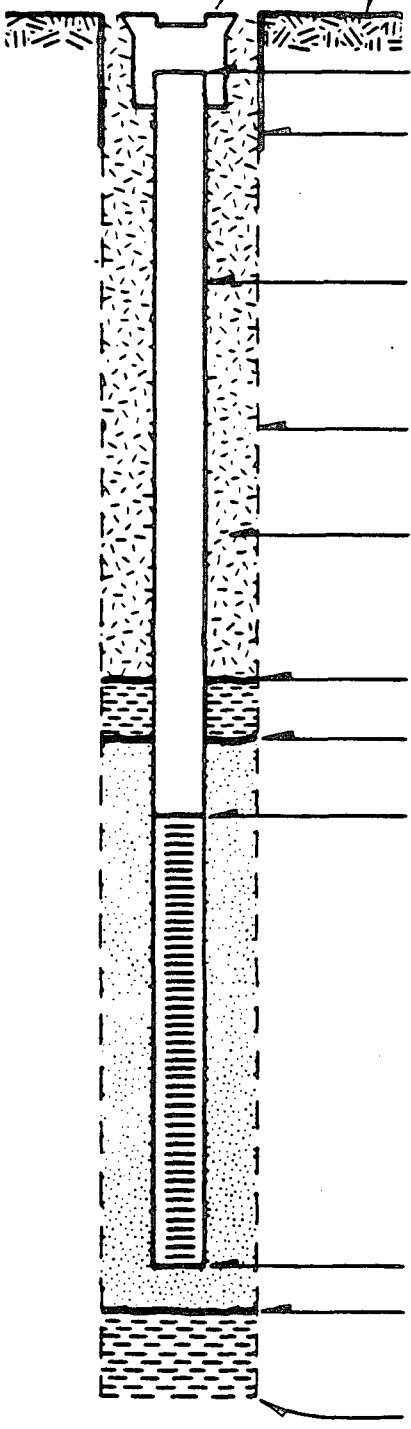
DATE 4/10/86 SURFACE ELEVATION 569.90 LOCATION Niagara Falls New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		Soft, dark brown, sandy SILTY CLAY with vegative matter CL CLAY CAP FILL)	569.4	
		Stiff, medium-dark brown to gray SILTY CLAY with coarse gravel, wood fragments and vegative matter, low plastic, moist (CL FILL)	▽565.9	
5		-becoming sandy and wet at 4 feet	563.4	
		Firm, olive gray, fine SILTY SAND with trace coarse gravel and vegative matter, nonplastic, wet		
10				
15				
20				
25				
30				
35				

000663

Completion Depth 562.9 Feet Water Depth 565.9 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136



JV type water tight cover

Ground Elevation 569.90

Elev. of top of well casing 569.55

I.D. of protective casing N/A

Type of protective casing N/A

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 564.7

Elev. of top of sand pack 562.7

Elev. of top of screen 558.4

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 553.4

Elev. of tip of sand pack 552.9

Type of backfill Bantonite

Elev. of bottom of borehole 551.9

000664

REPORT OF MONITORING WELL NO. MW-16

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

LOG of BORING No. MW-16

DATE 4/10/86 SURFACE ELEVATION 569.90 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		27	Soft, dark brown, sandy SILTY CLAY with vegative matter (CL CLAY CAP FILL)	569.4	
		10	Stiff, medium dark brown to gray SILTY CLAY with coarse gravel, wood fragments and vegative matter, low plastic, moist (CL FILL)	▽ 565.9	
5		8	-becoming sandy and wet at 4 feet	563.4	
		2	Firm, olive gray, fine SILTY SAND with trace coarse gravel and vegative matter, nonplastic, wet		
10		5	-becoming loose and more silty below 13 feet		
		2	-becoming fine to medium sand with subrounded gravel and shell fragments below 16 feet		
15		21		552.9	
			Stiff, red-brown, fine sandy SILTY CLAY with angular gravel, medium plastic, wet (CL GLACIAL TILL)		
20					
25					
30					
35					

000665

Completion Depth 571.7 Feet Water Depth 565.9 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

Elev. of top of well casing 579.00

Ground Elevation 575.80

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 564.8
Elev. of top of sand pack 562.8

Elev. of top of screen 552.3
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 547.3
Elev. of tip of sand pack 545.8
Type of backfill Bentonite
Elev. of bottom of borehole 543.3

000666

REPORT OF MONITORING WELL NO. MW-17

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-17

DATE April 17, 1986 SURFACE ELEVATION 575.8 LOCATION Niagara Falls, NY

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION
0			Stiff, red brown, SILTY CLAY with vegative matter, low plastic, moist. (CL CLAY CAP FILL)	575.3
		22	Stiff, tan to gray, SILTY CLAY and large angular gravel low plastic, dry.	
		16	(CL FILL with RUBBLE)	
5			- becoming red-brown and slightly moist with gravel absent below 4 feet	568.3
		12		
		3	Loose, black, SILTY CLAY with cinders, fly ash, glass and wood fragments intermixed, low plastic, moist.	
10			(FILL)	563.3
		12	Firm, olive gray with gray brown mottling, fine SILTY SAND with vegative matter, low plastic, wet.	▽ 562.8
		3	(SM/CL ALLUVIUM)	
15			- becoming loose below 18 feet	
		14	- becoming firm with some coarse sand below 22 feet.	
		5	- becoming dense, coarse sand and rounded gravel with shell fragments below 25 feet.	
20		6	(SP ALLUVIUM)	
		18		
25		53		546.8
		4	Stiff, medium red-brown, sandy SILTY CLAY with trace angular gravel, medium plastic, wet.	
30			(CL GLACIAL TILL)	
35				

STRATIGRAPHIC LOG

000697

Completion Depth 542.3 Feet Water Depth 562.8 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

WCC-RP 2

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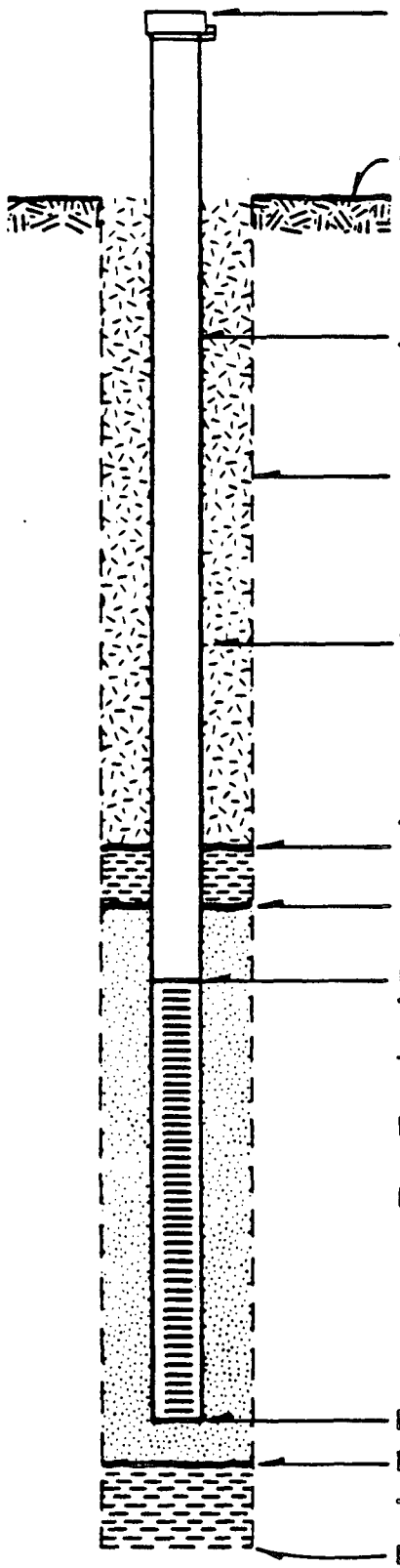


Elev. of top of well casing 578.91

Ground Elevation 575.80

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 571.8

Elev. of top of sand pack 569.8

Elev. of top of screen 569.3
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 564.3

Elev. of tip of sand pack 563.8

Type of backfill Bentonite

Elev. of bottom of borehole 563.3

REPORT OF MONITORING WELL NO. MW-18 000668

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

LOG of BORING No. MW-18

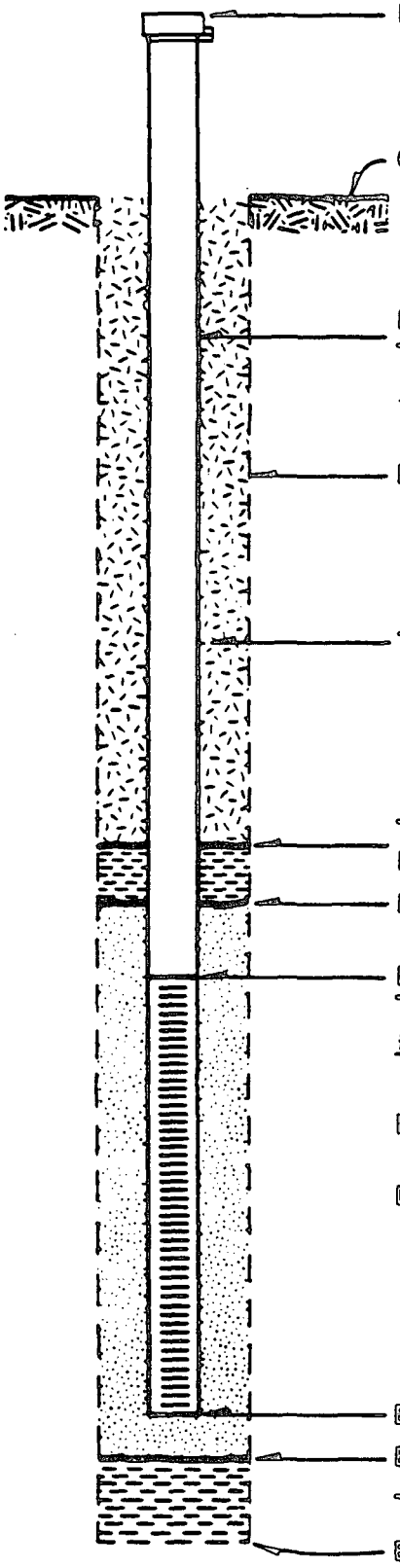
DATE 4/17/86 SURFACE ELEVATION 575.8 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0			Stiff, red-brown, SILTY CLAY with vegative matter, low plastic, moist (CL CLAY CAP FILL)	575.3	
			Stiff, tan to gray, SILTY CLAY and large angular gravel low plastic, dry (CL FILL with RUBBLE)		
5			-becoming red-brown and slightly moist with gravel absent below 4 feet	568.3	
			Loose, black, SILTY CLAY with cinders, fly ash, glass and wood fragments intermixed, low plastic, moist (FILL)	563.3	
10			Firm, olive gray with gray brown mottling, fine SILTY SAND with vegative matter, low plastic, wet (SM/CL ALLUVIUM)	▽ 562.8	
15					
20					
25					
30					
35					

000669

Completion Depth 563.3 Feet Water Depth 562.8 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136



Elev. of top of well casing 578.00

Ground Elevation 575.02

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 564.0

Elev. of top of sand pack 562.0

Elev. of top of screen 548.5
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 543.5

Elev. of tip of sand pack 543.0

Type of backfill Bentonite

Elev. of bottom of borehole 541.0

REPORT OF MONITORING WELL NO. MW-19

000670

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

recycled paper

LOG of BORING No. MW-19

Niagara Falls

DATE 4-24-86 SURFACE ELEVATION 575.02 LOCATION New York

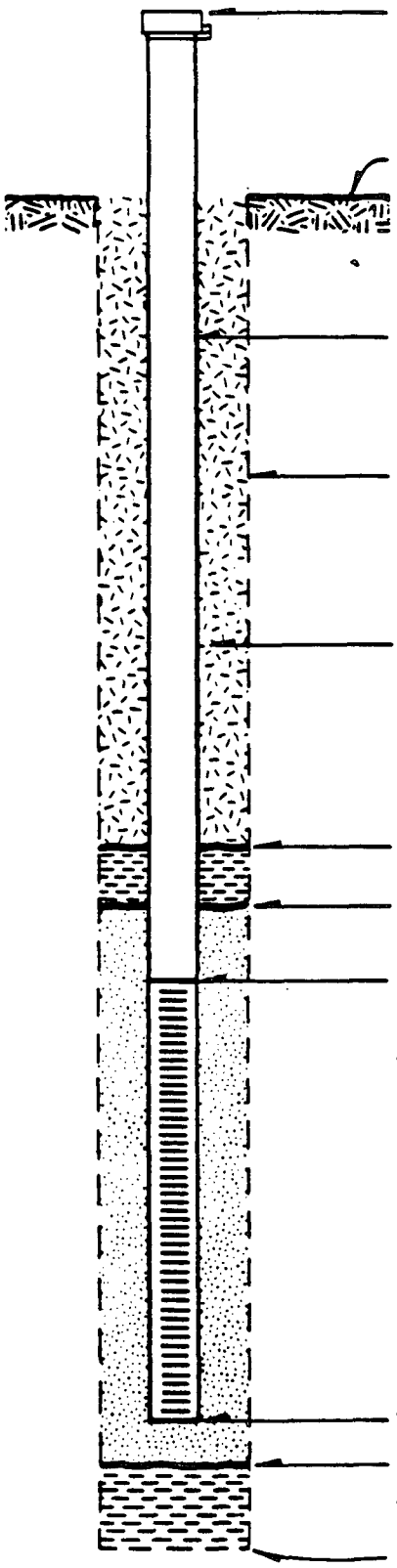
DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION
0		Hard, red brown, SILTY CLAY with vegative matter, low plastic, dry (CL CLAY CAP FILL)	574.5
	76		
	10	Dense, tan to red-brown, very SILTY SAND and gravel, nonplastic, dry. (FILL)	570.5
5		Firm, dark gray, SILTY CLAY with white fly ash, cinders, wood chips, low plastic, moist (FILL)	▽ 567.0
	5		
	2	- Oily black NAPL below 10 feet	
10			563.5
	11	Firm, olive gray with brown mottling SILTY SAND with trace clay and vegative matter, low plastic, wet. (SM/CL ALLUVIUM)	
15	2	- becoming loose with shell fragments and vegative matter absent below 14 feet	
	7	- becoming firm, coarse sand and rounded gravel interbedded below 26.5 feet.	
20	4	- brown, very odorous NAPL below 31 feet.	
	30		
25	10		
	28		
30	32		543.5
	8	Stiff, medium red-brown, sandy SILTY CLAY with subrounded to angular gravel, medium plastic, wet. (GLACIAL TILL)	
35			

STRATIGRAPHIC LOG

000671

Completion Depth 541.0 Feet Water Depth 567.0 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136



Elev. of top of well casing 577.82

Ground Elevation 575.02

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 571.0

Elev. of top of sand pack 570.0

Elev. of top of screen 569.0

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 564.0

Elev. of tip of sand pack 563.5

Type of backfill Bentonite

Elev. of bottom of borehole 563.0

000072

REPORT OF MONITORING WELL NO. MW-20

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

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LOG of BORING No. MW-20

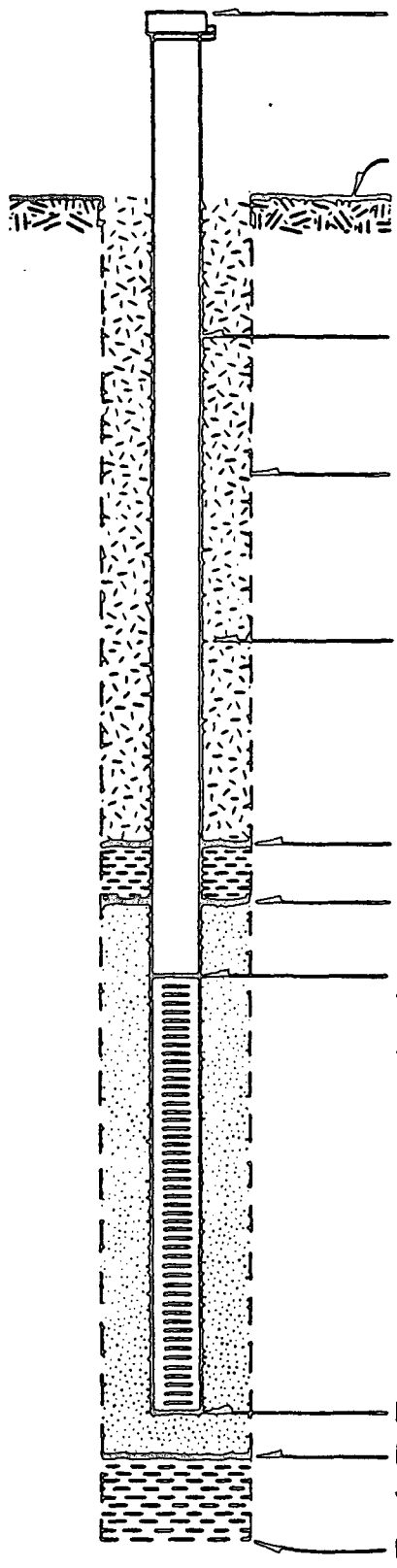
DATE 4/24/86 SURFACE ELEVATION 575.02 LOCATION Niagara Falls New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		Hard, red brown, SILTY CLAY with vegative matter, low plastic, dry (CL CLAY CAP FILL)	574.5	
		Dense, tan to red-brown, very SILTY SAND and gravel, nonplastic, dry (FILL)	570.5	
5		Firm, dark gray, SILTY CLAY with white fly ash, cinders, wood ships, low plastic, moist (FILL)	▽ 567.0	
10		- oily black NAPL below 10 feet	563.5	
		Firm, olive gray with brown mottling SILTY SAND with trace clay and vegative matter, low plastic, wet (SM/CL ALLUVIUM)		
15				
20				
25				
30				
35				

000673

Completion Depth 563.0 Feet Water Depth 567.0 Feet Date

Project Name Olin 102nd Street Landfill Project Number 84C2136



Elev. of top of well casing 578.39

Ground Elevation 575.40

I.D. of well casing 0.17 ft.

Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite

Elev. of top of seal 571.4

Elev. of top of sand pack 569.4

Elev. of top of screen 568.9

Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 5.0 ft.

Elev. of tip of screen 563.9

Elev. of tip of sand pack 563.4

Type of backfill Bentonite

Elev. of bottom of borehole 562.4

000674

REPORT OF MONITORING WELL NO. MW-21

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

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colour and environment

LOG of BORING No. MW-21

Niagara Falls

DATE 4-22-86 SURFACE ELEVATION 575.4 LOCATION New York

DEPTH, ft. / SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0		Stiff, red brown, SILTY CLAY with vegative matter, low plastic, moist. (CL CLAY CAP FILL)	574.6	
	23	Stiff, dark gray, SILTY CLAY with white ash, cinders glass and rubber fragments, low plastic, moist. (FILL)		
	14		▽ 570.4	
5			569.9	
	8	Firm, tan, SILTY SAND with abundant gravel, cinders, fly ash, wood and rubber fragments, nonplastic, wet. (FILL)		
	2			
10			563.6	
	7	Firm, olive gray, SILTY SAND with a trace clay, abundant vegative matter, low plastic, wet (SM/CL ALLUVIUM)		
15				
20				
25				
30				
35				

000675

Completion Depth _____ Feet Water Depth _____ Feet Date _____

Project Name _____ Project Number _____

WCC-RP 2

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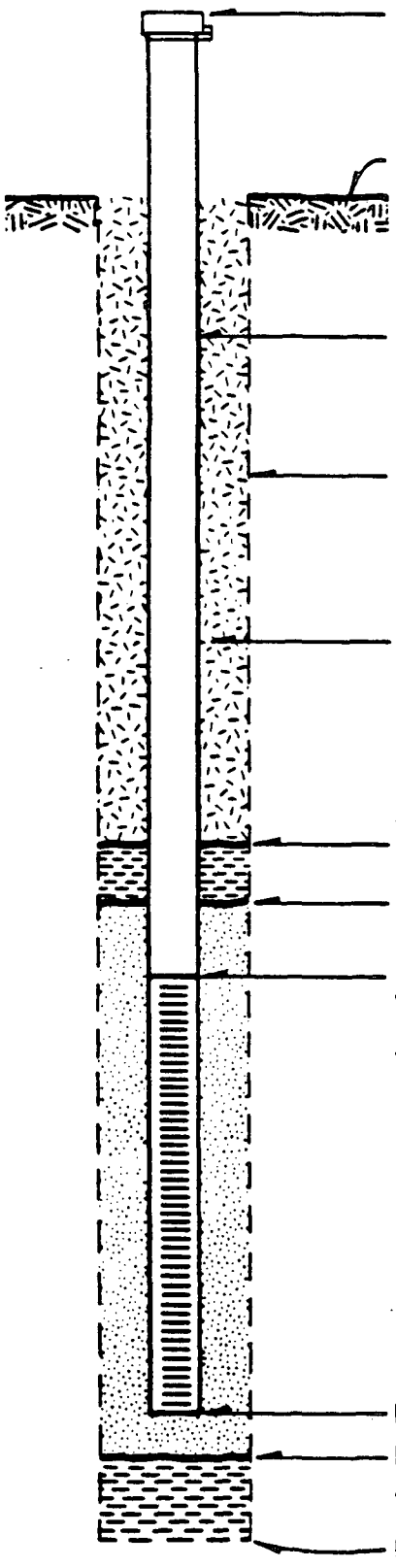

Elev. of top of well casing 579.31

Ground Elevation 575.92

I.D. of well casing 0.17 ft.
Type of well casing Black steel pipe

Diameter of borehole 1.1 ft.

Type of backfill Cement/Bentonite Grout

Type of seal Bentonite
Elev. of top of seal 572.7

Elev. of top of sand pack 571.7

Elev. of top of screen 567.4
Type of screened section #6 Superslot stainless steel

I.D. of screened section 0.17 ft.

Length of screened section 2.5 ft.

Elev. of tip of screen 564.9

Elev. of tip of sand pack 564.3

Type of backfill Bentonite

Elev. of bottom of borehole 563.9

000676

REPORT OF MONITORING WELL NO. MW-22

DRAWN BY: D.B.	CHECKED BY: R.K.	PROJECT NO: 84C2136-10	DATE: 8/15/86	FIGURE NO:

LOG of BORING No. MW-22

DATE 4-25-86 SURFACE ELEVATION 575.9 LOCATION Niagara Falls New York

DEPTH, ft.	SAMPLES	SAMPLING RESISTANCE	DESCRIPTION	ELEVATION	STRATIGRAPHIC LOG
0			Very stiff, gray brown, SILTY CLAY with vegative matter, low plastic, moist. (CL CLAY CAP FILL)	574.7	
		26	Stiff, red brown, sandy SILTY CLAY with gravel, cinders, fly ash, brick and glass fragments, low plastic, moist - becoming firm (FILL)	569.9	
5		9	Stiff, olive gray with brown mottling, SILTY CLAY low plastic, moist. (CL FILL)	567.2	
		23	Firm, dark gray, sandy SILTY CLAY with gravel and cinders, low plastic, moist. (CL FILL)	564.9	
10		7	Firm, olive gray with brown mottling, SILTY SAND with vegative matter, low plastic, moist. (SM/CL ALLUVIUM)		
15					
20					
25					
30					
35					

000677

Completion Depth 563.9 Feet Water Depth none enters Feet ATD Date

Project Name Olin 102nd Street Landfill Project Number 84C2136

WCC-RP 2

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