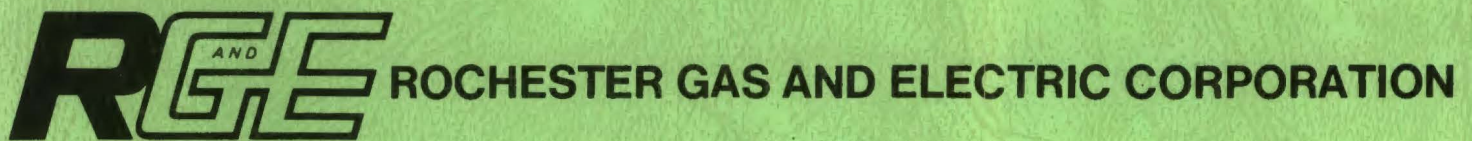


3.



**PRELIMINARY SITE REVIEW
NYS SUPERFUND SITE NO. 828044**

APPENDIX VOLUME II

MAY 1986



MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY

ROCHESTER GAS AND ELECTRIC CORPORATION

PRELIMINARY SITE REVIEW
NYS SUPERFUND SITE NO.828044

APPENDIX VOLUME II

1986

APPENDIX VOLUME II

TABLE OF CONTENTS

- AA. Core Boring Logs
- BB. Laboratory Analyses of Soil and Water Samples
- CC. Laboratory Analyses of Samples - RG&E Tunnel and Stations

APPENDIX AA

Core Boring Logs

TEST BORING REPORT

MOLE NO. IK 7

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

FILE NO. 374813
SHEET NO. 1 of 5
LOCATION: 568 Lake Ave.
ELEVATION: 485.0 ft. NCD
DATE START: 17 Feb. 1981
DATE FINISH: 17 Feb. 1981
DRILLER: G. Miller
INSPECTOR: F. Serpe

GROUNDWATER		DEPTH TO:		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	
					SIZE ID in	4 1/4
					HAMMER WT lb	300
					HAMMER FALL in	24
					S/S	1-3/8
					NX	2-1/8

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5		31	22	S1	0.0	Very compact dark brown fine sandy SILT, trace glass and cinders (slightly plastic) -FILL-
			32		1.5	
		57	34			
		68				
		19				
5	8.0	20				Compact brown coarse to fine SAND, little fine gravel and silt (wash material) -FILL-
		12	19	S2	5.0	
			100/7.5		6.0	
10		31				Compact brown medium to fine SAND, trace silt.
		33				
		32				
		44				
		7	13	S3	10.0	
10	17	11.5				
15		7	21			Compact brown fine SAND & SILT (stratified)
		11				
		27				
		24	15	S4	15.0	
			22		16.5	
20	20.0	19	27			Top of Rock at 20 ft.
		18				
		21				

26.3
20.0

M.B.A. 6086 1/8 1/4

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 20.0
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK _____
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 4
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	MOLE NO. IK 7
50+	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
20	5	20.0					<p>Begin coring at 20.0 ft.</p> <p>Light to dark gray, fine-grained dolomitic mudstone, very thinly color banded. Trace fossils.</p> <p>Secondary gypsum seams in closely to very closely spaced partings.</p> <p>ROCHESTER SHALE</p> <p>Very thin closely spaced limestone beds from 20.5 to 85.0 ft., many of which are vertically cracked.</p> <p>Several high to low angle, closely to very closely spaced joints from 21.5 to 33.2 ft.</p> <p>ROCHESTER SHALE</p> <p>Very thin, vuggy, severely eroded limestone bed at 32.1 ft.</p> <p>Thin, severely weathered clay bed at 33.6 ft.</p>
	5						
	5	R-1	69	96	MOD		
	5		52	72			
25	4						
	3	26.0					
	3						
	3						
	2.5						
30	2.5	R-2	118	98	MOD		
	3		98	82			
	3						
	3						
	3						
35	3	36.0			SL		
	3						
	2						
	1.5						
40	1.5	R-3	118	98	SL		
	1.5		110	92			
	2						
	1.5						
	1.5						
45	2	46.0					
	2						
	2.5						
	2.5						
	2						
50	2	R-4	116	97	SL		
	2		115	96			
	2						
	2						
	2						
55	2						

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	- carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

H & A FORM 46 .R77

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
55	2	56.0					<p>ROCHESTER SHALE</p> <p>Vertical joint from 56.0 to 56.4 ft.</p> <p>Vertical joint, sealed by gypsum seam, from 60.4 to 60.8 ft.</p> <p>Vertical joint from 61.5 to 62.0 ft.</p> <p>*RQD based on core recovered. (lost rock recovered in R-8)</p>
	2.5						
	2.5						
	2						
60	2	R-5	106/106	88/100*	SL		
	2.5						
	2.5						
	2.5						
65	2.5						
	2	66.0					
	2						
	2						
	1.5	R-6	77/77	99/99	SL		
70	1.5						
	2						
	2	72.5					
	1						
	2						
75	2	R-7	106/102	104/96*	SL		
	2						
	2						
	2						
80	2	81.0					
	2				SL		
	2						
	2						
85	2	R-8	119/114	124/96*	SL-MOD		
	2						
	2						
	2						
	2	89.0					
90	2						

83.7

ROCHESTER SHALE

Vertical joint at 78.0 to 78.3 ft.

ROCHESTER SHALE

Light to medium gray, fine to medium-grained fossiliferous limestone, thin to medium-bedded. Interbedded with thin, dark gray dolomitic shale.

IRONDEQUOIT LIMESTONE

Thin to very thin severely weathered shale at 84.0 and 86.6 ft. Vertical joints from 87.6 to 87.8 and 88.6 to 89.0 ft.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS				
			in.	%							
90	2	R-9	91 87	95 91	SL		IRONDEQUOIT LIMESTONE				
	2										Light to medium gray, fine to medium-grained, fossiliferous limestone, thin to medium-bedded.
	2										Interbedded with thin, dark gray dolomitic shale.
	2										High angle joint, sealed with secondary gypsum seam at 94.7 to 95.2 ft.
95	2	R-10	48 48	100 100	SL		IRONDEQUOIT LIMESTONE				
	2										Two joints, low and medium angle, not parallel, from 99.9 to 100.1 ft.
	3										
	3										
100	3	R-11	72 50	100 69	MOD		Dark greenish gray shale, trace fossils.				
	3										WILLIAMSON SHALE
	3										Vertical joint from 102.0 to 102.9 ft.
	3										Very thin, severely weathered clay beds at 103.6, 104.1 and 105.7 ft. High angle joint from 105.4 to 105.7 ft.
105	3	R-12	24 7	100 29	MOD-SEV		Dark greenish gray to grayish brown shale, trace fossils.				
	3										LOWER SODUS SHALE
	3										Three thin to very thin light gray shell limestone beds from 108.0 to 109.7 ft.
	3										Severely weathered shale and clay from 114.9 to 116.0 ft.
110	3	R-13	120 113	100 94	SL		LOWER SODUS SHALE				
	3										Very thin severely weathered clay bed at 116.8 ft. Two very close, slickensided low angle joints from 119.4 to 119.6 ft.
	3										
	3										
115	3	R-14	125				Light to medium gray, fine to medium-grained, thin-bedded fossiliferous limestone interbedded with very thin dark gray, closely to very closely spaced shale beds. Trace stylolites				
	3										REYNALES LIMESTONE
	3										
	3										

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

MSA FORM 4L AR 77

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

CORE BORING REPORT

HOLE NO. **LK 7** PAGE **5** OF **5**
GEOLOGIST **Fred Amos**

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
125	3	127.0					REYNALES LIMESTONE Light to medium gray, fine to medium grained, thin bedded fossiliferous limestone interbedded with very thin, dark gray, closely to very closely spaced shale beds. Trace stylolites. Gypsum seams in closely spaced partings from 120.3 to 135.9 ft.
	3						
	2.5						
	2.5						
130	2.5	R-13	120	100	SL-MOD		REYNALES LIMESTONE High angle brecciated fault zone with gypsum matrix, from 131.7 to 132.5 ft. Very thin severely weathered clay bed at 132.5 ft.
	2.5		101	84			
	2.5						
	2.5						
135	3	137.0					134.9 Red, medium grained oolitic, fossiliferous 135.5 FURNACEVILLE MEMBER hematitic limestone.
	2.5						
	3						REYNALES LIMESTONE Two low angle and two 0.1 ft. vertical joints from 135.8 to 137.0 ft.
	4.5						
140	5	R-14	96	80	SL-MOD	138.1	3/9 Light greenish gray argillaceous shale.
	5		79	82*			3 MAPLEWOOD SHALE
	5						2 Eleven low angle closely to very closely spaced joints or shears from 139.0 to 145.9 ft.
	5						1/0 Very thin severely weathered clay beds at 137.4, 141.3 and 141.5 ft.
145	5	147.0				FRACTURE FREQUENCY (Fract./ft.)	4 Very thin severely weathered clay beds at 137.4, 141.3 and 141.5 ft.
	5				1 High angle joints from 144.1 to 144.4 and from 146.5 to 147.0 ft.		
	5				3 *ROD based on core recovered. Approx. 2 ft. of rock left in hole.		
	5						
150							BOTTOM OF BORING AT 147.0 FT. Hole grouted to surface.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. LK 10

PROJECT: CSOAP, Phase II

FILE NO. 374813

CLIENT: L.S.T.

SHEET NO. 1 of 6

CONTRACTOR Drill & Test

LOCATION: Birr/Lake

ELEVATION: 504.9 ft. *506.0 ft.*

GROUNDWATER

DEPTH TO:

CASING SAMPLER CORE BARREL

DATE START 26 Feb. 1981

DATE TIME WATER BOTTOM OF CASING BOTTOM OF HOLE

DATE FINISH 4 Mar. 1981

TYPE SIZE ID in 3 S/S 1-3/8 NX 2-1/8

DRILLER J. Jensen

HAMMER WT lb 300 140

INSPECTOR T. Wood/S. Putney

HAMMER FALL in 30 30

SCALE IN FEET STRATA CHANGE CASING BLOWS PER FOOT SAMPLER BLOWS PER 6 INCHES SAMPLE NUMBER SAMPLE DEPTH RANGE

FIELD CLASSIFICATION AND REMARKS

						Loose to medium compact brown silty, medium to fine SAND, little fine gravel, trace clay.
			5	S-1	1.5	
			5		3.0	
5			4	S-2	4.5	Loose to medium compact brown silty, medium to fine SAND, little fine gravel, trace clay.
			7		6.0	
			11			
10			35	S-3	9.0	Very compact brown silty fine SAND, trace medium sand and fine gravel.
			40		10.5	
			45			
					14.0	
15			100	S-4	14.5	Very compact brown silty fine SAND, trace coarse sand and coarse gravel.
					19.0	
20			100/2	S-5	19.2	Very compact brown silty fine SAND, trace fine gravel. (Poor Recovery)
					24.0	
25			60	S-6	24.0	Very compact brown fine SAND, little silt, trace coarse sand.
			100		25.0	
					29.0	
30			100	S-7	29.5	Very compact brown fine SAND, little silt, trace coarse sand.

PRELIMINARY

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 50.9 ft.
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 11
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. LK 10
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

TEST BORING REPORT

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
30						
					34.0	
		100.7	3	S-8	34.3	Very compact brown silty fine SAND, trace coarse to fine gravel.
35						
					39.0	
		115		S-9	39.5	Very compact brown silty fine SAND, little fine gravel, trace coarse sand.
40						
					44.0	
		100		S-10	44.5	Very compact brown silty fine SAND, trace fine gravel and coarse to medium sand.
45						
					49.0	
		100.7	3	S-11	49.3	Very compact brown silty fine SAND, trace coarse to medium sand.
50						
						TOP OF ROCK AT 50.9 ft.
55						

PRELIMINARY

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION		SUMMARY
0-4	Very Loose	0-2	Very Soft	S	Split Spoon	Overburden: 50.9
4-10	Loose	2-4	Soft	T	Thin Wall Tube	Rock: ---
10-30	Medium Compact	4-8	Medium Stiff	U	Undisturbed Piston	Samples: II
30-50	Compact	8-15	Stiff	O	Open End Rod	HOLE NO. LK 10
50+	Very Compact	15-30	Very Stiff	W	Wash Sample	

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
45							
		49.3					Begin coring at 49.3 ft.
50	1					50.9	Boulder, cobbles and brown Till.
	1						
	2						
	3						
	4	R-1	72/46	99/63	MOD		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, very thin, closely spaced Limestone beds.
55	4						
	2						
	2	57.0					
	3					57.3	ROCHESTER SHALE
	2						
60	3						Smooth, low angle joint at 51.1 ft.
	3						Moderately dipping smooth joint at 52.3 ft.
	3					PT8	Vertical joint in severely weathered shaly parting from 52.7 to 52.8 ft.
	3						Vertical crack in Limestone bed from 53.1 to 53.3 ft.
	2	R-2	113/92	94/77	MOD		Very thin, moderately weathered Shale bed at 61.4 ft.
	3					64.0	ROCHESTER SHALE
65	3						Severely weathered shale partings at 65.0, 67.5 and 68.7 ft.
	3	67.0					
	3					67.4	ROCHESTER SHALE
	2		43/43	100/100	SL		
	3					68.8	ROCHESTER SHALE
70	4						
	3	R-3				70.6	Light to medium gray, fine to medium-grained, thin to medium-bedded fossiliferous Limestone, interbedded with dark gray, thin to very thin, closely spaced dolomitic Shale. Secondary gypsum seams in closely spaced partings.
	3		77/64	100/63	MOD		IRONDEQUOIT LIMESTONE
	3						Very thin, severely weathered clayey Shale beds at 70.3, 71.5, 71.8 and 72.4 ft.
	2	77.0					Severely weathered clay from 72.9 to 73.1 ft. and 74.2 to 74.5 ft.
	3				SL		Moderately weathered shaly partings at 78.1 and 78.3 ft.
	2						
	2					79.3	

FIELD HARDNESS	WEATHERING		BEDDING/JOINT SPACING			RQD	
- Knife can't scratch - scratches diff. - scratches easily - grooves - carves	Fresh V. slight Slight Moderate	Mod. Severe Severe V. Severe Complete	V. thin Thin Medium Thick V. thick	V. Close Close Mod. Close Wide V. wide	< 2" 2" - 12" 12" - 36" 36" - 120" > 120"	> 90% 90-75 75-50 50-25 < 25	Excellent Good Fair Poor V. Poor

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS					
			in.	%								
115	4	R-8	123 106	103 86*	SL- MOD	117.5 118.5	Light to medium gray, fine to medium-grained, crystalline, thin-bedded fossiliferous Limestone, interbedded with dark gray, very thin, closely to very closely spaced Shale beds. Secondary gypsum seams in closely spaced partings. REYNALES LIMESTONE Moderately weathered, smooth, low angle joints with trace slickensides at 120.8 and 121.8 ft.					
	4											
	3											
	3.5											
120	3.5											
	4											
	6	122.0					122.4 Red, medium-grained, oolitic, fossiliferous, 123.4 FURNACEVILLE MEMBER, hematitic Limestone.					
	4	R-9	52 25	100 48	MOD	126.3	Five very close gypsum seam partings from 123.9 to 124.1 ft. REYNALES LIMESTONE. Moderately weathered, very closely spaced gypsum seam partings from 124.7 to 126.3 ft.					
	4											
125	5											
	5											
	8											
	5											
	5	R-10	67 49	99 72	SL MOD	128.3	Light greenish gray argillaceous Shale. MAPLEWOOD SHALE Several very close moderately weathered partings from 128.4 to 128.8 ft. Smooth, low angle joint at 131.6 ft. Several very close moderately weathered partings from 133.2 to 134.5 ft. * RQD based on core recovered. MAPLEWOOD SHALE Severely weathered parting at 138.2 ft. Slickensided low angle joint at 141.0 ft. Smooth, low angle parallel joints at 141.7 and 142.0 ft. ** Sample from 136.1 to 137.4 ft. MAPLEWOOD SHALE Moderately weathered partings at 142.8 and 143.0 ft.					
	5											
130	5											
	4											
	7							132.0				
	8							R-11	117 100	98 83	SL	135.0
	5											
135	6											
	7											
	5											
	5											
	5	R-11	28 22	100 79	SL	137.3	Light greenish gray fine to medium-grained, thick-bedded Sandstone. THOROLD SANDSTONE Reddish brown, fine to medium-grained, thin to medium bedded Sandstone, trace light gray mottling. GRIMSBY SANDSTONE Swirly bedding from 149.2 to 152.0 ft.					
	5											
140	4											
	5											
	5							142.0				
	7							R-11	92 92	100 100	SL	144.0
	5											
145	4											
	3											
	3											
	3											
150	3											

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	- urooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	- carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

MSA FORM 48

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
150	2	152.0				PT1	Reddish brown, fine to medium-grained, thin to medium-bedded Sandstone, trace light gray mottling. GRIMSBY SANDSTONE 153.2
	3						
	3						
	5	R-12	119	99	SL	156.0	Cross-bedding from 161.0 to 182.0 ft. GRIMSBY SANDSTONE
155	3						
	4						
	5						
	4						
160	4	R-13	116	97	SL	172.0	Severely weathered shaly partings at 168.7, 168.9, 170.6, 171.0 and 171.5 ft. GRIMSBY SANDSTONE
	4						
	6						
165	5						
	4						
	8	R-14	118	98	SL	172.0	Swirly bedding from 171.5 to 173.2 ft. Smooth, parallel, low angle joints with secondary gypsum seams at 173.7, 174.7 and 174.9 ft. GRIMSBY SANDSTONE
170	5						
	3						
	4						
	5						
175	4	R-14	112	93	SEV MOD SL	182.0	Rough, high angle joint from 177.6 to 177.8 ft. Ten severely weathered, closely to very closely spaced partings from 177.8 to 180.7 ft.
	4						
	4						
	6						
	6						
180	6						Bottom of Boring at 182.0 ft. Borehole grouted to depth of 6.5 ft., backfilled to surface.
	6						
	9						

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- urooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK10 TEST NO. 1

PROJECT: CSOAP, Phase II

FILE NO. 374813

CLIENT: L.S.T.

SHEET NO. 1 of 1

CONTRACTOR: Drill & Test

LOCATION: Lake & Birr

PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
---------------	-------------	----------------	---------------

ELEVATION: 544.9 ft.

TYPE	Pneumatic	Digital	Dial	None
------	-----------	---------	------	------

DATE START: 3 March 81

MFG.	Dia. Drill	Neptune	Harvard	-
------	------------	---------	---------	---

DATE FINISH: 3 March 81

MODEL NO.	-	Trident	-	-
-----------	---	---------	---	---

DRILLER: J. Jensen

INSPECTOR: S. Putney

GEOLOGIST: -

M.G.P. = (0.568 to 1.0) x Z

COMPUTED MAX GAUGE PRESS: (MGP) 110 psi

ROCK TYPE: Grimsby Sandstone HOLE SIZE 3 in.

RECOVERY (%) 99

COMPUTED INTERNAL FRICTION: -

R O D (%) 99

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 51.8 TO TOP LOWER PACKER 156.0

TO BOTTOM OF BORING 182.0 TO BOTTOM UPPER PACKER (Z) 149.3

TO WATER TABLE 28.5 LENGTH OF TEST SECTION 6.7

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.8

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1320	0	150	25	772.2		
	1			772.2		
	2			772.2		
	5			722.2	0.0	
1326	0		50	772.5		
	1			772.5		
	2			772.5		
	5			772.8		
	10			772.9	0.0	
1337	0		75	775.1		
	1	160		781.2		Water coming up casing at 75 and 100 psi. Probable leak around packer.
	2			788.3		
	5			809.5	6.9	
1343	0	175	110	820.0		
	1			826.0		PRELIMINARY
	2			831.2		
	5			847.8		
	10			876.7	5.7	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. IK10

TEST NO. 2

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill & Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Lake & Birr

ELEVATION: 544.9 ft.

DATE START: 3 March 81

DATE FINISH: 3 March 81

DRILLER: J. Jensen

INSPECTOR: S. Putney

GEOLOGIST: -

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Harvard	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.586 to 1.0) x \bar{z}

COMPUTED MAX GAUGE PRESS: (MGP) 100 psi

COMPUTED INTERNAL FRICTION: -

ROCK TYPE Maplewood Shale HOLE SIZE 3 in.

RECOVERY (%) 98 to 100

R Q D (%) 79 to 93

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 51.8 TO TOP LOWER PACKER 144.0

TO BOTTOM OF BORING 182.0 TO BOTTOM UPPER PACKER (\bar{z}) 137.3

TO WATER TABLE 28.5 LENGTH OF TEST SECTION 6.7

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.8

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1420	0	175	25	893.3		Possible leak around packer at 100 psi.
	1			893.3		
	2			893.3		
	5			893.3	0.0	
1435	0		50	893.8		
	1			893.8		
	2			893.8		
	5			893.8	0.0	
1441	0		75	893.9		
	1			893.9		
	2			893.9		
	5			893.9	0.0	
1447	0		100	894.0		
	1			894.7		
	2			895.3		
	5			897.8		
	10			901.5	0.8	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK10

TEST NO. 3

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill & Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Lake & Birr

ELEVATION: 544.9 ft.

DATE START: 3 March 81

DATE FINISH: 3 March 81

DRILLER: J. Jensen

INSPECTOR: S. Putney

GEOLOGIST: -

TYPE	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Harvard	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.566 to 1.0) x \bar{z}	ROCK TYPE: <u>Maplewood Shale</u>	HOLE SIZE <u>3 in.</u>
COMPUTED MAX GAUGE PRESS: (MGP) <u>95 psi</u>	RECOVERY (%) <u>98 to 99</u>	
COMPUTED INTERNAL FRICTION: <u>-</u>	R O D (%) <u>72 to 83</u>	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK <u>51.8</u>	TO TOP LOWER PACKER <u>135.0</u>
TO BOTTOM OF BORING <u>182.0</u>	TO BOTTOM UPPER PACKER (Z) <u>128.3</u>
TO WATER TABLE <u>28.5</u>	LENGTH OF TEST SECTION <u>6.7</u>
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE <u>2.8</u>	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1515	0	160	20	903.5		
	1			904.0		
	2			904.8		
	10			908.8	0.5	
1526	0		45	910.0		
	1			911.2		
	2			912.3		
	5			914.8		
	10			918.5	0.8	
1533	0		70	919.5		
	1			920.9		
	2			922.0		
	5			925.0		
	10			930.0	1.1	
1549	0		95	933.0		Water coming up casing at 95 psi. Probable leak around packer.
	1			941.2		
	2			950.8		
	5			980.5		
	10			1030.8	9.8	

HALEY & ALDRICH, INC.
AMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. IK10 TEST NO. 4

OBJECT: CSOAP, Phase II
 IDENT: L.S.T.
 CONTRACTOR: Drill & Test

FILE NO. 374813
 SHEET NO. 1 of 1
 LOCATION: Lake & Birr
 ELEVATION: 544.9 ft.
 DATE START: 4 March 81
 DATE FINISH: 4 March 81
 DRILLER: J. Jensen
 INSPECTOR: S. Putney
 GEOLOGIST: -

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	<u>Pneumatic</u>	<u>Digital</u>	<u>Dial</u>	<u>None</u>
MFG.	<u>Dia. Drill</u>	<u>Neptune</u>	<u>Harvard</u>	<u>-</u>
MODEL NO.	<u>-</u>	<u>Trident</u>	<u>-</u>	<u>-</u>

G.P. = (0.566 to 1.0) x \bar{z}
 COMPUTED MAX GAUGE PRESS: (MGP) 80 psi ROCK TYPE: Reynales lms. HOLE SIZE 3 in.
 COMPUTED INTERNAL FRICTION: - RECOVERY (%) 98 to 103
 ROD (%) 45 to 86

DEPTH: (All Distances Measured From Ground Surface in Feet)

TO TOP OF ROCK 51.8 TO TOP LOWER PACKER 114.0
 TO BOTTOM OF BORING 182.0 TO BOTTOM UPPER PACKER (±) 107.3
 TO WATER TABLE 28.5 LENGTH OF TEST SECTION 6.7
 HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.8

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
0915	0	175	20	1031.9		
	1			1031.9		
	2			1031.9		
	3			1031.9	0.0	
0919	0		40	1032.0		
	1			1032.0		
	2			1032.0		
	3			1032.0	0.0	
0924	0		60	1032.0		
	1			1032.0		
	2			1032.0		
	3			1032.0	0.0	
0928	0		80	1032.2		
	1			1032.2		
	2			1032.3		
	5			1032.6		
	10			1033.0	0.1	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK10 TEST NO. 6

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

FILE NO. 374813
SHEET NO. 1 of 1
LOCATION: Lake & Birr
ELEVATION: 544.9 ft.
DATE START: 4 March 81
DATE FINISH: 4 March 81
DRILLER: J. Jensen
INSPECTOR: S. Putney
GEOLOGIST: -

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Harvard	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.566 to 1.0) x \bar{z}
COMPUTED MAX GAUGE PRESS: (MGP) 65 psi
COMPUTED INTERNAL FRICTION: -

ROCK TYPE: Williamson Shale HOLE SIZE 3 in.
RECOVERY (%) 100 to 112
R O D (%) 34 to 49

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 51.8 TO TOP LOWER PACKER 96.0
TO BOTTOM OF BORING 182.0 TO BOTTOM UPPER PACKER (Z) 89.3
TO WATER TABLE 28.5 LENGTH OF TEST SECTION 6.7
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.8

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1025	0	175	20	1036.9		
	1			1036.9		
	2			1036.9		
	3			1036.9	0.0	
1029	0		35	1037.6		
	1			1037.6		
	2			1037.6		
	3			1037.6	0.0	
1033	0		50	1037.9		
	1			1037.9		
	2			1037.9		
	3			1037.9	0.0	
1038	0		65	1038.0		
	1			1038.0		
	2			1038.0		
	5			1038.0		
	10			1038.0	0.0	

RELINQUISHED

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. IK10 TEST NO. 7

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

FILE NO. 374813
SHEET NO. 1 of 1
LOCATION: Lake & Birr
ELEVATION: 544.9 ft.
DATE START: 4 March 81
DATE FINISH: 4 March 81
DRILLER: J. Jensen
INSPECTOR: S. Putney
GEOLOGIST: -

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Harvard	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.566 to 1.0) x Z
COMPUTED MAX GAUGE PRESS: (MGP) 55 psi
COMPUTED INTERNAL FRICTION: -

ROCK TYPE: Irondequoit Lms. HOLE SIZE 3 in.
RECOVERY (%) 99
R Q D (%) 89

DEPTHS: (All Distances Measured From Ground Surface in Feet)

TO TOP OF ROCK 51.8 TO TOP LOWER PACKER 86.0
TO BOTTOM OF BORING 182.0 TO BOTTOM UPPER PACKER (Z) 79.3
TO WATER TABLE 28.5 LENGTH OF TEST SECTION 6.7
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.8

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1100	0	175	20	1038.0		
	1			1038.2		
	2			1038.2		
	3			1038.2	0.1	
1105	0		40	1038.7		
	1			1038.8		
	2			1038.8		
	3			1038.8	0.0	
1109	0		55	1038.9		
	1			1038.9		
	2			1038.9		
	5			1038.9		
	10			1038.9	0.0	

J 83
H&A

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK10

TEST NO. 8

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill & Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Lake & Birr

ELEVATION: 544.9 ft.

DATE START: 4 March 81

DATE FINISH: 4 March 81

DRILLER: J. Jensen

INSPECTOR: S. Putney

GEOLOGIST: -

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	<u>Pneumatic</u>	<u>Digital</u>	<u>Dial</u>	<u>None</u>
MFG.	<u>Dia. Drill</u>	<u>Neptune</u>	<u>Harvard</u>	<u>-</u>
MODEL NO.	<u>-</u>	<u>Trident</u>	<u>-</u>	<u>-</u>

M.G.P. = (0.868 to 1.0) x \bar{z}
 COMPUTED MAX GAUGE PRESS: (MGP) 35 psi
 COMPUTED INTERNAL FRICTION: -

ROCK TYPE: Rochester Shale HOLE SIZE 3 in.
 RECOVERY (%) 94
 R O D (%) 77

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK <u>51.8</u>	TO TOP LOWER PACKER <u>64.0</u>
TO BOTTOM OF BORING <u>182.0</u>	TO BOTTOM UPPER PACKER (±) <u>57.3</u>
TO WATER TABLE <u>28.5</u>	LENGTH OF TEST SECTION <u>6.7</u>
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE <u>2.8</u>	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1330	0	170	20	1043.0		F R E E L I N E
	1			1043.5		
	2			1045.3		
	5			1060.6		
	10			1064.3	2.1	
1341	0		35	1064.9		
	1			1066.0		
	2			1066.9		
	5			1069.0		
	10			1072.2	0.7	

TEST BORING REPORT

HOLE NO. LK 17

PROJECT: CSOAP, Phase II
 CLIENT: L-S-T
 CONTRACTOR: Drill & Test

FILE NO. 374813
 SHEET NO. 1 of 6
 LOCATION Lake at Car Wash
 ELEVATION 490.0 ft. NCD
 DATE START 16 April 1981
 DATE FINISH 20 April 1981
 DRILLER T. Smith
 INSPECTOR E. Hanna

GROUNDWATER		DEPTH TO			CASING	SAMPLER *	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE		SS	NX
4 21-81	7:30	18.5	20.5	169.3	SIZE 1 D in 3	2-1/8	2-1/4
					HAMMER WT lb 16	140	
					HAMMER FALL in	30	

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
			8 13 13	S-1	0.0 1.5
5			7 10 9	S-2	5.0 6.5
10			21 10 9	S-3	10.0 11.5
15	15.3		2 2 2	S-4	15.0 16.5
20	20.5		100/5	S-5	20.0 20.5

FIELD CLASSIFICATION AND REMARKS

Medium compact brown, coarse to fine SAND, some brick fragments, trace cinder and silt.

Loose brown, coarse to fine SAND, some brick, tile fragments.

Medium compact, black, coarse to fine SAND, some cinder, trace silt.

- FILL -

Very loose brown, mottled to laminated fine sandy SILT, trace coarse to medium sand, trace clay.

Very compact brown fine sandy SILT, trace weathered shale fragments. TOP OF ROCK AT 20.5 FT.

* Double tube, split inner liner.

488.9
140.9
348.0

← 390 → 17?
 ↓
 Lake Car Wash

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>20.5</u>
4-16	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u>-</u>
16-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>5</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	
50+	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	HOLE NO. <u>LK 17</u>

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
15							Begin coring at 20.5 ft.
20							<p>Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, vugs and gypsum nodules. Closely to very closely spaced partings. Light gray, thin to very thin closely to moderately closely spaced Limestone beds, most of which are vertically cracked.</p> <p>ROCHESTER SHALE</p> <p>Two parallel high angle joints in severely weathered Mudstone from 20.5 to 21.9 ft. Closely to moderately closely spaced, severely weathered shaly and clayey partings from 21.2 to 34.1 ft.</p> <p>Severely weathered high angle joint from 22.7 to 23.5 ft. High angle joint from 24.7 to 25.0 ft.</p> <p>ROCHESTER SHALE</p> <p>Short vertical joints in Limestone beds at 27.7, 28.7 and 34.8 ft.</p> <p>Vertical crack from 35.3 to 35.6 ft. Curved, high angle joint from 37.5 to 37.7 ft. Severely weathered shaly partings at 37.7 and 39.4 ft.</p> <p>Severely weathered clay beds from 39.6 to 39.8 ft. and 41.1 to 41.2 ft. Secondary gypsum seams in partings from 42.8 to 89.3 ft. Severely weathered shaly partings at 40.7 and 46.5 ft.</p> <p>ROCHESTER SHALE</p> <p>* RQD based on core recovered.</p> <p>Short vertical joint at 49.5 ft.</p>
	3	20.5			SEV		
	3	R-1	54/24	113/44*	MOD		
	3				SEV		
	3	24.5			MOD		
25	3						
	2						
	2						
	2	R-2	57/40	95/67	MOD		
	2	29.5					
30	2						
	2						
	2						
	2	R-3	59/57	102/97*	MOD		
	2	34.3					
35	2						
	2						
	2						
	2	R-4	61/46	102/75*	SL	36.6	
	2					36.9	
	2	39.3					
40	2						
	2				SEV		
	2				SL		
	2				MOD		
	2						
	2	R-5	61/48	102/78*	SL		
	2	44.3				44.3	
45	2						
	2						
	2						
	2	R-6	59/55	98/92	SL-MOD	44.7	
	2	49.3					
50	2				MOD		

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	-- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	-- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	-- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	-- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	-- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
50	2	R-7 54.3	62 62	103 100*	MOD		Light to dark gray, fine-grained, dolomitic Mudstone, very thinly color-banded. Trace pits, vugs, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds. ROCHESTER SHALE
	2						
	2						
	2						
55	2	R-8 59.3	59 54	98 90	SL-MOD	57.6 58.0	Short high angle joint at 52.9 ft. Vertical joint from 54.9 to 55.0 ft. Gypsum nodule, 0.1 ft. wide, in parting at 55.9 ft. Severely weathered shaly partings at 56.3, 57.3 and 59.1 ft. Gypsum nodules, 0.1 ft. wide, at 57.5 and 59.9 ft. ROCHESTER SHALE
	2						
	2						
	2						
60	2	R-9 64.3	61 61	102 100*	SL		Smooth, low angle joint at 64.8 ft. ROCHESTER SHALE
	2						
	2						
	2						
65	2	R-10 69.3	60 60	100 100	SL	67.2 67.6	Severely weathered shaly partings at 69.6, 69.7, 70.3 and 70.5 ft. ROCHESTER SHALE
	2						
	2						
	2						
70	2	R-11 74.3	60 56	100 93	SL-MOD		ROCHESTER SHALE
	2						
	2						
	2						
75	2	R-12 79.3	60 55	100 92	SL		Short vertical joint at 74.3 ft. Gypsum nodule, 0.1 ft. wide, in parting at 76.2 ft. Severely weathered shaly partings at 77.0, 79.4 and 79.5 ft. ROCHESTER SHALE
	2						
	2						
	2						
80	2	R-13 84.3	61 58	102 95*	SL	81.0 81.3	ROCHESTER SHALE
	2						
	2						
	2						
85	2				SL-MOD		

* RQD based on core recovered.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	-- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	-- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	-- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	-- urooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	-- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Elev.	Drill Rate in. per foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS								
			in.	%											
5	2	R-14 89.3	60 60	100 100	SL- MOD	88.9	Light to dark gray, fine-grained, dolomitic, fossiliferous Mudstone, very thinly color-banded. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds. Severely weathered shaly parting at 87.0 ft. ROCHESTER SHALE								
	2														
	2														
	2														
10	2	R-15 94.3	62 61	103 98*	SL	89.3	Light to medium-gray, fine to medium-grained, thin-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Secondary gypsum seams in closely to very closely spaced partings. IRONDEQUOIT LIMESTONE								
	2														
	2														
	2														
95	2	R-16 99.3	59 50	98 83	SL	96.6	Thin to very thin, closely to moderately closely spaced, severely weathered Shale beds from 89.9 to 92.5 ft. Gypsum nodule, 0.1 ft. wide, at 93.5 ft. Severely weathered shaly partings at 96.2 and 96.3 ft.								
	2														
	2														
	2														
100	2	R-17 104.3	62 62	103 100*	SL	103.0	IRONDEQUOIT LIMESTONE ** Sample from 106.6 to 107.3 ft. *RQD based on core recovered.								
	2														
	2														
	2														
105	2	R-18 109.3	25 25	100 100	SL	103.2	Moderately weathered high angle joint from 103.8 to 104.3 ft. Four severely weathered partings and one moderately dipping joint from 104.8 to 105.4 ft. 106.4								
	2														
	2														
	2														
110	2	R-19 114.3	37 36	100 97	SL	108.2	Dark greenish gray Shale, trace fossils. WILLIAMSON SHALE. Two smooth, intersecting low angle joints at 106.5 ft. Smooth, low angle joints with trace gypsum at 107.0 and 107.8 ft. Severely weathered partings at 108.0, 108.1 and 111.1 ft. Moderately weathered low angle joint at 111.2 ft. Light gray, very thin Limestone beds at 107.5, and very closely spaced from 111.5 to 112.3 ft.								
	2														
	2														
	2														
115	2	R-20 119.3	22 22	96 96	SL	110.8	Dark greenish gray to grayish brown Shale, trace fossils. LOWER SODUS SHALE Five light gray, thin to very thin, closely to moderately closely spaced shell Limestone beds from 112.3 to 115.4 ft. Four medium-gray, very thin Limestone beds from 116.7 to 118.6 ft.								
	2														
	2														
	2														
20	2					112.4	112.8	113.9	115.4	1	2	1	0	FRACTURE FREQUENCY (Fract./ft.)	LOWER SODUS SHALE

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	F.F.	FIELD CLASSIFICATION AND REMARKS
			in.	%				
20	2	R-21 124.3	$\frac{61}{61}$	$\frac{102}{100}^*$	SL	120.8	0	Grayish brown Shale. Trace fossils. LOWER SODUS SHALE Grayish green Shale from 124.1 to 125.4 ft. Severely weathered parting at 125.1 ft. ** Sample 122.7 to 122.9 ft. *RQD based on core recovered.
	2					121.4	0	
	2					**	0	
	2					123.8	1	
125	2	R-22 129.3	$\frac{60}{60}$	$\frac{100}{100}$	SL	124.2	5	Light to medium gray, fine to medium-grained, crystalline, thin-bedded fossiliferous Limestone, interbedded with dark gray, very thin, closely to very closely spaced Shale beds. Trace stylolites. Secondary gypsum seams in closely to moderately closely spaced partings.
	2					125.4	3/4	
	2							
	2							
130	2	R-23 134.3	$\frac{60}{60}$	$\frac{100}{100}$	SL	132.5		REYNALES LIMESTONE
	2					132.9		
	2							
	2							
135	2	R-24 139.3	$\frac{59}{59}$	$\frac{98}{98}$	SL			REYNALES LIMESTONE Smooth low ang angle joint at 140.5 ft.
	2							
	2							
	2							
140	2	R-25 144.3	$\frac{60}{60}$	$\frac{100}{100}$	SL	140.9		Red, medium-grained, oolitic, fossiliferous FURNEVILLE MEMBER hematitic Limestone. Rough low angle joint at 141.8 ft. REYNALES LIMESTONE Short vertical joint at 144.3 144.3
	2					141.4		
	2					143.7		
	2					144.3		
145	2	R-26 149.3	$\frac{59}{45}$	$\frac{98}{75}$	SEV	144.1	1	Light greenish gray argillaceous Shale. MAPLEWOOD SHALE High angle joint from 144.3 to 144.4 ft. Severely weathered low angle joints from 144.4 to 144.5 ft. Severely weathered partings at 144.7, 144.9, 145.3, 146.0, 146.1, 147.2; very closely spaced from 149.4 to 149.6, and at 149.8 ft. Smooth, moderately dipping joints with trace gypsum from 150.2 to 150.4 and from 150.7 to 150.9 ft. Severely weathered vertical joints from 151.5 to 151.7 and from 153.0 to 153.3 ft. Parallel low angle joints at 153.5 and 153.9 ft. MAPLEWOOD SHALE
	2				MOD	146.6	4	
	2				SL	146.9	>10	
	2				SL	147.7	>10	
150	3	R-27 154.3	$\frac{62}{19}$	$\frac{103}{31}^*$	SEV	149.0	>5	
	3				SL	150.2	>10	
	3				SEV	150.4	>10	
	3				SEV		>10	
55	2				SL		4	

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS

WEATHERING

BEDDING/JOINT SPACING

RQD

V. Hard - Knife can't scratch
Hard - scratches diff.
Med. Hard - scratches easily
Soft - grooves
V. Soft - carves

Fresh
V. slight
Slight
Moderate

Mod. Severe
Severe
V. Severe
Complete

V. thin
Thin
Medium
Thick
V. thick

V. Close
Close
Mod. Close
Wide
V. wide

< 2"
2" - 12"
12" - 36"
36" - 120"
> 120"

> 90%
90-75
75-50
50-25
< 25

Excellent
Good
Fair
Poor
V. Poor

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. LK 21

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill and Test

FILE NO. 374813
SHEET NO. 1 of 6
LOCATION: RG&E Lot
ELEVATION 480.6 ft. NCD
DATE START 4 May 1981
DATE FINISH 6 May 1981
DRILLER T. Smith
INSPECTOR S. Putney

GROUNDWATER		DEPTH TO			CASING	SAMPLER	CORE BARREL	
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE		SS	NX
6 May 81	AM	84 ft.	37.5	132.6	SIZE ID in.		1-3/8	2-1/8
7 May	AM	86 ft.	37.5	166.8	HAMMER WT lb.		140	--
8 May	AM	84 ft.	37.5	166.8	HAMMER FALL in.		30	--

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
			7 11 18	S1	0.0 1.5	Medium compact COAL
5	5.5		4 11 18	S2	5.0 6.5	Loose red to brown sand, brick fragments, coal. Medium compact, gray to brown, coarse SAND, little fine gravel with cinders, brick.
10			3 7 7	S3	10.0 11.5	Medium compact gray to brown SAND, little gravel, trace silt, with cinders, brick fragments.
15	15.5					Medium compact gray SILT, little coarse sand, with cinders, brick fragments. - FILL -
			14 6 7	** S4	15.0 16.5	Medium compact gray mottled silty CLAY, trace fine gravel, organic odor.
20			49 90 100/4	S5	20.0 21.4	Very compact gray, slightly mottled to laminated, silty CLAY, weathered rock fragments, organic odor.
25					25.0	
			71 100/2	S6**	25.7	Very compact gray laminated silty CLAY, weathered rock fragments, organic odor.

PRELIMINARY

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>37.5</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u>—</u>
10-20	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>8</u>
20-50	COMPACT	8-15	STIFF	O — OPEN END ROD	
50+	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	HOLE NO. <u>LK 21</u>

H & A 4/81

TEST BORING REPORT

HOLE NO. IK 21

PAGE 2 OF 6

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
30			100/4	S7**	30.0 30.4	Very compact gray laminated silty CLAY, organic odor.
35			100/4	S8	35.0 35.4 37.5	Very compact gray SILT, little clay, weathered rock fragments, organic odor. - GLACIAL TILL -
			100/0			Top of rock at 37.5 ft. **Atterberg Limits analysis.

PRELIMINARY

VS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: <u>37.5</u>
4-10	Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: <u>8</u>
30-50	Compact	8-15	Stiff	O _____ Open End Rod	
50+	Very Compact	15-30	Very Stiff	W _____ Wash Sample	

HOLE NO IK 21

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS		
			in.	%					
35							Begin coring at 37.5 ft.		
	/	37.5							
40	/	R-1	$\frac{117}{54}$	$\frac{98}{45}$	MOD		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color banded. Trace pits, vugs, gypsum nodules and fossils. Closely to very closely spaced partings, some of which have trace secondary gypsums. Light gray, thin to very thin, closely to moderately closely spaced limestone beds, most of which are vertically cracked. ROCHESTER SHALE Partings moderately to severely weathered from 37.8 to 62.3 ft. Short vertical joints at 47.0, 47.9 and 48.6 ft. Moderately dipping joint from 51.2 to 51.3 ft. Short vertical joints at 52.2, 54.8 and 57.2 ft.		
	/								
	/								
	/								
	/								
	/								
45	/				MOD-SEV				
	/	47.5							
	/	R-2	$\frac{121}{70}$	$\frac{104}{58^*}$					
50	/						MOD		
	/								
	/								
	/								
	/								
55	/				MOD-SEV	54.3			
	/	57.2							
	/	R-3	$\frac{119}{76}$	$\frac{99}{63}$	MOD	PT8	*RQD based on core recovered. ROCHESTER SHALE Low angle joint at 59.5 ft. Gypsum nodule, 0.1 ft. wide, in parting at 61.3 ft. wide. Short vertical joint at 61.5 ft. Vertical joint from 63.1 to 63.4 ft. ROCHESTER SHALE		
60	/							MOD-SEV	60.0
	/								
	/								
	/								
	/								
65	/				MOD	PT7			
	/	67.2							
	/	R-4			MOD	68.0			
	/						SEV		
70	/						MOD		

H & A FORM 48 - 7

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- urooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
70	/	R-4	109 77	94 71*	SL-MOD	71.4	Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits and fossils. Trace secondary gypsum in closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds, most of which are vertically cracked.
/	71.9						
/	73.4						
/	73.9						
75	/	76.9			MOD		ROCHESTER SHALE
/							
80	/	R-5	122 96	112 79*	MOD		ROCHESTER SHALE *RQD based on core recovered. Runs R-5 and R-7 recovered rock from previous runs.
/							
/							
/							
85	/	86.0			MOD	85.0	Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Trace pits and vugs. Trace secondary gypsum in very closely to moderately closely spaced argillaceous partings.
/							
90	/	R-6	108 91	90 84*	SL-MOD	90.3	IRONDEQUOIT LIMESTONE Severely weathered partings from 85.6 to 87.8 ft. Vuggy zone from 85.7 to 85.9 ft. Heavily pitted zone in Limestone from 89.8 to 90.0 ft. Moderately weathered vertical joint from 90.3 to 94.7 ft. Curved high angle joint from 92.8 to 93.4 ft. Short vertical joint at 95.6 ft.
/							
/							
/							
95	/	96.0			SL	PT6 96.0	IRONDEQUOIT LIMESTONE
/							
100	/	R-7	95 89	113 94*	SL-MOD	97.3	IRONDEQUOIT LIMESTONE
/							
/							
/							
105	/	105.0			SL	103.0 **	Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE ** Sampled 104.3 to 104.9 ft.

FIELD HARDNESS

WEATHERING

BEDDING/JOINT SPACING

RQD

V. Hard	- Knife can't scratch
Hard	- scratches diff.
Med. Hard	- scratches easily
Soft	- grooves
V. Soft	- carves

Fresh	Mod. Severe
V. slight	Severe
Slight	V. Severe
Moderate	Complete

V. thin	V. Close	< 2"	> 90%	Excellent
Thin	Close	2" - 12"	90-75	Good
Medium	Mod. Close	12" - 36"	75-50	Fair
Thick	Wide	36" - 120"	50-25	Poor
V. thick	V. wide	> 120"	< 25	V. Poor

> 90%	Excellent
90-75	Good
75-50	Fair
50-25	Poor
< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log	Strata Change	FIELD CLASSIFICATION AND REMARKS	
			in.	%			Weath.	Tests
105	2	105.0				**	0	Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE
	2				SL		0	Vertical joint from 105.7 to 106.0 ft. Short vertical joints at 108.0 and 108.4 ft. Very thin Limestone bed at 108.2 ft.
	2					PT4	6	
	2						3	108.8
110	2	R-8	109	92			1	Dark greenish gray to grayish brown SHALE. Trace fossils.
	2		101	86	SL-		0	LOWER SODUS SHALE
	2				MOD		2	Seven light gray, thin to very thin shell Limestone beds from 108.8 to 111.8 ft.
	2						2	*RQD based on core recovered. Rock cored in R-7 was recovered in R-8.
	2						1	Vertical joint in Limestone bed from 110.5 to 110.8 ft. Rough, moderately dipping joint
115	1				**		1	from 111.5 to 111.6 ft.
	1						1	Curved, rough, high angle joint from 112.0 to 112.5 ft.
	2					PT3	>10	LOWER SODUS SHALE
	2						0	Grayish brown Shale from 115.0 to 121.0 ft.
	1	R-9	121	103	SL-		0	
	2		107	88*	MOD		3	** Samples from 105.9 to 107.1, 113.1 to 113.6 and 114.3 to 114.9 ft.
120	2						3	
	2						3	
	2						3	
	1						3	
	2						3	
	1						3	
125	1				SL-		125.3	Light to medium gray, fine to medium-grained, crystalline, thin-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin Shale.
	1				MOD		127.4	Trace pits and stylolites. Trace secondary gypsum in closely to very closely spaced argillaceous partings.
	1						128.1	REYNALES LIMESTONE
	1	R-10	121	101			129.3	
	1		103	85*		PT2	130.1	Severely weathered shaly partings from 124.1 to 127.4 ft.
130	1						131.0	Vertical crack from 127.5 to 128.0 ft.
	1				SL			Severely weathered clayey Shale from 128.1 to 128.3 ft. Vertical cracks from 129.1 to 129.3 ft., from 135.6 to 135.8 ft., from 136.2 to 136.4 ft., and from 136.8 to 137.0 ft.
	1							Very hard siliceous zones at 134.2 and 136.8 ft.
135	2							
	3							
	3	R-11	103	106	SL		137.5	Red, medium-grained, oolitic, fossiliferous, hematitic Limestones.
	2		89	86*			137.9	FURNACEVILLE MEMBER
	3							REYNALES LIMESTONE
140	3							

FRACTURE FREQUENCY (Fract./ft.)

H&A FORM 48

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
140	4				SL	140.7	REYNALES LIMESTONE
	3	141.8	13/12	100/92		2/3 2	Light greenish gray, argillaceous Shale. MAPLEWOOD SHALE
	3				SEV	142.3	Severely weathered partings at 141.8 and 142.0 ft.
	3					>10	Severely weathered vertical joint from 142.6 to 143.8 ft.
145	2				**	PT1	Severely weathered high angle joint from 144.6 to 144.7 ft.
	3				SL		Rough high angle joint from 150.1 to 150.2 ft.
	3	R-12	55/37	52/67*		8	*RQD based on core recovered; over 4 ft. of rock left in borehole at end of R-12.
	2				SEV	148.0	MAPLEWOOD SHALE
	3				SL		Smooth low angle joints at 151.2, 151.4 and 151.7 ft.
150	3	150.6			SL-MOD		Severely weathered low angle joint at 153.0 ft.
	3				SEV		** Sample from 145.6 to 146.1 ft.
	2				SL-MOD		
	2				SEV		
155	2	R-13	121/27	164/22*	MOD-SEV		Low angle and moderately dipping intersecting joints at 155.5 ft.
	2						*RQD based on core recovered. Some rock cored in R-12 was recovered in R-13.
	2	156.8			SL		
	3		21/8	95/36	MOD-SEV	158.6	
	3					159.1	
160	3						Light greenish gray, fine to medium-grained, thick-bedded Sandstone. THOROLD SANDSTONE
	3					160.3	
	3	R-14	99/99	101/100*	SL		Light reddish brown mottling from 160.4 to 160.6 ft. and from 162.2 to 163.1 ft.
	2					163.6	
165	1					163.5	Reddish brown, medium-grained, medium-bedded Sandstone. Trace light gray mottling.
	1					164.8	Swirly bedding. GRIMSBY SANDSTONE
	2	166.8					
170							Bottom of Boring at 166.8 ft. Observation well installed in completed borehole.

FRACTURE FREQUENCY (Fract./Ft.)

(NOTE: No water return from 156.8 to 159.8 ft.)

HALEY & ALDRICH

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LK 21	TEST NO. 1
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: RG&E Lot	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.6 ft. NCD	
TYPE	Pneumatic	Neptune	Digital	None	DATE START: 7 May 1981	
MFG.	Dia. Drill	Trident	Barnett	--	DATE FINISH: 7 May 1981	
MODEL NO.	--	--	--	--	DRILLER: T. Smith	
					INSPECTOR: S. Putney	
					GEOLOGIST: --	
M.G.P. = (0.566 to 1.0) x Z				ROCK TYPE: <u>Maplewood Shale</u> HOLE SIZE <u>3 in.</u>		
COMPUTED MAX GAUGE PRESS: (MGP) <u>107 psi</u>				RECOVERY (%) <u>52</u>		
COMPUTED INTERNAL FRICTION: <u>---</u>				R O D (%) <u>67</u>		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 34.5 TO TOP LOWER PACKER 148.0
 TO BOTTOM OF BORING 166.8 TO BOTTOM UPPER PACKER (±) 142.3
 TO WATER TABLE 86.0 LENGTH OF TEST SECTION 5.7
 HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1110	0	150	25	614.6		Apparent leak around packer at 96 psi. Water came up casing.
	1			614.6		
	2			614.6		
	3			614.6	0.0	
1114	0		50	615.0		
	1			615.0		
	2			615.1		
	3			615.1	0.0	
1118	0		75	616.0		
	1			616.0		
	2			616.1		
	5			616.4	0.4	
1124	0		96	623.5		
	1			635.0		
	2			643.2		
	3			653.5		
	4			665.0		
	5			677.4	10.8	

78 63

HL

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LK 21	TEST NO. 2
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: RG&E Lot	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.6 ft. NCD	
TYPE	Pneumatic	Neptune	Digital	None	DATE START: 7 May 1981	
MFG.	Dia.Drill	Trident	Barnett	--	DATE FINISH: 7 May 1981	
MODEL NO.	--	--	--	--	DRILLER: T. Smith	
					INSPECTOR: S. Putney	
					GEOLOGIST: --	

M.G.P. = (0.508 to 1.0) x Z	ROCK TYPE: Reynales Lms. HOLE SIZE 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 90 psi	RECOVERY (%) 101
COMPUTED INTERNAL FRICTION: --	R O D (%) 85

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 37.5 TO TOP LOWER PACKER 131.0

TO BOTTOM OF BORING 166.8 TO BOTTOM UPPER PACKER (2) 125.3

TO WATER TABLE 86.0 LENGTH OF TEST SECTION 5.7

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1230	0	150	30	692.3		Probable leak around packer at 90 psi.
	1			692.3		
	2			692.3		
	3			692.3	0.0	
1234	0		50	692.3		
	1			692.3		
	2			692.4		
	3			692.5	0.1	
1237	0		70	692.7		
	1			692.7		
	2			692.7		
	3			692.7	0.0	
1241	0		90	694.6		
	1			698.0		
	2			701.3		
	5			720.5		
	10			756.5	6.2	

M. 76 83

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. IK 21	TEST NO. 3
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: RG&E Lot	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.6 ft. NCD	
TYPE	Pneumatic	Neptune	Digital	None	DATE START: 7 May 1981	
MFG.	Dia. Drill	Trident	Barnett	—	DATE FINISH: 7 May 1981	
MODEL NO.	—	—	—	—	DRILLER: T. Smith	
					INSPECTOR: S. Putney	
					GEOLOGIST: —	

M.G.P. = (0.566 to 1.0) x \bar{z}	ROCK TYPE: L. Sodus Shale	HOLE SIZE: 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 80 psi	RECOVERY (%) 103	
COMPUTED INTERNAL FRICTION: —	R O D (%) 97	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK	37.5	TO TOP LOWER PACKER	118.0
TO BOTTOM OF BORING	166.8	TO BOTTOM UPPER PACKER (±)	112.3
TO WATER TABLE	86.0	LENGTH OF TEST SECTION	5.7
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE	1.5		

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1315	0	150	20	764.1		Probable leak around packer at 80 psi.
	1			764.1		
	2			764.1		
	3			764.1	0.0	
1318	0		40	764.3		
	1			764.3		
	2			764.3		
	3			764.3	0.0	
1322	0		60	764.6		
	1			764.6		
	2			764.6		
	3			764.6	0.0	
1326	0		80	765.6		
	1			766.0		
	2			766.6		
	5			770.4		
	10			779.4	1.4	

78 63
 M.B.

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK 21 TEST NO. 4

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill and Test

FILE NO. 374813
SHEET NO. 1 of 1
LOCATION: RG&E Lot
ELEVATION: 480.6 ft. NCD
DATE START: 7 May 1981
DATE FINISH: 7 May 1981
DRILLER: T. Smith
INSPECTOR: S. Putney
GEOLOGIST: ---

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Neptune	Digital	None
MFG.	Dia. Drill	Trident	Barnett	---
MODEL NO.	---	---	---	---

M.G.P. = (0.566 to 1.0) x \bar{z}
COMPUTED MAX GAUGE PRESS: (MGP) 75 psi
COMPUTED INTERNAL FRICTION: ---

ROCK TYPE: Williamson Shale HOLE SIZE 3 in.
RECOVERY (%) 92
R O D (%) 86

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 37.5 TO TOP LOWER PACKER 110.0
TO BOTTOM OF BORING 166.8 TO BOTTOM UPPER PACKER (Z) 104.3
TO WATER TABLE 86.0 LENGTH OF TEST SECTION 5.7
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1350	0	150	25	784.5		
	1			784.5		
	2			784.5		
	3			784.5	0.0	
1354	0		50	784.6		
	1			784.6		
	2			784.6		
	3			784.6	0.0	
1357	0		75	785.0		
	1			785.0		
	2			785.0		
	5			785.0	0.0	

HA 78 83

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LK 21	TEST NO. 5
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: RG&E Lot	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.6 ft. NCD	
TYPE	Pneumatic	Neptune	Digital	None	DATE START: 7 May 1981	
MFG.	Dia.Drill	Trident	Barnett	--	DATE FINISH: 7 May 1981	
MODEL NO.	---	---	---	---	DRILLER: T. Smith	
					INSPECTOR: S. Putney	
					GEOLOGIST: --	
M.G.P. = (0.588 to 1.0) x Z				ROCK TYPE: Irondequoit Lms. HOLE SIZE 3 in.		
COMPUTED MAX GAUGE PRESS: (MGP) 70 psi				RECOVERY (%) 113		
COMPUTED INTERNAL FRICTION: --				R O D (%) 94		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 37.5 TO TOP LOWER PACKER 103.0

TO BOTTOM OF BORING 166.8 TO BOTTOM UPPER PACKER (±) 97.3

TO WATER TABLE 86.0 LENGTH OF TEST SECTION 5.7

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1415	0	150	25	789.0		PRESS
	1			796.3		
	2			791.5		
	3			792.7		
	5			795.1	1.2	
1420	0		50	800.0		
	1			803.3		
	2			806.5		
	5			815.1		
	10			830.1	3.0	
1431	0		70	834.8		
	1			840.0		
	2			845.1		
	5			859.2		
	10			883.1	4.8	

H. 78 83

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. <u>LK 21</u>	TEST NO. <u>6</u>
PROJECT: <u>CSOAP, Phase II</u>					FILE NO. <u>374813</u>	
CLIENT: <u>L.S.T.</u>					SHEET NO. <u>1 of 1</u>	
CONTRACTOR: <u>Drill and Test</u>					LOCATION: <u>RG&E Lot</u>	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: <u>480.6 ft. NCD</u>	
TYPE	<u>Pneumatic</u>	<u>Neptune</u>	<u>Digital</u>	<u>None</u>	DATE START: <u>7 May 1981</u>	
MFG.	<u>Dia.Drill</u>	<u>Trident</u>	<u>Barnett</u>	<u>---</u>	DATE FINISH: <u>7 May 1981</u>	
MODEL NO.	<u>---</u>	<u>---</u>	<u>---</u>	<u>---</u>	DRILLER: <u>T. Smith</u>	
					INSPECTOR: <u>S. Putney</u>	
					GEOLOGIST: <u>---</u>	
M.G.P. = (0.588 to 1.0) x \bar{z}				ROCK TYPE: <u>Irondequoit Lms. HOLE SIZE <u>3 in.</u></u>		
COMPUTED MAX GAUGE PRESS: (MGP) <u>65 psi</u>				RECOVERY (%) <u>90</u>		
COMPUTED INTERNAL FRICTION: <u>---</u>				ROD (%) <u>84</u>		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 37.5 TO TOP LOWER PACKER 96.0
 TO BOTTOM OF BORING 166.8 TO BOTTOM UPPER PACKER (H) 90.3
 TO WATER TABLE 86.0 LENGTH OF TEST SECTION 5.7
 HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1450	0	150	25	890.2		
	1			890.2		
	2			890.2		
	3			890.2	0.0	
1454	0		45	890.3		
	1			890.3		
	2			890.3		
	3			890.3	0.0	
1457	0		65	890.5		
	1			890.6		
	2			890.6		
	3			890.6	0.0	

H&A 78 63

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LK 21	TEST NO. 7
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: RG&E Lot	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.6 ft. NCD	
TYPE	Pneumatic	Neptune	Digital	None	DATE START: 7 May 1981	
MFG.	Dia. Drill	Trident	Barnett	---	DATE FINISH: 7 May 1981	
MODEL NO.	---	---	---	---	DRILLER: T. Smith	
					INSPECTOR: S. Putney	
					GEOLOGIST: ---	

M.G.P. = (0.566 to 1.0) x \bar{z}	ROCK TYPE: Rochester Shale	HOLE SIZE: 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 45 psi	RECOVERY (%) 99	
COMPUTED INTERNAL FRICTION: ---	R Q D (%) 63	

DEPTHS: (All Distances Measured From Ground Surface in Feet)

TO TOP OF ROCK 37.5 TO TOP LOWER PACKER 68.0

TO BOTTOM OF BORING 166.8 TO BOTTOM UPPER PACKER (2) 62.3

TO WATER TABLE 86.0 LENGTH OF TEST SECTION 5.7

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1515	0	150	16	9903.7		Pressure
	1			9906.3		
	2			9911.4		
	5			9922.5	3.8	
1421	0		30	9931.2		
	1			9936.3		
	2			9941.2		
	5			9955.4		
	10			9980.1	4.9	
1432	0		45	9986.0		
	1			9992.7		
	2			9999.7		
	5			10020.0		
	10			10053.5	6.8	

78 63
HL

WATER PRESSURE TEST

PROJECT: CSOAP, Phase II
 CLIENT: L.S.T.
 CONTRACTOR: Drill and Test

FILE NO. 374813
 SHEET NO. 1 of 1
 LOCATION: RG&E Lot
 ELEVATION: 480.6 ft. NCD
 DATE START: 7 May 1981
 DATE FINISH: 7 May 1981
 DRILLER: T. Smith
 INSPECTOR: S. Putney
 GEOLOGIST: —

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Neptune	Digital	None
MFG.	Dia. Drill	Trident	Barnett	—
MODEL NO.	—	—	—	—

M.G.P. = (0.568 to 1.0) x z
 COMPUTED MAX GAUGE PRESS: (MGP) 40 psi
 COMPUTED INTERNAL FRICTION: —

ROCK TYPE: Rochester Shale HOLE SIZE 3 in.
 RECOVERY (%) 99 to 104
 R Q D (%) 58 to 63

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 37.5 TO TOP LOWER PACKER 60.0
 TO BOTTOM OF BORING 166.8 TO BOTTOM UPPER PACKER (±) 54.3
 TO WATER TABLE 86.0 LENGTH OF TEST SECTION 5.7
 HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1550	0	150	20	62.5		
	1			62.5		
	2			62.5		
	3			62.5	0.0	
1554	0		40	62.8		
	1			62.9		
	2			63.0		
	5			63.5		
	10			64.1	0.1	

MB.
 78 63

GROUND WATER OBSERVATION WELL REPORT

PROJECT: CSOAP, PHASE II
 LOCATION: Rochester, NY
 CLIENT: L.S.T.
 CONTRACTOR: Drill & Test
 DRILLER: T. Smith INSPECTOR: S. Putney
 INSTALLATION DATE: 8 April 1981

FILE NO. 374813
 WELL NO. OW LK 21
 BORING NO. LK 21
 LOCATION Off Lake Ave.
(RG&E Lot)
 SHEET 1 OF 2

Should be LK 21
~~to be LK 21~~

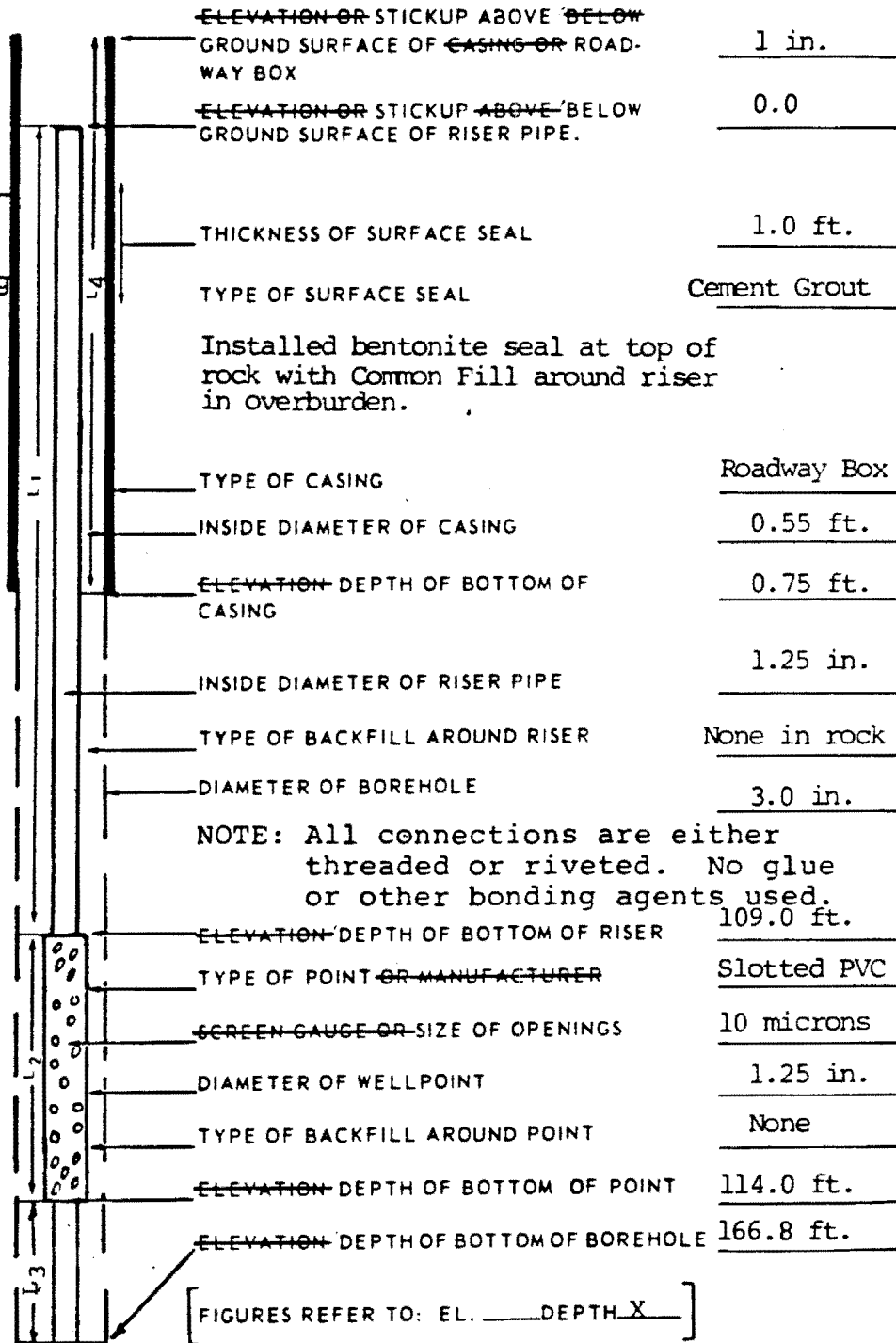
SURVEY DATUM NCD

GROUND ELEVATION 480.6 ft.

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)

Refer to test boring log for description of soil and rock conditions.

OVERBURDEN THICKNESS (ft) 37.5



$$\left[\frac{0.85 \text{ ft.}}{\text{LENGTH OF CASING } L_4} \right] \left[\frac{161.8}{\text{LENGTH OF RISER PIPE } (L_1 + L_3)} + \frac{5.0}{\text{LENGTH OF POINT } (L_2)} \right] = \frac{166.8 \text{ ft.}}{\text{PAY LENGTH}}$$

PROJECT: CSOAP, Phase II
 CLIENT: L.S.T.
 CONTRACTOR: Drill and Test

FILE NO. 374813
 SHEET NO. 1 of 5
 LOCATION Lake Ave. (RG&E)
 ELEVATION 480.1 ft. NCD
 DATE START 7 May 1981
 DATE FINISH 13 May 1981
 DRILLER G. Miller
 INSPECTOR M. Tierney

GROUNDWATER		DEPTH TO			CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	S/S	NX
13 May 81	AM	59.5	65.0	167.2	SIZE 1 D in.	1-3/8	2-1/8
14 May 81	AM	60.0	65.0	167.2	HAMMER WT lb.	140	
15 May 81	AM	68.0	65.0	167.2	HAMMER FALL in.	30	

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5			1	S-1	0.0	Medium compact black COAL.
			6		1.5	
			9			
10			3	S-2	5.0	Loose brown sandy SILT, trace ash, trace organics, trace coal, trace fine gravel.
			3		6.5	
			3			
15			2	S-3	10.0	Very loose black-brown sandy SILT, little coal, trace ash, trace organics, trace red brick fragments.
			1		11.5	
			1			
18.0			18	S-4	15.0	Very compact RED BRICK, little coal, trace ash.
			20		16.5	
			37			
20			27	S-5	20.0	Compact brown to black sandy SILT, some red brick, some ash, trace organics, trace coal, trace fine gravel.
			18		21.5	
			14			
25			3	S-6	25.0	Loose black sandy SILT, some ash, trace red brick, trace coal, trace fine gravel.
			5		26.5	
			4			
30						- FILL -

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>65.0 ft.</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u> </u>
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>13</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. <u>LK 22</u>
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

H.B.A. FORM 4

TEST BORING REPORT

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
30			5	S-7	30.0	Loose black coal and red brick fragments, trace organics, trace fine gravel.
			4		31.5	
			5			
	34.0					- FILL -
35						BOULDER CORED
	35.5					
			5	S-8	37.0	No recovery
			22		38.5	
			16			
40			6	S-9	40.0	Compact brown to black silty SAND, some coal, little brick fragments, little fine gravel, trace organics.
			8		41.5	
			23			
45			7	S-10	45.0	Medium compact black COAL, some fine gravel, little sand, trace ash, trace brick fragments.
			4		46.5	
			6			
50			25	S-11	50.0	No recovery
			12		51.5	
			7			
	53.5					- FILL -
55			13	S-12	55.0	Very compact brown finely laminated clayey SILT, trace wood.
			22		56.5	
			30			
60			20	S-13	60.0	Very compact brown slightly mottled to finely laminated clayey SILT, trace fine gravel, trace organics.
			54		61.5	
			50			
65						Top of rock at 65.0 ft.

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: 65.0 ft.
4-10	Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: 13
30-50	Compact	8-15	Stiff	O _____ Open End Rod	
50+	Very Compact	15-30	Very Stiff	W _____ Wash Sample	
					HOLE NO. LK 22

H&A FORM SEP. 72

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
65	3	65.0					<p>Begin coring at 65.0 ft.</p> <p>(NOTE: There is a 0.9 ft. boulder in core box above R-1.)</p> <p>Medium to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits and fossils. Closely to very closely spaced partings, some of which contain trace secondary gypsum seams. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds. (NOTE: No water return throughout boring.)</p> <p>ROCHESTER SHALE</p> <p>Partings moderately to severely weathered from 65.5 to 74.6 ft.</p> <p>Rough vertical joints from 66.9 to 67.1 ft., 68.8 to 68.9 ft., and from 69.5 to 70.0 ft.</p> <p>Short vertical joint at 70.4 ft.</p>
	3	R-1	54	82	MOD-SEV		
	3		30	45			
	4						
70	4	70.5					
	3				SL-MOD		
	4						
	3						
	3						
75	4	R-2	110	92		74.5	
	4		83	75*			
	4					75.6	
	3				SL		
	3						
80	3	80.5					
	3				SL		
	4		56	130			
	4		51	91*			
85	3	R-3					84.1
	4				SL-MOD		
	4		59	91			
	3		44	75*			
	3	89.5					
90	3				SL		
	4						
	4						
	3						
	3						
95	3	R-4	114	106		95.2	
	3		77	68*			
	4				MOD-SEV	96.5	
	3						
	3	98.5			MOD		
	4						
100	3			SL			

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
V. Hard - Knife can't scratch	Fresh	V. thin < 2"	> 90%
Hard - scratches diff.	V. slight	Thin 2" - 12"	90-75
Med. Hard - scratches easily	Slight	Medium 12" - 36"	75-50
Soft - urooves	Moderate	Thick Wide 36" - 120"	50-25
V. Soft - carves	Complete	V. thick V. wide > 120"	< 25
			Excellent
			Good
			Fair
			Poor
			V. Poor

PRELIMINARY

HSA FORM 4B

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS	
			in.	%				
100	3	R-5	41	103	SL		Dark gray dolomitic Shale. Light gray fossiliferous Limestone from 101.3 to 101.8 ft. IRONDEQUOIT LIMESTONE	
	3		33	80*				101.8
	4					1	Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE Moderately dipping joint at 101.9 ft. Smooth, high angle joint from 102.2 to 102.8 ft. Low angle joints at 103.6, 105.3 and 106.5 ft. Short vertical joint at 107.1 ft. Light gray, very thin Limestone beds at 103.0, 105.3, 105.7, 106.6, and 107.2 ft.	
	3					1		
-105	3					0		
	4					0		
	4			63	85	SL		
	4			54	86*			
	4						0	
	3						3	
	3	108.0				2		
	3					1-1		
-110	3	R-6			SL		Dark greenish gray to grayish brown Shale. Trace fossils. LOWER SODUS SHALE	
	3							
	3					4	Six light gray, thin to very thin shell Limestone beds from 108.1 to 113.8 ft. Rough vertical joints, in shell Limestones, from 110.0 to 110.2 ft., and from 111.2 to 111.4 ft. High angle joint from 110.2 to 110.4 ft. Severely weathered high angle joint from 114.0 to 114.3 ft. **Sample from 111.7 to 112.0 ft. Severely weathered vertical joint from 114.7 to 115.2 ft. Severely weathered, curved, high angle joint from 116.4 to 117.4 ft. LOWER SODUS SHALE	
	3					1		
	3			120	105	**		2
	3			79	66*	112.3		2
-115	3						2	Severely weathered vertical joint from 114.7 to 115.2 ft. Severely weathered, curved, high angle joint from 116.4 to 117.4 ft. LOWER SODUS SHALE
	3						2	
	3					PT3	2	Severely weathered vertical joint from 114.7 to 115.2 ft. Severely weathered, curved, high angle joint from 116.4 to 117.4 ft. LOWER SODUS SHALE
	3						7	
	3	117.5				6	Severely weathered vertical joint from 114.7 to 115.2 ft. Severely weathered, curved, high angle joint from 116.4 to 117.4 ft. LOWER SODUS SHALE	
	2					6		
-120	2		59	109	MOD		Severely weathered partings at 111.2, 114.7, 115.2, 117.6, 118.5, 118.9, 119.1, 120.3, and 121.5 ft. Intersecting low angle joints at 121.2 ft.	
	2		31	53*	SEV MOD	>10		
	3					3	Light to medium gray, fine to medium-grained, crystalline, thin-bedded fossiliferous Limestone, interbedded with dark gray, thin to very thin Shale beds. Trace pits and stylolites. Closely to very closely spaced argillaceous partings, some of which are stylolitic. REYNALES LIMESTONE	
	3				SL-MOD	122.0		
	3		47	87	SEV		Vertical joints from 123.2 to 123.6 ft., and from 124.2 to 124.5 ft. Short vertical joint at 130.4 ft. Severely weathered shaly parting at 134.4 ft. REYNALES LIMESTONE	
125	3		38	81*	SL	124.5		
	3	126.5				125.9	Vertical joints from 123.2 to 123.6 ft., and from 124.2 to 124.5 ft. Short vertical joint at 130.4 ft. Severely weathered shaly parting at 134.4 ft. REYNALES LIMESTONE	
	3							
	3						Vertical joints from 123.2 to 123.6 ft., and from 124.2 to 124.5 ft. Short vertical joint at 130.4 ft. Severely weathered shaly parting at 134.4 ft. REYNALES LIMESTONE	
	3							
30	4	R-8	120	118	SL		*RQD based on core recovered. Runs R-5 through R-8 recovered rock cored previously.	
	4			109				91*
	4							
	3							
	4							
35	3	135.0				PT2		

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD	
Soft - Knife can't scratch Hard - scratches diff. Very Hard - scratches easily Grooves - grooves Carves - carves	Fresh V. slight Slight Moderate	Mod. Severe Severe V. Severe Complete	V. thin V. Close < 2" Thin Close 2" - 12" Medium Mod. Close 12" - 36" Thick Wide 36" - 120" V. thick V. wide > 120"	> 90% 90-75 75-50 50-25 < 25 Excellent Good Fair Poor V. Poor

GROUND WATER OBSERVATION WELL REPORT

PROJECT: CSOAP, PHASE II
 LOCATION: Rochester, NY
 CLIENT: L.S.T.
 CONTRACTOR: Drill and Test
 DRILLER: G. Miller INSPECTOR: S. Putney
 INSTALLATION DATE: 15 May 1981

FILE NO. 374813
 WELL NO. OW LK 22
 BORING NO. LK 22
 LOCATION Off Lake Ave.
(RG&E Lot)
 SHEET 1 OF 2

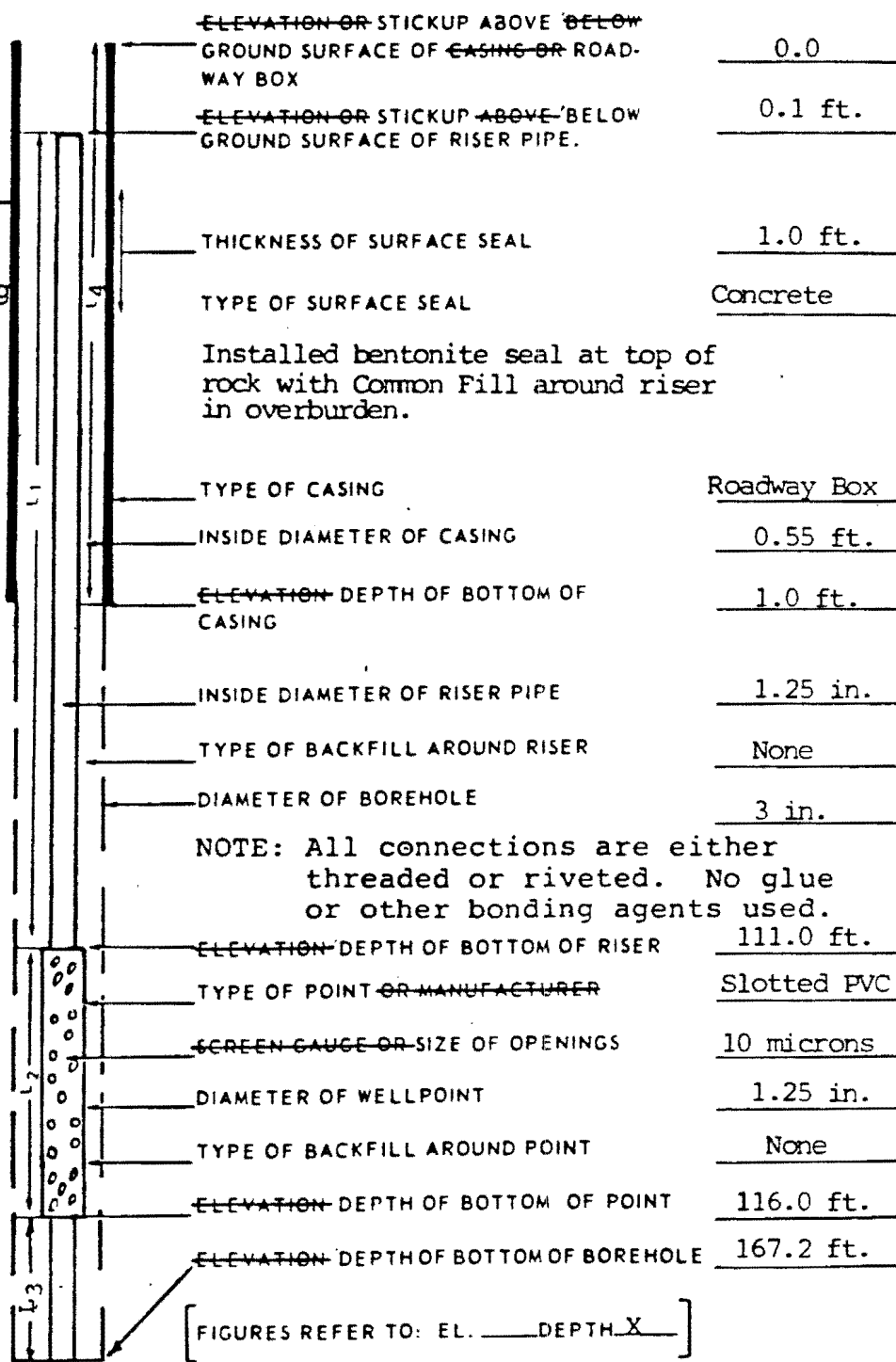
SURVEY DATUM NCD

GROUND ELEVATION 480.1 ft.

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)

Refer to test boring log for description of soil and rock conditions.

OVERBURDEN THICKNESS (ft) 65.0



ELEVATION OR STICKUP ABOVE/BELOW GROUND SURFACE OF CASING OR ROADWAY BOX	0.0
ELEVATION OR STICKUP ABOVE/BELOW GROUND SURFACE OF RISER PIPE.	0.1 ft.
THICKNESS OF SURFACE SEAL	1.0 ft.
TYPE OF SURFACE SEAL	Concrete
Installed bentonite seal at top of rock with Common Fill around riser in overburden.	
TYPE OF CASING	Roadway Box
INSIDE DIAMETER OF CASING	0.55 ft.
ELEVATION DEPTH OF BOTTOM OF CASING	1.0 ft.
INSIDE DIAMETER OF RISER PIPE	1.25 in.
TYPE OF BACKFILL AROUND RISER	None
DIAMETER OF BOREHOLE	3 in.
NOTE: All connections are either threaded or riveted. No glue or other bonding agents used.	
ELEVATION DEPTH OF BOTTOM OF RISER	111.0 ft.
TYPE OF POINT OR MANUFACTURER	Slotted PVC
SCREEN GAUGE OR SIZE OF OPENINGS	10 microns
DIAMETER OF WELLPOINT	1.25 in.
TYPE OF BACKFILL AROUND POINT	None
ELEVATION DEPTH OF BOTTOM OF POINT	116.0 ft.
ELEVATION DEPTH OF BOTTOM OF BOREHOLE	167.2 ft.

[FIGURES REFER TO: EL. _____ DEPTH X]

$$\left[\frac{1.0 \text{ ft.}}{\text{LENGTH OF CASING } (L_4)} \right] + \left[\frac{162.1}{\text{LENGTH OF RISER PIPE } (L_1 + L_2)} \right] + \left[\frac{5.0}{\text{LENGTH OF POINT } (L_3)} \right] = \frac{167.1 \text{ ft.}}{\text{PAY LENGTH}}$$

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LK 22	TEST NO. 1
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: Lake Ave. (RG&E Lot)	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.1 ft. NCD	
TYPE	Pneumatic	Digital	Dial	None	DATE START: 13 May 1981	
MFG.	Dia. Drill	Badger	Barnett	---	DATE FINISH: 13 May 1981	
MODEL NO.	---	80016037	---	---	DRILLER: G. Miller	
M.G.P. = (0.586 to 1.0) x Z					ROCK TYPE: Maplewood Shale	HOLE SIZE 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 110 psi					RECOVERY (%) 88 to 108	
COMPUTED INTERNAL FRICTION: ---					ROD (%) 49 to 61	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 65.0 TO TOP LOWER PACKER 153.0
 TO BOTTOM OF BORING 167.2 TO BOTTOM UPPER PACKER (2) 147.3
 TO WATER TABLE 59.5 LENGTH OF TEST SECTION 5.7
 HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1745	0	150	25	80.6		
	1			80.6		
	2			80.6		
	3			80.6	0.0	
1749	0		50	81.3		
	1			81.3		
	2			81.3		
	3			81.3	0.0	
1753	0		75	81.9		
	1			84.4		
	2			92.2		
	3			101.2		
	5			113.4		
	10			145.4	6.4	Probable leak around packer at 75 and 100 psi.
1805	0		100	158.7		
	1			167.9		
	2			177.4		
	5			205.7		
	10			256.0	9.7	

78 63
MB

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LK_22	TEST NO. 2
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: Lake Ave. (RG&E Lot)	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.1 ft. NCD	
TYPE	Pneumatic	Digital	Dial	None	DATE START: 13 May 1981	
MFG.	Dia.Drill	Badger	Barnett	--	DATE FINISH: 13 May 1981	
MODEL NO.	--	80016037	--	--	DRILLER: G. Miller	
					INSPECTOR: S. Putney	
					GEOLOGIST: --	
M.G.P. = (0.588 to 1.0) x z				ROCK TYPE: Reynales Lms.		HOLE SIZE: 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 95 psi				RECOVERY (%) 118		
COMPUTED INTERNAL FRICTION: --				R O D (%) 91		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 65.0 TO TOP LOWER PACKER 137.0

TO BOTTOM OF BORING 167.2 TO BOTTOM UPPER PACKER (z) 131.3

TO WATER TABLE 59.5 LENGTH OF TEST SECTION 5.7

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1820	0	150	25	68.1		
	1			69.8		
	2			71.4		
	5			74.9	1.4	
1806	0		50	76.2		
	1			78.5		
	2			80.4		
	5			85.7	1.9	
1812	0		75	88.7		
	1			91.6		
	2			94.3		
	5			103.5	3.0	
1818	0	180	95	148.7		
	1			152.4		
	2			156.3		
	5			165.7	3.4	

78 83 H.S.

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. IK 22	TEST NO. 3
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: Lake Ave. (RG&E Lot)	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.1 ft. NCD	
TYPE	Pneumatic	Digital	Dial	None	DATE START: 13 May 1981	
MFG.	Dia.Drill	Badger	Barnett	--	DATE FINISH: 13 May 1981	
MODEL NO.	--	80016037	--	--	DRILLER: G. Miller	
					INSPECTOR: S. Putney	
					GEOLOGIST: --	
M.G.P. = (0.586 to 1.0) x Z				ROCK TYPE: Lower Sodus Shale HOLE SIZE 3 in.		
COMPUTED MAX GAUGE PRESS: (MGP) 80 psi				RECOVERY (%) 105		
COMPUTED INTERNAL FRICTION: --				R O D (%) 66		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 65.0	TO TOP LOWER PACKER 118.0
TO BOTTOM OF BORING 167.2	TO BOTTOM UPPER PACKER (Z) 112.3
TO WATER TABLE 59.5	LENGTH OF TEST SECTION 5.7
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1900	0	150	20	81.2		
	1			81.2		
	2			81.2		
	3			81.2	0.0	
1904	0		40	81.7		
	1			81.7		
	2			81.7		
	3			81.7	0.0	
1909	0		60	81.9		
	1			81.9		
	2			81.9		
	3			81.9	0.0	
1913	0		80	82.1		
	1			82.1		
	2			82.1		
	5			82.1	0.0	

MS. 78 83

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LK 22	TEST NO. 1A
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: Lake Ave. (RG&E Lot)	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.1 ft. NCD	
TYPE	Pneumatic	Digital	Dial	None	DATE START: 14 May 1981	
MFG.	Dia. Drill	Badger	Barnett	—	DATE FINISH: 14 May 1981	
MODEL NO.	—	80016037	—	—	DRILLER: G. Miller	
					INSPECTOR: S. Putney	
					GEOLOGIST: —	
M.G.P. = (0.566 to 1.0) x z				ROCK TYPE: Grim./Thor./Maple. HOLE SIZE 3 in.		
COMPUTED MAX GAUGE PRESS: (MGP) 110 psi				RECOVERY (%) 88 to 108		
COMPUTED INTERNAL FRICTION: —				ROD (%) 49 to 92		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 65.0 TO TOP LOWER PACKER 163.0

TO BOTTOM OF BORING 167.2 TO BOTTOM UPPER PACKER (z) 152.1

TO WATER TABLE 60.0 LENGTH OF TEST SECTION 10.9

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.8

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
0930	0	160	25	183.3		Probable leak around packer at 75 and 100 psi.
	1			183.3		
	2			183.3		
	3			183.3	0.0	
0935	0		50	183.9		
	1			183.9		
	2			183.9		
	3			183.9	0.0	
0939	0		75	184.5		
	1			186.6		
	2			190.3		
	5			205.1		
	10			231.4	4.7	
0941	0		100	238.0		
	1			244.7		
	2			251.6		
	5			270.3		
	10			303.2	6.5	

MS 78 83

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			MOLE NO. IK 22	TEST NO. 2A
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: Lake Ave. (RG&E Lot)	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.1 ft. NCD	
TYPE	Pneumatic	Digital	Dial	None	DATE START: 14 May 1981	
MFG.	Dia. Drill	Badger	Barnett	--	DATE FINISH: 14 May 1981	
MODEL NO.	--	80016037	--	--	DRILLER: G. Miller	
					INSPECTOR: S. Putney	
					GEOLOGIST: --	

M.G.P. = (0.566 to 1.0) x \bar{z}	ROCK TYPE: <u>Maplewood Shale</u>	HOLE SIZE <u>3 in.</u>
COMPUTED MAX GAUGE PRESS: (MGP) <u>105 psi</u>	RECOVERY (%) <u>88 to 108</u>	
COMPUTED INTERNAL FRICTION: <u>---</u>	R O D (%) <u>49 to 61</u>	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK <u>65.0</u>	TO TOP LOWER PACKER <u>153.0</u>
TO BOTTOM OF BORING <u>167.2</u>	TO BOTTOM UPPER PACKER (±) <u>142.1</u>
TO WATER TABLE <u>60.0</u>	LENGTH OF TEST SECTION <u>10.9</u>
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE <u>1.8</u>	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1015	0	160	25	312.3		Probable leak around packer at 75 and 100 psi.
	1			312.3		
	2			312.3		
	3			312.3	0.0	
1020	0		50	313.2		
	1			313.2		
	2			313.3		
	3			313.4		
	5			313.6	0.1	
1026	0		75	314.2		
	1			314.3		
	2			314.7		
	5			327.4		
	10			357.2	4.3	
1037	0		98	364.1		
	1			372.6		
	2			380.8		
	5			405.8		
	10			448.6	8.5	

78 83
H.B.

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LK 22	TEST NO. 3A
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: Lake Ave. (RG&E Lot)	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.1 ft. NCD	
TYPE	Pneumatic	Digital	Dial	None	DATE START: 14 May 1981	
MFG.	Dia.Drill	Badger	Barnett	--	DATE FINISH: 14 May 1981	
MODEL NO.	--	80016037	--	--	DRILLER: G. Miller	
					INSPECTOR: S. Putney	
					GEOLOGIST: --	

M.G.P. = (0.588 to 1.0) x \bar{z}	ROCK TYPE: Reynales/Maplewood	HOLE SIZE 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 95 psi	RECOVERY (%) 57	
COMPUTED INTERNAL FRICTION: --	R O D (%) 70	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 65.0	TO TOP LOWER PACKER 143.0
TO BOTTOM OF BORING 167.2	TO BOTTOM UPPER PACKER (±) 132.1
TO WATER TABLE 60.0	LENGTH OF TEST SECTION 10.9
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.8	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1100	0	160	25	461.8		
	1			463.2		
	2			464.4		
	5			467.5	1.1	
1106	0		50	470.0		
	1			472.2		
	2			474.0		
	5			478.8	1.8	
1112	0		75	481.9		
	1			485.3		
	2			488.1		
	5			500.5		
	10			526.5	4.5	
1123	0		95	532.5		
	1			540.0		
	2			547.9		
	5			571.5		
	10			613.0	8.1	

HA 78 63

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LK 22	TEST NO. 4A
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: Lake Ave. (RG&E Lot)	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.1 ft. NCD	
TYPE	Pneumatic	Digital	Dial	None	DATE START: 14 May 1981	
MFG.	Dia. Drill	Badger	Barnett	---	DATE FINISH: 14 May 1981	
MODEL NO.	---	80016037	---	---	DRILLER: G. Miller	
					INSPECTOR: S. Putney	
					GEOLOGIST: ---	
M.G.P. = (0.566 to 1.0) x Z				ROCK TYPE: Reynales Lms.		HOLE SIZE 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 90 psi				RECOVERY (%) 87 to 118		
COMPUTED INTERNAL FRICTION: ---				R Q D (%) 81 to 91		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 65.0 TO TOP LOWER PACKER 133.0

TO BOTTOM OF BORING 167.2 TO BOTTOM UPPER PACKER (2) 122.1

TO WATER TABLE 60.0 LENGTH OF TEST SECTION 10.9

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.8

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1140	0	160	25	621.7		Probable leak around packer at 90 psi.
	1			621.7		
	2			621.7		
	3			621.7	0.0	
1144	0		50	622.1		
	1			622.1		
	2			622.1		
	3			622.1	0.0	
1148	0		70	622.4		
	1			622.4		
	2			622.4		
	3			622.4	0.0	
1152	0		90	625.1		
	1			630.0		
	2			634.1		
	5			645.0		
	10			668.4	4.3	

VM 78 63
 MA

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. IK 22 TEST NO. 5A

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill and Test

FILE NO. 374813
SHEET NO. 1 of 1
LOCATION: Lake Ave. (RG&E Lot)
ELEVATION: 480.1 ft. NCD
DATE START: 14 May 1981
DATE FINISH: 14 May 1981
DRILLER: G. Miller
INSPECTOR: S. Putney
GEOLOGIST: ---

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Badger	Barnett	---
MODEL NO.	---	80016037	---	---

M.G.P. = (0.666 to 1.0) x \bar{z}
 COMPUTED MAX GAUGE PRESS: (MGP) 80 psi
 COMPUTED INTERNAL FRICTION: ---
 ROCK TYPE: Lower Sodus Shale HOLE SIZE 3 in.
 RECOVERY (%) 105 to 109
 ROD (%) 53 to 66

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 65.0 TO TOP LOWER PACKER 123.0
 TO BOTTOM OF BORING 167.2 TO BOTTOM UPPER PACKER (Z) 112.1
 TO WATER TABLE 60.0 LENGTH OF TEST SECTION 10.9
 HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.8

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1250	0	160	20	672.9		
	1			672.9		
	2			672.9		
	3			672.9	0.0	
1154	0		40	673.3		
	1			673.3		
	2			673.3		
	3			673.3	0.0	
1158	0		60	673.6		
	1			673.6		
	2			673.6		
	3			673.6	0.0	
1202	0		80	673.8		
	1			673.8		
	2			673.8		
	3			673.8	0.0	

M.L. 78 63

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			MOLE NO. LK 22	TEST NO. 6A
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: Lake Ave. (RG&E Lot)	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.1 ft. NCD	
TYPE	Pneumatic	Digital	Dial	None	DATE START: 14 May 1981	
MFG.	Dia. Drill	Badger	Barnett	--	DATE FINISH: 14 May 1981	
MODEL NO.	--	80016037	--	--	DRILLER: G. Miller	
					INSPECTOR: S. Putney	
					GEOLOGIST: --	
M.G.P. = (0.588 to 1.0) x \bar{z}				ROCK TYPE: Williamson/Sodus		HOLE SIZE: 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 75 psi				RECOVERY (%) 85 to 105		
COMPUTED INTERNAL FRICTION: --				R O D (%) 66 to 86		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 65.0 TO TOP LOWER PACKER 113.0

TO BOTTOM OF BORING 167.2 TO BOTTOM UPPER PACKER (\bar{z}) 102.1

TO WATER TABLE 60.0 LENGTH OF TEST SECTION 10.9

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.8

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1315	0	160	25	675.5		
	1			675.5		
	2			675.5		
	3			675.5	0.0	
1319	0		50	676.0		
	1			676.0		
	2			676.0		
	3			676.0	0.0	
1324	0		75	678.8		
	1			678.8		
	2			679.0		
	3			679.1		
	5			680.2		
	10			681.1	0.2	

MAY 21 1983

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. IK 22	TEST NO. 7A
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: Lake Ave. (RG&E Lot)	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.1 ft. NCD	
TYPE	Pneumatic	Digital	Dial	None	DATE START: 14 May 1981	
MFG.	Dia. Drill	Badger	Barnett	—	DATE FINISH: 14 May 1981	
MODEL NO.	—	80016037	—	—	DRILLER: G. Miller	
					INSPECTOR: S. Putney	
					GEOLOGIST: —	
M.G.P. = (0.566 to 1.0) x Z				ROCK TYPE: Irondequoit Lms. HOLE SIZE 3 in.		
COMPUTED MAX GAUGE PRESS: (MGP) 65 psi				RECOVERY (%) 103 to 106		
COMPUTED INTERNAL FRICTION: —				R O D (%) 68 to 80		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 65.0 TO TOP LOWER PACKER 103.0

TO BOTTOM OF BORING 167.2 TO BOTTOM UPPER PACKER (±) 92.1

TO WATER TABLE 60.0 LENGTH OF TEST SECTION 10.9

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.8

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1340	0	160	25	685.3		
	1			685.9		
	2			686.5		
	5			688.2	0.6	
1346	0		45	689.3		
	1			690.0		
	2			690.8		
	5			693.1		
	10			697.0	0.8	
1357	0		65	698.3		
	1			699.4		
	2			700.4		
	5			704.0		
	10			710.0	1.2	

M.S. 78 63

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LK 22	TEST NO. 8A
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: Lake Ave. (RG&E Lot)	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.1 ft. NCD	
TYPE	Pneumatic	Digital	Dial	None	DATE START: 14 May 1981	
MFG.	Dia. Drill	Badger	Barnett	--	DATE FINISH: 14 May 1981	
MODEL NO.	--	80016037	--	--	DRILLER: G. Miller	
					INSPECTOR: S. Putney	
					GEOLOGIST: --	

M.G.P. = (0.566 to 1.0) x \bar{z}	ROCK TYPE: Roch./Irondequoit	HOLE SIZE 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 60 psi	RECOVERY (%) 91 to 130	
COMPUTED INTERNAL FRICTION: --	ROD (%) 68 to 91	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 65.0	TO TOP LOWER PACKER 93.0
TO BOTTOM OF BORING 167.2	TO BOTTOM UPPER PACKER (Z) 82.1
TO WATER TABLE 60.0	LENGTH OF TEST SECTION 10.9
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.8	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1410	0	160	20	719.8		
	1			724.4		
	2			728.9		
	5			742.3	4.5	
1416	0		40	747.4		
	1			753.5		
	2			759.8		
	5			777.8		
	10			805.4	5.8	
1428	0		60	812.5		
	1			820.1		
	2			827.9		
	5			849.8		
	10			887.4	7.5	

78 83
MB.

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LK 22	TEST NO. 9A
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: Lake Ave. (RG&E Lot)	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.1 ft. NCD	
TYPE	Pneumatic	Digital	Dial	None	DATE START: 14 May 1981	
MFG.	Dia. Drill	Badger	Barnett	--	DATE FINISH: 14 May 1981	
MODEL NO.	--	80016037	--	--	DRILLER: G. Miller	
					INSPECTOR: S. Putney	
					GEOLOGIST: --	

M.G.P. = (0.588 to 1.0) x z	ROCK TYPE: Rochester Shale	HOLE SIZE 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 50 psi	RECOVERY (%) 92 to 130	
COMPUTED INTERNAL FRICTION: --	R O D (%) 75 to 91	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK	65.0	TO TOP LOWER PACKER	83.0
TO BOTTOM OF BORING	167.2	TO BOTTOM UPPER PACKER (z)	72.1
TO WATER TABLE	60.0	LENGTH OF TEST SECTION	10.9
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE	1.8		

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1450	0	160	20	897.7		
	1			897.9		
	2			898.3		
	5			899.0	0.3	
1456	0		40	900.7		
	1			901.2		
	2			901.8		
	5			903.4		
	10			905.9	0.5	
1506	0		50	906.9		
	1			907.9		
	2			908.6		
	5			910.2		
	10			913.1	0.6	

78 63
784

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LK 22	TEST NO. 10A
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: Lake Ave. (RG&E Lot)	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.1 ft. NCD	
TYPE	Pneumatic	Digital	Dial	None	DATE START: 14 May 1981	
MFG.	Dia.Drill	Badger	Barnett	—	DATE FINISH: 14 May 1981	
MODEL NO.	—	80016037	—	—	DRILLER: G. Miller	
					INSPECTOR: S. Putney	
					GEOLOGIST: —	

M.G.P. = (0.586 to 1.0) x \bar{z}	ROCK TYPE: Rochester Shale	HOLE SIZE: 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 45 psi	RECOVERY (%) 82 to 92	
COMPUTED INTERNAL FRICTION: —	R O D (%) 45 to 75	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 65.0	TO TOP LOWER PACKER 76.0
TO BOTTOM OF BORING 167.2	TO BOTTOM UPPER PACKER (Z) 65.1
TO WATER TABLE 60.0	LENGTH OF TEST SECTION 10.9
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.8	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1520	0	160	15	915.5		PRELIM
	1			915.7		
	2			915.9		
	5			916.5	0.2	
1525	0		30	917.8		
	1			918.2		
	2			918.6		
	5			920.0		
	10			922.4	0.5	
1536	0		45	923.3		
	1			924.2		
	2			925.0		
	5			927.4		
	10			930.8	0.8	

M 78 63

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LK 22	TEST NO. 2A
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: Lake Ave. (RG&E Lot)	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 480.1 ft. NCD	
TYPE	Pneumatic	Digital	Dial	None	DATE START: 14 May 1981	
MFG.	Dia. Drill	Badger	Barnett	--	DATE FINISH: 14 May 1981	
MODEL NO.	--	80016037	--	--	DRILLER: G. Miller	
					INSPECTOR: S. Putney	
					GEOLOGIST: --	

M.G.P. = (0.586 to 1.0) x \bar{z}	ROCK TYPE: <u>Maplewood Shale</u>	HOLE SIZE: <u>3 in.</u>
COMPUTED MAX GAUGE PRESS: (MGP) <u>105 psi</u>	RECOVERY (%) <u>88 to 108</u>	
COMPUTED INTERNAL FRICTION: <u>---</u>	R O D (%) <u>49 to 61</u>	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK <u>65.0</u>	TO TOP LOWER PACKER <u>153.0</u>
TO BOTTOM OF BORING <u>167.2</u>	TO BOTTOM UPPER PACKER (±) <u>142.1</u>
TO WATER TABLE <u>60.0</u>	LENGTH OF TEST SECTION <u>10.9</u>
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE <u>1.8</u>	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1015	0	160	25	312.3		Probable leak around packer at 75 and 98 psi.
	1			312.3		
	2			312.3		
	3			312.3	0.0	
1020	0		50	313.2		
	1			313.2		
	2			313.3		
	3			313.4		
	5			313.6	0.1	
1026	0		75	314.2		
	1			314.3		
	2			314.7		
	5			327.4		
	10			357.2	4.3	
1037	0		98	364.1		
	1			372.6		
	2			380.8		
	5			405.8		
	10			448.6	8.5	

MBA 1 83

PROJECT: <u>CSOAP, Phase II</u>	FILE NO: <u>374813</u>
CLIENT: <u>L.S.T.</u>	SHEET NO: <u>1 of 6</u>
CONTRACTOR: <u>Drill and Test</u>	LOCATION: <u>Lake Ave. (RG&E)</u>
	ELEVATION: <u>479.2 ft. NCD</u>

GROUNDWATER		DEPTH TO			CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	SS	NX
20 May	AM	87.5	88.0	127.9	SIZE 1.0 in.	1-3/8	2-1/8
21 May	PM	87.0	88.0	161.0	HAMMER WT 1b.	140	---
					HAMMER FALL in.	30	---

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 2 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
			3		0.0	Medium compact brown SAND, little silt, trace glass fragments, cinders and organics.
			7	S-1	1.5	
			17			
						- FILL -
5			27		5.0	Compact brown SAND, some silt, little gravel, trace cinders.
			13	S-2	6.5	
			21			
						- FILL -
10			5		10.0	Medium compact reddish brown SAND, little silt, little gravel, trace cinders.
			10	S-3	11.5	
			9			
						- FILL -
15			6		15.0	Medium compact brown SAND, little coal, trace brick fragments and cinders.
			6	S-4	16.5	
			6			
						- FILL -
20			3		20.0	Loose brown SAND, trace brick fragments and cinders.
			3	S-5	21.5	
			2			
						- FILL -
25			2		25.0	Medium compact brown SAND, little coal, glass fragments and cinders.
			4	S-6	26.5	
			9			
						- FILL -
30						

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>89.9</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u>---</u>
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>18</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	HOLE NO <u>LK 25</u>

H & A 1000-4

TEST BORING REPORT

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
30			3	S-7	30.0	Loose brick fragments, coal, cinders and glass fragments.
			4		31.5	
			5			
33.0						
35			13	S-8	35.0	Medium compact brown SAND, trace gravel, cinders and brick fragments.
			11		36.5	
			12			
						- FILL -
40			4	S-9	40.0	Loose coal, cinders and brick fragments.
			4		41.5	
			5			
45			2	S-10	45.0	Medium compact brown SAND, some coal and cinders, trace gravel.
			7		46.5	
			8			
						- FILL -
50			6	S-11	50.0	Medium compact FILL - coal, cinders, wood fragments.
			7		51.5	
			8			
5			16	S-12	55.0	Compact silty SAND, some glass fragments, brick, wood and tin fragments.
			9		56.5	
			25			
			12	S-13	60.0	Medium compact silty SAND, some glass fragments, brick, and pieces of wood.
			11		61.5	
			19			

PRELIMINARY

DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: _____
Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: _____
Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: _____
Compact	8-15	Stiff	O _____ Open End Rod	
Very Compact	15-30	Very Stiff	W _____ Wash Sample	
				HOLE NO.

TEST BORING REPORT

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
65			50	S-14	65.0	Compact cinders, brick and glass fragments. - FILL -
			27		66.5	
			13			
70						
			14	S-15	70.5	Compact brick, wood and cinders. - FILL -
			27		72.0	
			15			
75						
			wt. of rods	S-16	75.0	Medium compact cinders and rock fragments. (NOTE: Rods slipped and weight of rods drove spoon 1.0 ft.; sampled from 76.0 to 77.0 ft.)
			9		77.0	
			15			
80						
			10	S-17	80.0	Medium compact brown SAND, some silt, brick fragments and glass, little gravel. - FILL -
			12		81.5	
			13			
83.0						
85						
			wt. of rods	S-18	85.0	Very compact brown silty SAND, trace clay. (NOTE: Roller bit used from 88.0 to 89.9 ft.)
			26		86.5	
			47			
90	89.9		100/0			Top of rock at 89.9 ft.

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION		SUMMARY
0-4	Very Loose	0-2	Very Soft	S	Split Spoon	Overburden: <u>89.9</u>
4-10	Loose	2-4	Soft	T	Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U	Undisturbed Piston	Samples: <u>18</u>
30-50	Compact	8-15	Stiff	O	Open End Rod	
50+	Very Compact	15-30	Very Stiff	W	Wash Sample	
						HOLE NO. <u>LK 25</u>

H&A FORM SEP. 76

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
85							Begin coring at 89.9 ft.
							Light to medium gray, fine to medium-grained, thin-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Closely to very closely spaced, severely weathered partings.
90	3	89.9			MOD-SEV		IRONDEQUOIT LIMESTONE
	3				SEV		Rough, severely weathered vertical joint from 90.0 to 90.5 ft. Intersecting low angle and moderately dipping joints from 90.5 to 90.6 ft. Vertical joint from 91.1 to 91.3 ft., and from 94.9 to 95.1 ft. Small vug at 96.5 ft. Vertical crack from 96.5 to 96.9 ft.
	3	R-1	83	86	MOD		
	3		4	4			
95	2				SEV		
	2				MOD		
	2	97.9				97.1	Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE
	3				SEV	97.9	Low angle joints at 97.1, 97.4, 98.6, and 98.7 ft. Smooth, intersecting low angle and moderately dipping joints at 97.6 ft. Low angle joint at 99.6 ft. Rough, high angle joint from 99.8 to 100.0 ft. Short high angle joint at 100.2 ft. Parallel low angle joints at 100.3 and 101.2 ft. Low angle joints at 101.6, 101.9, and 102.8 ft. Rough high angle joints from 102.0 to 102.1 ft., at 102.7 ft., and from 103.8 to 104.0 ft.
	4					>10	
100	4				SL-MOD	>10	
	5				SEV	>10	
	3	R-2	116	97		>10	
	3		33	28		4	
	4					8	
105	3				SL	7	Dark greenish gray to grayish brown Shale. Trace fossils. LOWER SODUS SHALE
	2					5	Six light gray, very thin shell Limestone beds from 105.2 to 110.4 ft. Rough, moderately dipping joint from 105.8 to 105.9 ft. Short vertical joint in Limestone at 110.4 ft. Grayish brown Shale from 110.5 to 115.7 ft. (NOTE: Core barrel blocked at 109.9 ft.)
	2	107.9				7	Severely weathered partings at 107.4, 109.7, 111.8, 114.5, 115.6, and 116.9 ft. LOWER SODUS SHALE
	3	R-3	35	146		0	Rough high angle joint from 116.1 to 116.2 ft. Low angle joint with trace slickensides at 116.4 ft. Intersecting low angle joints at 116.6 ft.
	3	109.9	23	66*	MOD	3	Light to medium gray, fine to medium-grained, crystalline, thin-bedded fossiliferous Limestone. REYNALES LIMESTONE
	2					8	Vug at 117.6 ft.
	2					0	*ROD based on core recovered.
	3	R-4	85	94	SL	2	
	3		72	80		0	
	2					1	
	3					1	
	3				MOD-SEV	3/4	
	3					1/4	
	4		31	103	MOD		
	3	119.9	5	16*			

FRACTURE FREQUENCY (Fract./ft.)

HARDNESS	WEATHERING		BEDDING/Joint SPACING			RQD	
- file can't scratch - scratches diff. - scratches easily - grooves - carves	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
120	3	R-5	97/63	101/65*	SL		Light to medium gray, fine to medium-grained, crystalline, thin-bedded, fossiliferous Limestone, interbedded with dark gray, very thin Shale. Trace pits, vugs and stylolites. Closely to very closely spaced argillaceous partings. REYNALES LIMESTONE
	3						
	2						
	3						
125	3	127.9			MOD		Partings severely weathered from 117.7 to 119.0 ft. Very thin, severely weathered clay bed at 119.2 ft. (NOTE: Lost water return.) Intersecting vertical joints from 119.4 to 119.5 ft. Vertical crack from 119.9 to 120.1 ft. Rough, high angle joint from 124.1 to 124.3 ft. Vuggy partings, with dolomitic crystals, at 124.4 ft. Short vertical joint at 125.4 ft. Intersecting vertical joints from 126.6 to 127.5 ft. Partings severely weathered from 127.8 to 137.9 ft. (NOTE: Core barrel blocked at 127.9, 132.7, 139.9, and 142.2 ft.) REYNALES LIMESTONE *RQD based on core recovered. Trace chert at 122.5 ft.
	3						
	4						
	4						
130	2	R-6	50/6	86/10	MOD-SEV		134.5 Red, medium-grained, oolitic, fossiliferous 134.8 FURNACEVILLE MEMBER hematitic Limestone. Very thin, siliceous Siltstone at 124.6 and 127.5 ft. Vertical crack in chert, from 131.3 to 131.4 ft. Rough vertical joint from 136.6 to 137.3 ft.
	3						
	4						
	5						
135	5	R-7	66/35	106/53*	SL	137.9 F.F.	Light greenish gray argillaceous Shale. MAPLEWOOD SHALE
	5						
	6						
	5						
140	5	R-8	32/0	62/0	MOD-SEV	>10	High angle joint from 137.9 to 138.2 ft. Moderately dipping joints from 138.1 to 138.2 ft., and from 138.5 to 138.6 ft.
	7						
	5						
	2						
145	2	R-9	4/0	3/0	SEV	-	(NOTE: Rock from R-9 apparently washed out during drilling.)
	7						
	10						
	5						
150	5	R-10	49/7	117/14*	MOD	-	High angle joint from 138.7 to 138.9 ft. Intersecting vertical and high angle joints, and many low angle joints, in the interval from 139.1 to 154.4 ft. Low angle joints at 154.4 and 154.7 ft.
	6						
	2						
	2						
155	1					7	MAPLEWOOD SHALE

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Foot	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	F.F.	FIELD CLASSIFICATION AND REMARKS
			in.	%				
155		R-10	67 41	100 61	MOD	155.4	2.4	Severely weathered partings at 155.3 and 155.4 ft. MAPLEWOOD SHALE
					MOD-SEV			Light greenish gray, fine to medium-grained, thin to medium-bedded Sandstone.
					SL			THOROLD SANDSTONE
160								Severely weathered shaly Sandstone from 155.4 to 157.3 ft. Vertical joint from 156.1 to 157.3 ft.
					161.0			160.6
				Reddish brown, fine-grained Sandstone. GRIMSBY SANDSTONE				
165							Bottom of boring at 161.0 ft. Borehole grouted to 80.0 ft., and then backfilled to surface.	

FIELD HARDNESS

WEATHERING

BEDDING/JOINT SPACING

RQD

V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

KALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. LK 33

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

FILE NO. 374813
SHEET NO. 1 of 5
LOCATION: DS (13) Tops
ELEVATION: 471.3 ft. NCD o.k.
DATE START: 9 June 1981
DATE FINISH: 16 June 1981
DRILLER: J. Jensen
INSPECTOR: F. Serpe

GROUNDWATER		DEPTH TO		CASING	SAMPLER	CORE BARREL	
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	NO	
					SIZE ID	S/S	NO
					HAMMER WT	140	
					HAMMER FALL	30	

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER FEET (INCHES)	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5	3.5		10	S-1	1.0	Medium compact brown silty fine SAND, little coarse to medium sand, trace brick and metal. - FILL -
			15		2.5	
			10			
5			20	S-2	4.0	Compact brown silty fine SAND, little coarse to medium sand, trace ash, brick, organics. - FILL -
			25		5.5	
			25			
10			1	S-3	9.0	Loose brown coarse to medium SAND with brick fragments, mortar, glass and cinders. - FILL -
			3		10.5	
			3			
15	17.0		1	S-4	14.0	
			1		15.5	
			1			
20			2	S-5	19.0	Loose black CINDERS.
			3		21.0	
			4			
25	24.0					TOP OF ROCK AT 24.0 ft.

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>24.0</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u> </u>
10-15	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>5</u>
15-30	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. <u>LK 33</u>
30-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

M&A 10/81

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
20							Begin Coring at 24.0 ft.
25	3	24.0					Light to dark gray, fine-grained dolomitic Mudstone very thinly color-banded. Trace pits, gypsum nodules and fossils. Closely to very closely spaced partings. Light gray thin to very thin, closely to moderately closely spaced Limestone beds, most of which are vertically cracked and pitted. ROCHESTER SHALE Partings moderately weathered from 24.5 to 39.5 ft. High angle, iron-stained joint from 29.1 to 29.4 ft. Short vertical joints in very thin Limestone beds at 31.0, 33.0, 35.2, 35.9 and 36.8 ft. Rough vertical joint from 39.3 to 39.5 ft. (NOTE: No water return in R-3 to bottom of boring.)
	3	R-1	41	98	MOD		
	3	27.5	33	79			
	3						
30	3	R-2	57	95	MOD		ROCHESTER SHALE Partings moderately weathered from 24.5 to 39.5 ft. High angle, iron-stained joint from 29.1 to 29.4 ft. Short vertical joints in very thin Limestone beds at 31.0, 33.0, 35.2, 35.9 and 36.8 ft. Rough vertical joint from 39.3 to 39.5 ft. (NOTE: No water return in R-3 to bottom of boring.)
	3		47	78			
	6		32.5				
	6						
35	3	R-3	117	98	MOD	36.6	ROCHESTER SHALE 40.1 40.6 Secondary gypsum seams in partings from 39.5 to 52.6 ft. 40.9 41.7
	3		104	87			
	3						
	3						
40	3	R-4			SL	PT7	Increasingly fossiliferous Mudstone from 43.2 to 52.6 ft. ROCHESTER SHALE
	3		42.5				
	3						
	3						
45	3	R-5	51	85	SL	43.0	Moderately dipping joint from 52.1 to 52.2 ft. Vuggy, pitted zone from 52.6 to 54.0 ft. Severely weathered clayey parting at 53.9 ft. * RQD based on core recovered.
	3		47	78			
	3						
	3						
50	2	R-6	68	113	MOD	52.6	Light to medium gray, fine to medium-grained fossiliferous Limestone. IRONDEQUOIT LIMESTONE
	2		66	97*			
	2		52.5				
	2						
55	2		46	96		54.2	
	2		36	75		54.7	

M & A FORM 48 -

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
55	2	R-6			MOD	55.6	Light to medium gray, fine to medium-grained, fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Trace pits and vugs. Secondary gypsum seams in closely to moderately closely spaced partings. IRONDEQUOIT LIMESTONE (NOTE: Core barrel blocked at ends of R-6 through R-13) Thin, severely weathered clayey Shale bed from 55.2 to 55.4 ft. High angle, iron-stained joint from 55.9 to 56.1 ft. High angle, pitted, iron-stained crack from 57.2 to 57.5 ft. IRONDEQUOIT LIMESTONE * RQD based on core recovered. Moderately weathered, iron-stained vertical joint from 57.7 to 59.4 ft. Rough, vertical joints from 61.2 to 61.4 ft. and from 61.8 to 62.7 ft. Curved vertical cracks from 63.6 to 63.8 ft. and 64.4 to 64.7 ft. Rough vertical joint from 64.7 to 64.9 ft.
	2	56.5				55.6	
	3						
	4	R-7	50/44	104/88*	MOD	PT6	
	5					59.7	
60	4	60.5			SL	60.4	
	5	R-8	17/17	71/71	SL-MOD	62.0	
	4	62.5					
	5						
	4						
65	5		101/99	106/98*			
	5						
	4	R-9			SL-MOD		
	5						
70	5					70.4	
	3	71.5	7/4	54/31	MOD	7	
	6	R-10	10/0	59/0		5	
	3	R-11	29/0	94/0	MOD-SEV	8	
75	4	75.5				10	
	6		19/8	106/42*		>10	
	6					9	
	7	R-12	29/8	81/22	MOD	7	
	8	80.0				1	
80	7					77.0	
	8	R-13	15/8	59/27		77.4	
	7	82.5				PT5	
	8					8	
	9	R-14	11/11	46/46	MOD	4	
	10	84.5				2	
85	5					2	
	5	R-15	91/57	138/63*	MOD	2	
	5					2	
	5					1	
	5					5	
90	6	90.0			MOD	89.7	

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS

WEATHERING

BEDDING/JOINT SPACING

RQD

V. Hard	- Knife can't scratch	fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

H & A FORM 4B

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Run s	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
90	5	90.0					Light to medium gray, fine to medium-grained, crystalline, thin-bedded, fossiliferous Limestone, interbedded with dark gray, very thin Shale. Trace pits, vugs and stylolites. Closely to very closely spaced argillaceous partings, some of which have secondary gypsum seams. REYNALES LIMESTONE Partings moderately to severely weathered from 89.8 to 92.9 ft. Vuggy zone from 89.8 to 90.4. Vug, 0.1 ft. wide, in parting at 90.4 ft. Hard siliceous zones from 96.6 to 96.7 ft.; from 98.5 to 98.7 ft. and 99.3 to 99.4 ft. Chert from 99.9 to 100.0 ft. and from 100.5 to 100.7 ft. Siliceous Siltstone with smooth, vertical crack from 102.0 to 102.2 ft. and from 103.4 to 104.0 ft. Vertical crack from 104.4 to 104.6 ft. and from 107.1 to 107.2 ft. 105.3 Red, medium-grained, oolitic, fossiliferous, hematitic Limestone Rough, high angle joint from 108.6 to 108.8. Low angle joint with trace slickensides at 109.0 ft.
	5	R-16	27	90	MOD		
	5	92.5	5	17			
	4						
95	4		84	100	SL	94.6	
	5	R-17	81	96			
	4						
	5						
	4	99.5				PT4	
	8						
100	4	R-18	35	97		101.0	
	4		35	97		**	
	5	102.5				102.5	
	4				SL	103.3	
	4						
105	5	R-19	78	99		105.9	
	4		76	96			
	4				MOD		
	4						
	4				SL	108.6	
110	5		42	101	MOD	2	
	5	112.5	39	93*		3	
	4					0	
	6				SEV	>10	
	6					>10	
115	6					115.0	
	4	R-20	120	100	MOD	1	
	4		76	63		2	
	4					0	
	4				SEV	8	
120	4					10	
	4				SL	0	
	5	122.5				1	
	4				SEV	>10	
	5		53	100	MOD-SEV	>10	
	5		31	58		10	

FRACTURE FREQUENCY (ft.)

FIELD HARDNESS

WEATHERING

BEDDING/JOINT SPACING

RQD

V. Hard - Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard - scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard - scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft - grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft - carves			V. thick	V. wide	> 120"	< 25	V. Poor

MSA FORM 41

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LK 33	TEST NO. 1
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill and Test					LOCATION: Lake Ave. at Tops	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION:	
TYPE	Pneumatic	Dial	Dial	None	DATE START: 16 June 1981	
MFG.	Dia. Drill	Badger	Barnett	--	DATE FINISH: 16 June 1981	
MODEL NO.	--	40	--	--	DRILLER: J. Jensen	
					INSPECTOR: E. Hanna	
					GEOLOGIST: --	
M.G.P. = (0.586 to 1.0) x Z				ROCK TYPE: Grimsby Sandstone HOLE SIZE 3 in.		
COMPUTED MAX GAUGE PRESS: (MGP) 100 psi				RECOVERY (%) 96		
COMPUTED INTERNAL FRICTION: --				R Q D (%) 96		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 24.0 TO TOP LOWER PACKER 149.0
 TO BOTTOM OF BORING 152.0 TO BOTTOM UPPER PACKER (H) 142.6
 TO WATER TABLE 67.0 LENGTH OF TEST SECTION 6.4
 HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.2

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
0926	0	150	25	48.7		Probable leak around packer at 75 and 100 psi.
	1			48.7		
	2			48.7		
	5			48.7	0.0	
0932	0		50	49.0		
	1			49.0		
	2			49.0		
	5			49.0	0.0	
0938	0		75	53.6		
	1			59.1		
	2			65.5		
	5			86.7	6.6	
0944	0		100	98.5		
	1			112.0		
	2			126.0		
	5			169.3		
	10			245.0	14.6	

FREE

76 83
H

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK 33

TEST NO. 2

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill and Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Lake Ave. at Tops

ELEVATION:

DATE START: 16 June 1981

DATE FINISH: 16 June 1981

DRILLER: J. Jensen

INSPECTOR: E. Hanna

GEOLOGIST: --

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Dial	Dial	None
MFG.	Dia. Drill	Badger	Barnett	--
MODEL NO.	--	40	--	--

M.G.P. = (0.586 to 1.0) x Z

COMPUTED MAX GAUGE PRESS: (MGP) 90 psi

COMPUTED INTERNAL FRICTION: --

ROCK TYPE: Maplewood Shale HOLE SIZE 3 in.

RECOVERY (%) 100

R O D (%) 58 to 63

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK	24.0	TO TOP LOWER PACKER	126.0
TO BOTTOM OF BORING	152.0	TO BOTTOM UPPER PACKER (Z)	119.6
TO WATER TABLE	67.0	LENGTH OF TEST SECTION	6.4
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE	2.2		

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
0842	0	150	10	876.8		<p>Probable leak around packer at 90 psi.</p>
	1			876.8		
	2			876.8	0.0	
0846	0		50	877.6		
	1			877.6		
	2			877.6		
	5			877.7	0.0	
0852	0		70	879.4		
	1			881.7		
	2			883.8		
	5			891.2	2.4	
0900	0		90	918.2		
	1			920.6		
	2			932.8		
	5			969.8		
	10			1031.8	11.4	

FR...

Probable leak around packer at 90 psi.

78 63

H

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK 33

TEST NO.

3

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill and Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Lake Ave. at Tops

ELEVATION:

DATE START: 16 June 1981

DATE FINISH: 16 June 1981

DRILLER: J. Jensen

INSPECTOR: E. Hanna

GEOLOGIST: --

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Dial	Dial	None
MFG.	Dia. Drill	Badger	Barnett	--
MODEL NO.	--	40	--	--

M.G.P. = (0.588 to 1.0) x \bar{z}

COMPUTED MAX GAUGE PRESS: (MGP) 80 psi

COMPUTED INTERNAL FRICTION: --

ROCK TYPE: Maplewood Shale HOLE SIZE 3 in.

RECOVERY (%) 100 to 101

R O D (%) 63 to 93

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 24.0 TO TOP LOWER PACKER 115.0

TO BOTTOM OF BORING 152.0 TO BOTTOM UPPER PACKER (Z) 108.6

TO WATER TABLE 67.0 LENGTH OF TEST SECTION 6.4

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.2

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1009	0	150	20	251.3		Probable leak around packer at 80 psi.
	1			251.3		
	2			251.3		
	5			251.3	0.0	
1015	0		40	251.7		
	1			251.7		
	2			251.7		
	5			251.7	0.0	
1021	0		60	251.9		
	1			251.9		
	2			251.9		
	5			251.9	0.0	
1027	0		80	256.2		
	1			262.6		
	2			269.4		
	5			291.6		
	10			333.5	7.7	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK 33 TEST NO. 4

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill and Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Lake Ave. at Tops

ELEVATION:

DATE START: 16 June 1981

DATE FINISH: 16 June 1981

DRILLER: J. Jensen

INSPECTOR: S. Putney

GEOLOGIST:

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Dial	Dial	None
MFG.	Dia. Drill	Badger	Barnett	--
MODEL NO.	--	40	--	--

M.G.P. = (0.586 to 1.0) x Z

COMPUTED MAX GAUGE PRESS: (MGP) 70 psi

COMPUTED INTERNAL FRICTION: --

ROCK TYPE: Reynales Limestone HOLE SIZE 3 in.

RECOVERY (%) 97 to 100

R O D (%) 96 to 97

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 24.0 TO TOP LOWER PACKER 101.0

TO BOTTOM OF BORING 152.0 TO BOTTOM UPPER PACKER (±) 94.6

TO WATER TABLE 67.0 LENGTH OF TEST SECTION 6.4

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.2

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1045	0	150	20	36.0		
	1			36.1		
	2			36.1		
	5			36.1		
1051	0		40	36.4		
	1			36.4		
	2			36.4		
	5			36.4		
1056	0		55	36.5		
	1			36.5		
	2			36.5		
1101	0		70	36.8		
	1			36.8		
	2			36.9		
	5			36.9		
	10			37.2		

78 83
M

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK 33

TEST NO. 6

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill and Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Lake Ave. at Tops

ELEVATION: _____

DATE START: 16 June 1981

DATE FINISH: 16 June 1981

DRILLER: J. Jensen

INSPECTOR: S. Putney

GEOLOGIST: _____

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Dial	Dial	None
MFG.	Dia. Drill	Badger	Barnett	--
MODEL NO.	--	40	--	--

M.G.P. = (0.586 to 1.0) $\times \bar{z}$

COMPUTED MAX GAUGE PRESS: (MGP) 45 psi

COMPUTED INTERNAL FRICTION: --

ROCK TYPE: Irondequoit Lms. HOLE SIZE 3 in.

RECOVERY (%) 71 to 104

ROD (%) 71 to 88

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 24.0 TO TOP LOWER PACKER 62.0

TO BOTTOM OF BORING 152.0 TO BOTTOM UPPER PACKER (Z) 55.6

TO WATER TABLE 67.0 LENGTH OF TEST SECTION 6.4

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.2

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1150	0	150	15	55.7		
	1			55.7		
	2			55.7		
	5			55.7	0.0	
1156	0		30	56.1		
	1			56.3		
	2			56.4		
	5			56.7	0.1	
1202	0		45	58.4		
	1			60.3		
	2			61.8		
	5			66.1		
	10			73.7	1.5	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK 33 TEST NO. 7

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill and Test

FILE NO. 374813
SHEET NO. 1 of 1
LOCATION: Lake Ave. at Tops
ELEVATION:
DATE START: 16 June 1981
DATE FINISH: 16 June 1981
DRILLER: J. Jensen
INSPECTOR: S. Putney
GEOLOGIST:

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Dial	Dial	None
MFG.	Dia. Drill	Badger	Barnett	--
MODEL NO.	--	40	--	--

M.G.P. = (0.586 to 1.0) x \bar{z}
COMPUTED MAX GAUGE PRESS: (MGP) 25 psi
COMPUTED INTERNAL FRICTION: --

ROCK TYPE: Rochester Shale HOLE SIZE 3 in.
RECOVERY (%) 98
R O D (%) 87

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 24.0 TO TOP LOWER PACKER 43.0
TO BOTTOM OF BORING 152.0 TO BOTTOM UPPER PACKER (H) 36.6
TO WATER TABLE 67.0 LENGTH OF TEST SECTION 6.4
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.2

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1230	0	150	15	75.5		
	1			75.5		
	2			75.5		
	5			75.5	0.0	
1236	0		25	76.2		
	1			76.2		
	2			76.2		
	5			76.2		
	10			76.2	0.0	

REV. 78 83

ROCHESTER PURE WATERS DISTRICT
 COMBINED SEWER OVERFLOW
 ABATEMENT PROGRAM

LST

PROGRAM MANAGEMENT CONSULTANTS

A JOINT V. ORE

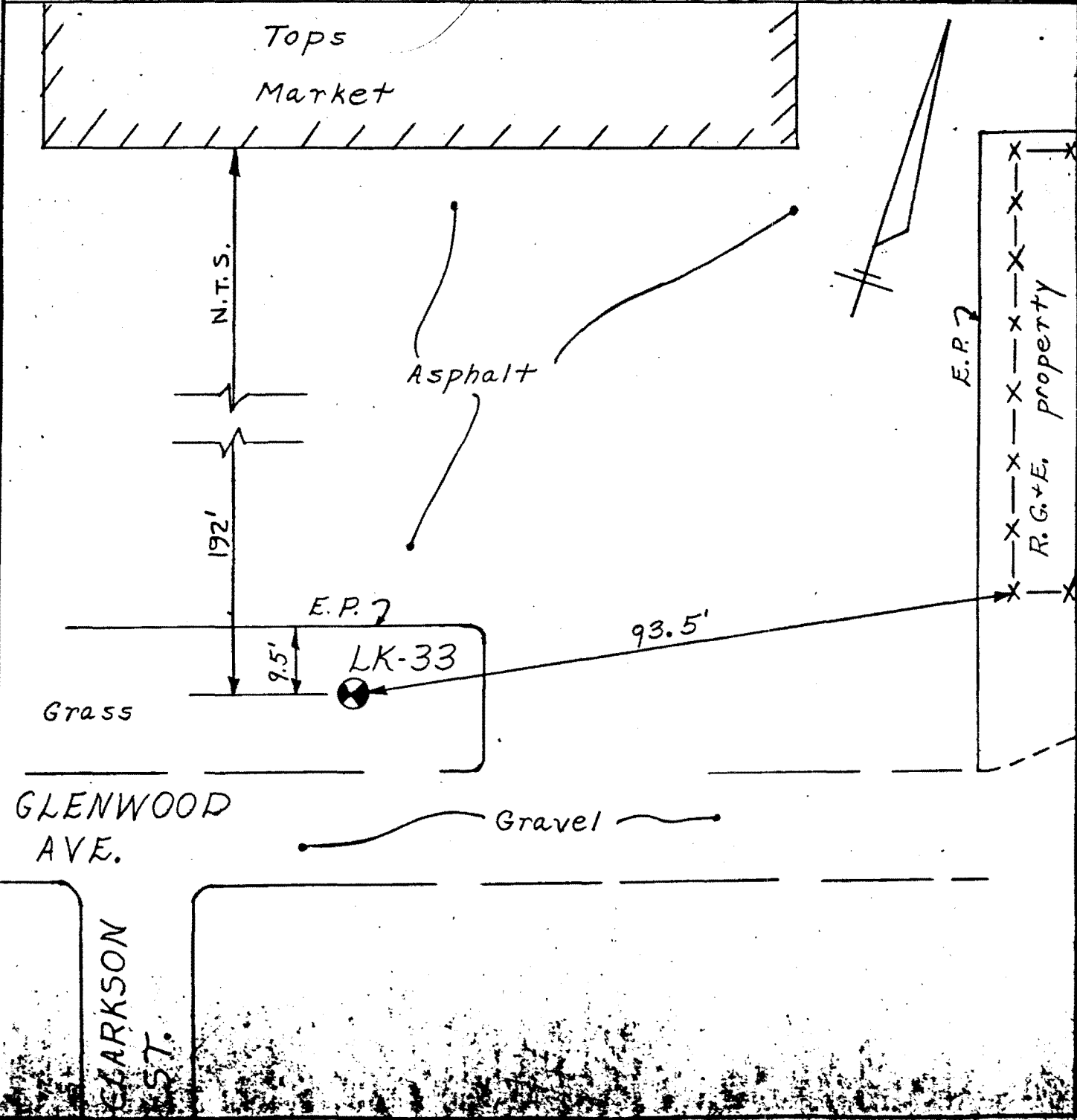
LOZIER, INC.

SEELYE STEVENSON VALUE & KNECHT, INC.

TONIAS ENGINEERS

TEST BORING LOCATION

CITY, TOWN OR COUNTY	TEST BORING NO.	GROUND ELEV.	DATE	SCALE
ROCHESTER	LK-33	470.2	6-29-81	1"=20'



TEST BORING REPORT

HOLE NO. LK 36

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill & Test

FILE NO. 374813

SHEET NO. 1 of 5

LOCATION: Lake Ave. DS (12)

ELEVATION: 472.4 ft. NCD

DATE START: 17 June 1981

DATE FINISH: 19 June 1981

DRILLER: J. Jensen

INSPECTOR: F. Serpe

GROUNDWATER			DEPTH TO		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	S/S	NO
6-19-81	AM	56.5	-	153.5	SIZE ID in	1-3/8	1-13/16
					HAMMER WT lb	140	
					HAMMER FALL in	30	

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
4.0			20	S-1	1.0
			20		2.5
			30		
5			3	S-2	4.0
			3		5.5
			5		
10			12	S-3	9.0
			12		10.5
			25		
15			60	S-4	14.0
			30		15.5
			36		
19.5			100/5	S-5	19.0
20					19.5

FIELD CLASSIFICATION AND REMARKS

Compact brown coarse to fine SAND, little fine gravel, trace glass, cinders and metal, slight petroleum odor present.

- FILL -

Medium stiff brown silty CLAY, little coarse to fine sand, trace gravel, trace cinders.

- FILL -

Compact brown SILT, little fine sand, trace fine gravel, trace clay.

- FILL -

Very compact brown fine sandy SILT, trace coarse to medium sand.

- FILL -

Very compact brown silty coarse to fine SAND, decomposed rock fragments.

TOP OF ROCK AT 19.5 ft.

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>19.5</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK _____
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>5</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. <u>LK 36</u>
50+	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
20							Begin coring at 20.5 ft.
	2	20.5					<p>Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, vugs, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds, most of which are vertically cracked.</p> <p>ROCHESTER SHALE Partings moderately to severely weathered from 20.8 to 30.4 ft. Moderately weathered iron-stained high angle joint from 23.8 to 24.7 ft. Vug, 0.1 ft. wide in parting at 24.4 ft. Rough, low angle joint at 29.5 ft.</p>
	2						
	2						
	2	R-1	93 55	97 57	MOD		
25	2						
	2						
	3						
	3	28.5					
	3				MOD		
	3						
30	3						
	3						
	3	R-2	120 86	100 72	SL		
	3						
35	3						
	3						
	3						
	3	38.5					
	3						
40	3						
	3						
	3						
	3	R-3	121 121	101 100*	SL		
	3						
45	2						
	3						
	2						
	3	48.5					
	2						
50	2						
	2	R-4	118 115	98 96	SL		
	2						
	2						
	2						
55	2						



FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS					
			in.	%								
55	3	R-4 58.5			SL	PT6 59.0	55.9	Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Trace pits.				
	3											
	3											
	3											
60	3	R-5 68.5	118 109	98 91	SL			Closely to moderately closely spaced argillaceous partings, some of which have secondary gypsum seams.				
	2											
	3											
	2											
	3											
	3											
65	2	R-6 71.0	20 17	154 85*				Intermittent, rough vertical crack from 62.2 to 64.2 ft.				
	3											
	2											
	3											
70	2	R-7 78.5	13 0	76 0	SL MOD	69.6 74.6 76.0	69.6	Dark greenish gray Shale. Trace fossils.				
	6											WILLIAMSON SHALE
	3											One high angle, two moderately dipping, and six low angle joints from 69.7 to 70.5 ft. Low angle joint at 71.4 ft. Moderately dipping joint from 72.8 to 73.0 ft. Low angle joint at 74.3 ft. Rough high angle joint from 74.9 to 75.3 ft. Several very thin interbedded Limestones and black graptolitic Shales from 74.8 to 75.8 ft.
	3											
	3											
	3											
75	3	R-8 88.5	28 23	88 72	SL	PT4 81.0		Dark greenish gray to grayish brown Shale. Trace fossils.				
	3											LOWER SODUS SHALE
	3											Six light gray, thin to very thin shell Limestone beds from 77.0 to 82.4 ft. Parallel, moderately dipping joints at 77.8 to 78.1 ft. Moderately dipping joints at 78.5 and 86.7 ft. Grayish brown Shale from 82.3 to 87.3 ft. Vertical crack in very thin Limestone bed at 88.0 ft. Low angle slickensided shear at 88.2 ft.
	3											
80	3	R-8 88.5	117 112	98 93	SL	84.0		LOWER SODUS SHALE				
	3											
	3											
	3											
	3											
	3											
85	3	R-8 88.5			MOD	85.5		LOWER SODUS SHALE				
	3											
	3											
	3											
90	3				SL	88.8		REYNALDES LIMESTONE				

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
90	3	R-9 94.5	73 66	101 90*	SL	93.6	Light to medium gray, fine to medium-grained, crystalline, thin-bedded fossiliferous Limestone, interbedded with dark gray, very thin Shale beds. Trace pits, vugs and stylolites. Closely to very closely spaced argillaceous partings, some of which have secondary gypsum seams. (NOTE: Core block at 94.5 ft.)
3							
3							
3							
7							
95	3	R-10 100.5	76 76	106 100*	SL	PT3 100.0	REYNALES LIMESTONE Moderately weathered shaly Limestone from 88.8 to 89.2 ft. Curved, high angle joint from 94.6 to 95.4 ft. Vertical crack from 96.0 to 96.5 ft. and from 97.9 to 98.4 ft. Severely weathered clayey parting at 97.9 ft. Hard siliceous zone from 99.6 to 99.7 ft. *RQD based on core recovered.
3							
3							
3							
3							
100	3	R-11 105.5	58 54	97 90	SL	103.2 103.8 105.3	REYNALES LIMESTONE Cherty Limestone from 99.9 to 100.4 ft. Hard siliceous zones from 100.6 to 101.2 ft., and from 101.8 to 102.0 ft. Cherty Limestone from 104.2 to 104.5 ft. (NOTE: Core block at 105.5 ft.) 104.7 Red, medium-grained, colitic, fossiliferous 105.3 FURNACEVILLE MEMBER hematitic Limestone
3							
3							
3							
3							
105	3	R-12 113.5	95 95	99 99	SL	106.2 108.2 108.6	Vertical crack from 103.5 to 103.8 ft. REYNALES LIMESTONE Light greenish gray argillaceous Shale.
3							
3							
3							
3							
110	3	R-13 123.5	120 105	100 88	SL	PT2 111.1 115.0	MAPLEWOOD SHALE Parallel, moderately dipping joints at 114.4 and 114.7 ft. High angle joint from 114.7 to 115.0 ft. Moderately dipping joint at 116.4 ft. Low angle joints at 117.0, 117.2 and 117.3 ft. Low angle slickensided shears at 117.8 and 121.3 ft. MAPLEWOOD SHALE Low angle joints at 123.2, 123.3, 123.4, 123.5 and 125.4 ft. Low angle slickensided shear at 123.5 ft.
3							
3							
3							
3							
115	3	R-13 123.5	120 105	100 88	SL	115.0	Very thin, light gray Limestone bed at 125.2 ft.
3							
3							
3							
3							
120	3	R-13 123.5	120 105	100 88	SL	0	FRACURE FREQUENCY (Fract./ft.)
3							
3							
3							
3							
125	3	R-13 123.5	120 105	100 88	SL	0	FRACURE FREQUENCY (Fract./ft.)
3							
3							
3							
3							

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	F.F.	FIELD CLASSIFICATION AND REMARKS
			in.	%				
125	3					125.5	2	MAPLEWOOD SHALE
	3					126.7		Light greenish gray, fine to medium-grained, thick-bedded Sandstone.
	3							THOROLD SANDSTONE.
	3					127.9		Reddish brown, very thin wavy color band at 129.0 ft.
130	3	R-14	121	101	SL	129.9		
	2		121	100*				Reddish brown, fine to medium-grained, thin to thick-bedded Sandstone. Trace light gray mottling. Closely to widely spaced argillaceous partings.
	2							GRIMSBY SANDSTONE
	2	133.5						Swirly bedding from 131.2 to 134.2 ft.
135	3							
	2							
	3							
	2	R-15	121	101	SL			
	3		121	100*				
140	3							
	3							
	3							
	3	143.5						
145	3					143.6		
	3					144.3		Light reddish brown and light gray mottled and thinly color-banded, with trace greenish gray, very thin color banding, from 143.0 to 145.4 ft.
	3					145.6		
	3				SL			
	2	R-16	115	96	MOD			Severely weathered, high to low angle (curved) slickensided shear at 148.8 ft. Five non-parallel, low angle joints, in moderately weathered shaly Sandstone, from 148.9 to 149.4 ft.
150	3		108	90		150.0		
	2							
	3				SL			
	3	153.5						
155	2							Bottom of Boring at 153.5 ft.
								Observation well installed in completed borehole.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK 36

TEST NO.

1

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill and Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Lake Ave. Auto Parts

ELEVATION:

DATE START: 19 June 1981

DATE FINISH: 19 June 1981

DRILLER: J. Jensen

INSPECTOR: S. Putney

GEOLOGIST: --

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Badger	Barnett	--
MODEL NO.	--	--	--	--

M.G.P. = (0.566 to 1.0) x \bar{z}

COMPUTED MAX GAUGE PRESS: (MGP) 105 psi

COMPUTED INTERNAL FRICTION: --

ROCK TYPE: Grimsby SaS.

HOLE SIZE 3 in.

RECOVERY (%) 96

R O D (%) 90

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 20.5 TO TOP LOWER PACKER 150.0

TO BOTTOM OF BORING 153.5 TO BOTTOM UPPER PACKER (±) 143.6

TO WATER TABLE 56.5 LENGTH OF TEST SECTION 6.4

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 4.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1050	0	150	25	76.0		Apparent leak around packer at 75 and 100 psi. Water came up casing. FREE
	1			76.1		
	2			76.3		
	5			76.9	0.2	
1056	0		50	77.7		
	1			78.2		
	2			78.5		
	5			79.2	0.3	
1102	0	180	75	81.2		
	1			87.0		
	2			92.5		
	5			13.4	6.4	
1108	0		100	26.0		
	1			35.0		
	2			44.5		
	5			74.2	9.6	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK 36

TEST NO. 2

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill and Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Lake Ave. Auto Parts

ELEVATION:

DATE START: 19 June 1981

DATE FINISH: 19 June 1981

DRILLER: J. Jensen

INSPECTOR: S. Putney

GEOLOGIST:

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Badger	Barnett	--
MODEL NO.	--	--	--	--

M.G.P. = (0.566 to 1.0) x \bar{z}

COMPUTED MAX GAUGE PRESS: (MGP) 80 psi

COMPUTED INTERNAL FRICTION: --

ROCK TYPE: Maplewood Shale HOLE SIZE 3 in.

RECOVERY (%) 99 to 100

ROD (%) 88 to 99

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 20.5 TO TOP LOWER PACKER 115.0

TO BOTTOM OF BORING 153.5 TO BOTTOM UPPER PACKER (Z) 108.6

TO WATER TABLE 56.5 LENGTH OF TEST SECTION 6.4

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 4.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1130	0	160	20	282.5		PRELIMINARY
	1			282.5		
	2			282.5		
	3			282.5	0.0	
1134	0		40	82.8		
	1			82.9		
	2			82.9		
	3			82.9	0.0	
1137	0		60	83.1		
	1			83.1		
	2			83.1		
	3			83.1	0.0	
1141	0	180	80	84.3		
	1			84.5		
	2			84.7		
	5			85.3		
	10			86.2	0.2	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK 36 TEST NO. 3

PROJECT: CSOAP, Phase II

FILE NO. 374813

CLIENT: L.S.T.

SHEET NO. 1 of 1

CONTRACTOR: Drill and Test

LOCATION: Lake Ave. Auto Parts

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Badger	Barnett	—
MODEL NO.	—	—	—	—

ELEVATION: _____
 DATE START: 19 June 1981
 DATE FINISH: 19 June 1981
 DRILLER: J. Jensen
 INSPECTOR: S. Putney
 GEOLOGIST: _____

M.G.P. = (0.588 to 1.0) x \bar{z}

COMPUTED MAX GAUGE PRESS: (MGP) 65 psi

COMPUTED INTERNAL FRICTION: _____

ROCK TYPE: Reynales lms. HOLE SIZE 3 in.

RECOVERY (%) 101 to 106

R O D (%) 90 to 100

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 20.5 TO TOP LOWER PACKER 100.0

TO BOTTOM OF BORING 153.5 TO BOTTOM UPPER PACKER (Z) 93.6

TO WATER TABLE 56.5 LENGTH OF TEST SECTION 6.4

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 4.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1200	0	160	25	88.0		
	1			88.7		
	2			88.7		
	5			88.9	0.2	
1206	0		45	90.0		
	1			91.2		
	2			91.8		
	5			92.6	0.5	
1211	0		65	93.8		
	1			95.0		
	2			96.2		
	5			97.7		
	10			100.1	0.6	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK 36 TEST NO. 4

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill and Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Lake Ave. Auto Parts

ELEVATION: _____

DATE START: 19 June 1981

DATE FINISH: 19 June 1981

DRILLER: J. Jensen

INSPECTOR: S. Putney

GEOLOGIST: _____

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Badger	Barnett	--
MODEL NO.	--	--	--	--

M.G.P. = (0.566 to 1.0) x \bar{z}
 COMPUTED MAX GAUGE PRESS: (MGP) 55 psi
 COMPUTED INTERNAL FRICTION: ---

ROCK TYPE: Lower Sodus Shale HOLE SIZE 3 in.
 RECOVERY (%) 88 to 98
 R O D (%) 72 to 93

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 20.5 TO TOP LOWER PACKER 81.0
 TO BOTTOM OF BORING 153.5 TO BOTTOM UPPER PACKER (\bar{z}) 74.6
 TO WATER TABLE 56.5 LENGTH OF TEST SECTION 6.4
 HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 4.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1230	0	160	25	0.9		
	1			0.9		
	2			1.0		
	5			1.0	0.0	
1235	0		40	1.2		
	1			1.2		
	2			1.2		
	5			1.2	0.0	
1241	0		55	1.5		
	1			1.6		
	2			1.7		
	5			1.7	0.0	

FRIEDMAN

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LK 36 TEST NO. 5

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill and Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Lake Ave. Auto Parts

ELEVATION:

DATE START: 19 June 1981

DATE FINISH: 19 June 1981

DRILLER: J. Jensen

INSPECTOR: S. Putney

GEOLOGIST:

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Badger	Barnett	--
MODEL NO.	--	--	--	--

M.G.P. = (0.666 to 1.0) x \bar{z}

COMPUTED MAX GAUGE PRESS: (MGP) 50 psi

COMPUTED INTERNAL FRICTION: --

ROCK TYPE: Williamson Shale MOLE SIZE 3 in.

RECOVERY (%) 76 to 103

R Q D (%) 0 to 82

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 20.5 TO TOP LOWER PACKER 76.0

TO BOTTOM OF BORING 153.5 TO BOTTOM UPPER PACKER (2) 69.6

TO WATER TABLE 56.5 LENGTH OF TEST SECTION 6.4

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 4.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1300	0	150	25	2.0		
	1			2.1		
	2			2.2		
	5			2.2	0.0	
1306	0		40	2.7		
	1			2.7		
	2			2.8		
	5			3.1	0.1	
1311	0		50	4.1		
	1			4.2		
	2			4.3		
	5			4.8		
	10			5.4	0.1	

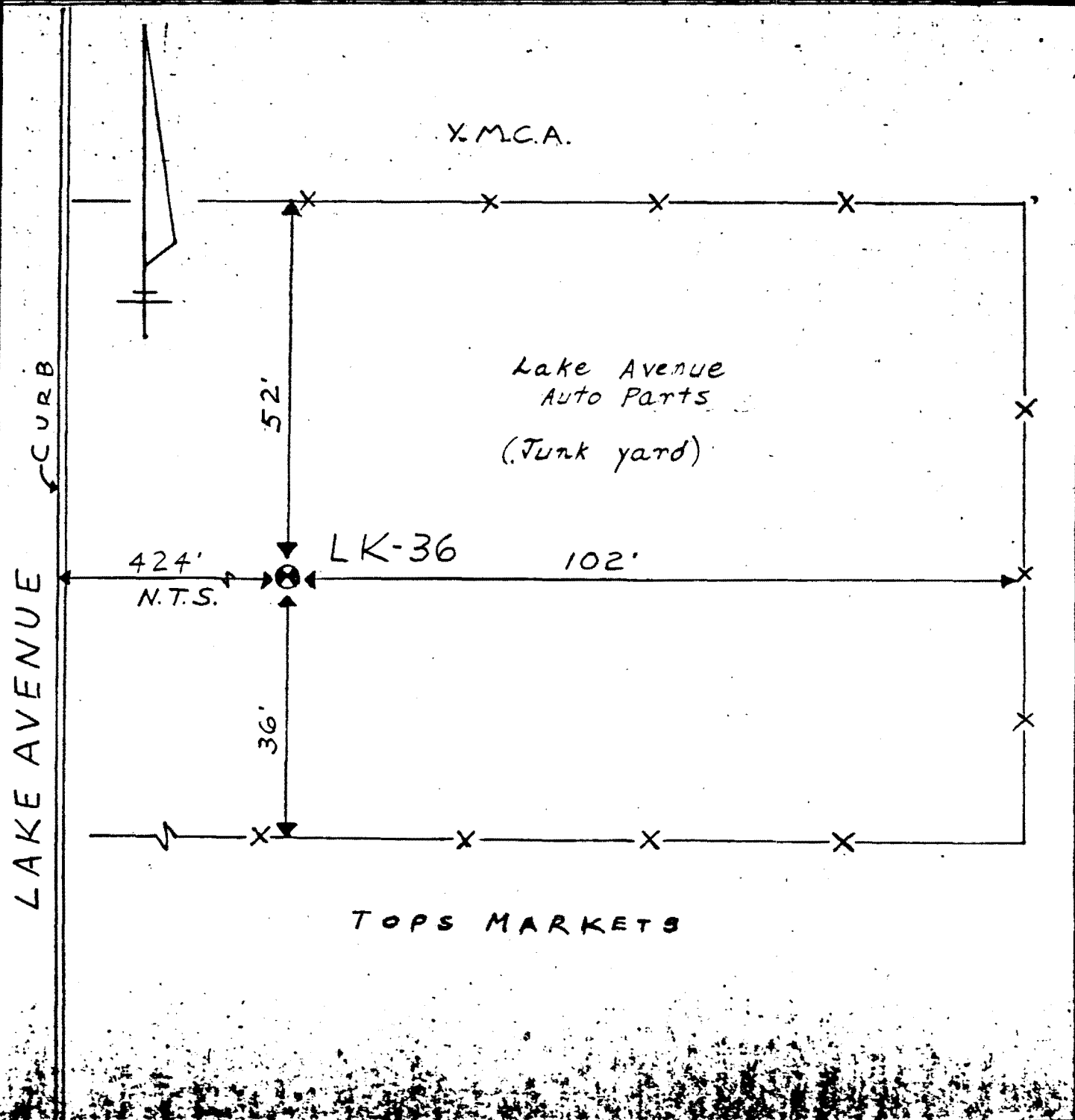
ROCHESTER PURE WATERS DISTRICT
 COMBINED SEWER OVERFLOW
 ABATEMENT PROGRAM



PROGRAM MANAGEMENT CONSULTANTS
 A JOINT VENTURE
 LOZIER, INC -
 BEELYE STEVENSON VALUE & TONECHT, INC -
 TOWNS ENGINEERS

TEST BORING LOCATION

CITY, TOWN OR COUNTY	TEST BORING NO.	GROUND ELEV.	DATE	SCALE
ROCHESTER	LK-36	471.3	6-29-81	1"=20"



HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. LK 66

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

FILE NO. 374813
SHEET NO. 1 of 2
LOCATION: RGE lot on Lake Ave.
ELEVATION: 480.6 ft. NCD
DATE START: 25 Aug. 1981
DATE FINISH: 25 Aug. 1981
DRILLER: G. Miller
INSPECTOR: E. Hanna

GROUNDWATER		DEPTH TO: (ft.)		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	
8-25-81	14:00	28	50	65	Auger	NX
					SIZE ID in. 4	2-1/8
					HAMMER WT lb. ---	---
					HAMMER FALL in ---	---

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS	
10						NOTE: No soil samples taken from this borehole.	
20							
30							
40							
50							
55.0							
							(NOTE: Drilled with roller bit from 51.0 to 55.0 ft.)
							FREELIMINARY
							TOP OF ROCK AT 55.0 ft.

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>55.0 ft.</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK _____
10-20	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES _____
20-30	COMPACT	8-15	STIFF	O — OPEN END ROD	
30-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	HOLE NO. <u>LK 66</u>

MS Form 4

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
50							Begin coring at 55.0 ft.
55	5 4 5 4 5	55.0			MOD SL		
60	4 5 4 5	R-1	110/99	92/83			<p>ROCHESTER SHALE</p> <p>Severely weathered shaly partings at 59.2 and 60.3 ft. Low angle joint at 59.9 ft. Smooth high angle joint from 60.3 to 60.7 ft. Vertical joint from 61.1 to 61.6 ft. Short vertical joint at 63.0 ft. Rough vertical joint from 63.6 to 64.3 ft.</p>
65	4	65.0			SL-MOD		
70							<p>Bottom of Boring at 65.0 ft.</p> <p>Borehole backfilled to surface.</p> <p>(NOTE: Poor rock condition below 59.8 ft. apparently due to drilling operations.)</p>

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
V. Hard - Knife can't scratch Hard - scratches diff. Med. Hard - scratches easily Soft - grooves V. Soft - carves	Fresh V. slight Slight Moderate Mod. Severe Severe V. Severe Complete	V. thin V. Close < 2" Thin Close 2" - 12" Medium Mod. Close 12" - 36" Thick Wide 36" - 120" V. thick V. wide > 120"	> 90% 90-75 75-50 50-25 < 25 Excellent Good Fair Poor V. Poor

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. LK 68

PROJECT: CSOAP, Phase II

FILE NO 374813

CLIENT: L.S.T.

SHEET NO. 1 of 4

CONTRACTOR: Drill and Test

LOCATION: RGE lot on Lake Ave.

GROUNDWATER DEPTH TO: (ft.)

CASING SAMPLER CORE BARREL

ELEVATION: 480.3 ft. NCD

DATE START: 26 Aug. 1981

DATE FINISH: 27 Aug. 1981

DRILLER: G. Miller

INSPECTOR: E. Hanna

DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE
8-24-81	8:30	59.0	82	82

TYPE	Auger	SS	NX
SIZE ID	in 4	1-3/8	2-1/8
HAMMER WT	lb ---	140	---
HAMMER FALL	in ---	30	---

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
5			10 27 29	S-1	0.0 1.5
			2 12 18	S-2	5.0 6.5
			16 12 9	S-3	10.0 11.5
15			12 10 8	S-4	15.0 16.5
			4 2 4	S-5	20.0 21.5
			8 8 8	S-6	25.0 26.5

FIELD CLASSIFICATION AND REMARKS

Medium compact brown coarse to fine SAND, little silt, coal and cinders, trace fine gravel.
- FILL -

Medium compact brown silty coarse to fine SAND, trace coal, cinders and fine gravel.
- FILL -

Medium compact silty coarse to fine SAND, little brick fragments, trace fine gravel, coal and cinders.
- FILL -

Medium compact brown silty coarse to fine SAND, trace brick fragments, coal and cinders.
- FILL -

No recovery

Medium compact brown medium to fine SAND, trace tile fragments, coal, cinders, ash and cloth, trace silt.
- FILL -

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>82.0 ft.</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u>---</u>
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>17</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. <u>LK 68</u>
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

H & A 10000 4

TEST BORING REPORT

HOLE NO. IK 68

PAGE 2 OF 4

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
30			3 4 5	S-7	30.0 31.5	Loose black COAL, CINDERS and ASH. - FILL -
35			16 6 4	S-8	35.0 36.5	Medium compact coarse to fine SAND, little silt, trace coal, cinders and tile fragments. - FILL -
40			2 18 15	S-9	40.0 41.5	Medium compact brown silty medium to fine SAND, trace coal, cinders, brick and glass fragments. - FILL -
45			6 6 6	S-10	45.0 46.5	Loose brown coarse to fine SAND, little coal, cinders and ash, trace fine gravel, silt and tile. - FILL -
50			5 9 9	S-11	50.0 51.5	Loose black medium to fine SAND, little coal, cinders and ash, trace silt and wood chips. - FILL -
55			6 10 12	S-12	55.0 56.5	Medium compact gray ASH and CINDERS, trace silt and wood chips, little sand. - FILL -
60			7 10 17	S-13	60.0 61.5	Medium compact black CINDER, ASH and WOOD FRAGMENTS, little medium to fine sand, trace silt, trace tile and glass fragments. - FILL -
65						

PRELIMINARY

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: <u>82.0 ft.</u>
4-10	Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: <u>17</u>
30-50	Compact	8-15	Stiff	O _____ Open End Rod	
50+	Very Compact	15-30	Very Stiff	W _____ Wash Sample	
					HOLE NO. <u>IK 68</u>

TEST BORING REPORT

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
65			6 7 9	S-14	65.0 65.5	Loose black coarse to fine SAND, trace silt, fine gravel, coal, cinders and tile fragments.
70			4 4 5	S-15	70.0 71.5	Loose gray ASH, little coarse to fine sand, little silt, tile fragments, coal and cinders.
75			7 18 22	S-16a S-16b	75.0 75.5 76.5	Loose black coarse to fine SAND, trace silt, tile, coal and cinders. Medium compact gray clayey SILT, trace coarse to fine sand and fine gravel, trace wood.
80			7 20 32	S-17	80.0 81.5	Compact brown SILT, little clay.
82.0			100/0			TOP OF ROCK AT 82.0 ft.
85						

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: 82.0 ft.
4-10	Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: 17
30-50	Compact	8-15	Stiff	O _____ Open End Rod	
50+	Very Compact	15-30	Very Stiff	W _____ Wash Sample	HOLE NO. IK 68

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
75							(NOTE: No water return throughout boring.)
80							Begin coring at 82.0 ft.
85	3	82.0			MOD	Light to medium gray, fine to medium-grained, thin-bedded fossiliferous Limestone, interbedded with medium gray, thin to very thin dolomitic Shale. Trace pits and vugs. Closely spaced argillaceous partings. IRONDEQUOIT LIMESTONE Moderately to severely weathered clayey Shale from 83.2 to 83.4, 84.1 to 84.5, 87.2 to 87.7, 88.3 to 88.7 and 89.8 to 90.4 ft. Moderately weathered, moderately dipping joint, at 85.1 ft. Moderately weathered rough vertical joint from 85.4 to 85.7 ft. Small vug in parting at 86.7 ft. High angle crack from 86.8 to 87.1 ft.	
	3			SEV			
	3			MOD			
	3			SEV			
	3			MOD			
	3	R-1	$\frac{102}{71}$	$\frac{85}{59}$	MOD-SEV		
	3			SL			
	3			MOD			
90	3				SL		
95						Bottom of Boring at 92.0 ft. Borehole grouted to depth of 82.0 ft. and backfilled to surface.	
100							

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	-- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	-- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	-- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	-- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	-- carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

H&A FORM 6 - MAR 77

TEST BORING REPORT

MOLE NO. LK 69

PROJECT: CSOAP, Phase II

FILE NO. 374813

CLIENT: L.S.T.

SHEET NO. 1 of 2

CONTRACTOR: Drill and Test

LOCATION: RGE lot on Lake Ave.

ELEVATION: 481.2 ft. NCI

GROUNDWATER			DEPTH TO: (ft.)		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF MOLE	TYPE		
8-27-81	17:30	63.5	78.0	91.0	Auger		NX
					SIZE ID	in 4	-- 2-1/8
					HAMMER WT	lb 7b	--
					HAMMER FALL	in	--

DATE START: 27 Aug. 1981

DATE FINISH: 27 Aug. 1981

DRILLER: G. Miller

INSPECTOR: E. Hanna

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
0						
20						
40						
60						
78.0						TOP OF ROCK AT 78.0 ft.
80						

NOTE: No soil samples taken from this borehole.

PRELIMINARY

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>78.0 ft.</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES —
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	MOLE NO. <u>LK 69</u>

M.B.A. FORM 1-81

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
75							(NOTE: No water return throughout boring.) Begin coring at 78.0 ft.
80	3	78.0	20	56	MOD	81.0	Medium to dark gray, fine-grained dolomitic fossiliferous Mudstone. Closely spaced partings. ROCHESTER SHALE Severely weathered clayey Shale from 78.9 to 80.7 ft.
	3		0	0	SEV		
	3	R-1			MOD		
	3		26	87	SEV		
85	3		11	37	MOD	81.0	Light to medium gray, fine to medium-grained, thin-bedded fossiliferous Limestone, interbedded with medium to dark gray, thin to very thin dolomitic Shale. Trace pits and vugs. Closely to very closely spaced partings. IRONDEQUOIT LIMESTONE Severely weathered clay from 81.3 to 81.6 ft. Severely weathered shaly partings at 82.6, 83.5, 83.8, 84.9, 88.5, 88.9 and 89.4 ft. Moderately weathered high angle joint from 85.6 to 86.2 ft. High angle crack from 86.4 to 87.3 ft. Small vug at 87.4 ft. Moderately dipping joint at 89.0 ft.
	3	83.5			SEV		
	3		79	88	MOD		
	3		48	53	MOD		
90	3	R-2			MOD-SEV	81.0	
	3				SL		
	3	91.0					
95							Bottom of Boring at 91.0 ft. Borehole grouted to 78.0 ft. and backfilled to surface.

FIELD HARDNESS

V. Hard -- Knife can't scratch
Hard -- scratches diff.
Med. Hard -- scratches easily
Soft -- urooves
V. Soft -- carves

WEATHERING

Fresh | Mod. Severe
V. slight | Severe
Slight | V. Severe
Moderate | Complete

BEDDING/JOINT SPACING

V. thin V. Close < 2"
Thin Close 2" - 12"
Medium Mod. Close 12" - 36"
Thick Wide 36" - 120"
V. thick V. wide > 120"

RQD

> 90% Excellent
90-75 Good
75-50 Fair
50-25 Poor
< 25 V. Poor

1005

MSA FORM 4B - 1-64 R77

TEST BORING REPORT

HOLE NO. IK 70

PROJECT: CSOAP, Phase II

FILE NO. 374813

CLIENT: L-S-T

SHEET NO. 1 of 4

CONTRACTOR: Drill and Test

LOCATION: RGE lot on Lake Ave.

GROUNDWATER | DEPTH TO: (ft.)

CASING SAMPLER CORE BARREL

ELEVATION: 481.7 ft. NCD

DATE: 8-28-81 TIME: 12:30 WATER: 58.0

TYPE: Auger SIZE ID: 1 1/4 S/S: 1-3/8 NX: 2-1/8

DATE START: 28 Aug. 1981

DATE FINISH: 31 Aug. 1981

BOTTOM OF CASING | BOTTOM OF HOLE

HAMMER WT: 15 HAMMER FALL: 17

DRILLER: G. Miller

INSPECTOR: E. Hanna

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5			34	S-1	0.0	Very compact brown coarse to fine SAND, little silt, trace fine gravel, coal, cinder, concrete and tile fragments. - FILL -
			52		1.5	
			43			
10			4	S-2	5.0	Medium compact brown silty coarse to fine SAND, trace fine gravel, coal and cinders. - FILL -
			5		6.5	
			11			
15			20	S-3	10.0	Compact brown coarse to fine SAND, trace silt, trace gravel. - FILL -
			44		11.5	
			11			
20			4	S-4	15.0	Loose brown silty SAND, trace fine gravel and brick fragments. - FILL -
			5		16.5	
			7			
25			3	S-5	20.0	Loose brown silty medium to fine SAND, trace medium to fine gravel, tile, coal and cinders. - FILL -
			5		21.5	
			7			
30			7	S-6	25.0	Loose brown silty coarse to fine SAND and COAL FRAGMENTS, trace fine gravel, trace cinders. - FILL -
			8		26.5	
			2			

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-2	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>79.0 ft.</u>
4-14	LOOSE	2-4	SOFT	T — THIN WALL TUBE	RDCH _____
14-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>16</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. <u>IK 70</u>
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

TEST BORING REPORT

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
30			WOR WOR WOR	S-7	30.0 31.5	Very loose brown sandy SILT, trace coal and cinder, trace fine gravel. - FILL - * WOR is Weight of Rods.
35			4 7 6	S-8	35.0 36.5	Loose black CINDER, trace sand, trace silt.
40			6 6 6	S-9	40.0 41.5	Loose black CINDER, ASH and TILE, little coarse to fine sand, trace silt, trace glass. - FILL -
45			8 13 13	S-10	45.0 46.5	Medium compact gray ASH, COAL and CINDER, little tile fragments, trace coarse to fine sand and silt.
50			8 7 6	S-11	50.0 51.5	Loose black SILT, little coal, cinder and ash, trace medium to fine sand and tile fragments. - FILL -
55			46 21 18	S-12	55.0 56.5	Compact brown medium to fine SAND, little silt, trace wood, tile, coal, cinder and glass.
60			7 7 6	S-13	60.0 61.5	Loose black silty medium to fine SAND, trace coal, cinder, ash, wood and metal. - FILL -
65						

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: <u>79.0 ft.</u>
4-10	Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: <u>16</u>
30-50	Compact	8-15	Stiff	O _____ Open End Rod	
50+	Very Compact	15-30	Very Stiff	W _____ Wash Sample	
					HOLE NO. <u>LK 70</u>

TEST BORING REPORT

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
65			10 15 25	S-14	65.0 66.5	Medium compact gray sandy SILT, trace clay, trace tile, brick and wood fragments. - FILL -
70			6 8 44	S-15	70.0 71.5	Compact gray SILT, little fine sand, trace clay, trace tile, coal and cinder fragments.
75			59 110 100/0	S-16	75.0 76.5	Very compact brown sandy SILT, trace clay. - FILL -
80						TOP OF ROCK AT 79.0 ft.

PRELIMINARY

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: <u>79.0 ft.</u>
4-10	Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: <u>16</u>
30-50	Compact	8-15	Stiff	O _____ Open End Rod	
50+	Very Compact	15-30	Very Stiff	W _____ Wash Sample	HOLE NO. <u>IK 70</u>

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
75							(NOTE: No water return throughout boring.) Begin coring at 79.0 ft.
80	3	79.0	18/8	100/44	MOD-SEV	80.5	Medium to dark gray fine-grained dolomitic Mudstone. ROCHESTER SHALE
	3				MOD		Light to medium gray, fine to medium-grained, thin-bedded fossiliferous Limestone, interbedded with dark gray, very thin dolomitic Shale. Closely to moderately closely spaced argillaceous partings. IRONDEQUOIT LIMESTONE Severely weathered clayey Shale partings at 80.7, 80.9, 81.2, 83.4, 83.9, 84.7, 85.3 and 86.8 ft. Very thin vuggy zones at 81.0 and 83.2 ft. Severely weathered clay from 82.2 to 83.0 ft. Vertical joints from 84.3 to 84.9 ft., 85.3 to 85.5 ft., and (severely weathered and iron-stained) from 85.8 to 86.5 ft.
	3				SEV		
85	3	R-1	77/44	75/43	MOD		
	3				SEV		
	3				MOD		
	3	89.0					
	3						
	3						
90							Bottom of Boring at 89.0 ft. Borehole grouted to depth of 79.0 ft. and backfilled to surface.
95							
100							

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

HSA FORM 4, MAR 77

TEST BORING REPORT

MOLE NO. IK 72
 FILE NO. 374813
 SHEET NO. 1 of 3
 LOCATION RG&E Lot on Lake Ave.
 ELEVATION: 476.7 ft. NCD
 DATE START 2 Sept. 1981
 DATE FINISH: 3 Sept. 1981
 DRILLER: G. Miller
 INSPECTOR E. Hanna

PROJECT: CSOAP, Phase II
 CLIENT: L-S-T
 CONTRACTOR: Drill and Test

GROUNDWATER			DEPTH TO: (ft.)		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF MOLE	TYPE		NX
9-3-81	8:00	71.0	80.0	100.0	SIZE ID in 3	--	2-1/8
					HAMMER WT lb	--	--
					HAMMER FALL in	--	--

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
0					
10					
20					
30					
40					
50					
60					
70					
80	80.0		100 / 0		
90					
100					

FIELD CLASSIFICATION AND REMARKS

NOTE: No soil samples taken from this borehole.

TOP OF ROCK AT 80.0 ft.

PRELIMINARY

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>80.0 ft</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u>---</u>
10-20	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>---</u>
20-30	COMPACT	8-15	STIFF	O — OPEN END ROD	
30-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	MOLE NO. <u>IK 72</u>

HSA FORM 4

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
75							* RQD based on core recovered.
80	2	80.0			MOD-SEV		Begin coring at 80.0 ft.
	2				MOD-SEV		Light to medium gray, fine to medium-grained, thin to medium-bedded fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Trace pits and vugs. Closely to moderately closely spaced, moderately to severely weathered shaly partings.
85	2	R-1	86	72	SEV		IRONDEQUOIT LIMESTONE
	2		47	39	MOD-SEV		Moderately to severely weathered Limestone and clayey Shale from 80.0 to 87.4 ft. Severely weathered high angle joint from 88.0 to 88.4 ft. Short vertical joints at 89.0 and 89.6 ft. Low angle joints at 90.7, 91.3 and 92.2 ft. Moderately to severely weathered vertical joint from 93.4 to 94.3 ft.
	2				SEV		
	2				MOD-SEV		
90	2	90.0			MOD		
	2						
	2						
	2						
95	2		79	88	MOD-SEV		IRONDEQUOIT LIMESTONE
	2	R-2	38	42			Short vertical crack at 94.6 ft. Severely weathered, shaly, moderately dipping joint at 96.0 ft. Short, intersecting vertical and moderately dipping joints at 97.0 ft. Rough, low angle joint at 97.3 ft.
	2						
	2				MOD	97.5	
	3		12	40	SEV	>10	Dark greenish gray Shale. Trace fossils.
	2	100.0	0	0	MOD-SEV	>10	WILLIAMSON SHALE
100	3		51	121	MOD-SEV	>10	Severely weathered rough vertical joint from 97.5 to 97.8 ft. Intersecting, severely weathered vertical and high angle joints from 98.0 to 98.7 ft. Rough, high angle joint from 98.7 to 99.3 ft. Smooth, vertical crack from 100.3 to 100.7 ft. High angle joint from 101.3 to 102.2 ft.
	2		36	71*	SL	5	
	3					2	
105	2	R-3	67	102	SL	0	Dark greenish gray to grayish brown Shale. Trace fossils.
	3		66	99*	SEV	0	LOWER SODUS SHALE
	2					1	Six thin to very thin, light gray shell Limestones from 103.5 to 109.6 ft. Low angle joint at 105.9 ft. Short vertical joint at 106.3 ft. Very thin, severely weathered clayey parting at 106.5 ft. Iron-stained vertical joint in Limestone from 108.5 to 108.6 ft. Rough, moderately dipping joint from 108.9 to 109.1 ft.
110	2	109.0			SL	>10	Limestone from 108.5 to 108.6 ft. Rough, moderately dipping joint from 108.9 to 109.1 ft. Smooth low angle joints at 109.6 and 111.1 ft.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	-- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	-- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	-- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	-- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	-- carves			V. thick	V. wide	> 120"	< 25	V. Poor

TEST BORING REPORT

NOLE NO. LK 73

PROJECT: CSOAP, Phase II
CLIENT: L-S-T
CONTRACTOR: Drill and Test

FILE NO. 374813

SHEET NO. 1 of 5

LOCATION: RG&E lot on Lake Ave.

ELEVATION: 479.4 ft. NCD

GROUNDWATER DEPTH TO: (ft.)

CASING SAMPLER CORE BARREL

DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF MOLE
9-4-81	13:00	61.0	82.0	139.0

TYPE	SIZE	CASING	SAMPLER	CORE BARREL
	in	3	1-3/8	2-1/8
HAMMER WT	lb	--	140	--
HAMMER FALL	in	--	30	--

DATE START 2 Sept. 1981

DATE FINISH 4 Sept. 1981

DRILLER: J. Jensen

INSPECTOR: E. Hanna

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
---------------	---------------	-----------------------	----------------------------	---------------	--------------------

FIELD CLASSIFICATION AND REMARKS

5			4 5 8	S-1	1.0 2.5	Loose brown SILT, little coal, cinder and tile fragments, trace coarse to fine sand. - FILL -
			4 5 7	S-2	5.0 6.5	Loose black ASH, COAL and CINDER, trace silt, trace concrete, glass and tile fragments. - FILL -
			8 9 8	S-3	10.0 11.5	Loose brown ASH, COAL, CINDER and WOOD, trace silt, trace glass, tile and wood chips. - FILL -
15			4 6 3	S-4	15.0 16.5	Loose gray ASH, little brick and concrete, trace silt. - FILL -
			6 6 11	S-5	20.0 21.5	Medium compact brown sandy SILT, little coal, trace fine gravel, trace tile fragments. - FILL -
25			5 5 5	S-6	25.0 26.0	Loose brown CINDER, trace silt, trace tile and wood fragments. - FILL -
	30					

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>82.0 ft.</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u>---</u>
10-16	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>18</u>
16-30	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. <u>LK 73</u>
30-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

TEST BORING REPORT

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
30			3 3 7	S-7	30.0 31.5	Loose black ASH, COAL and CINDER, little medium to fine sand, trace silt, trace concrete and tile fragments. - FILL -
35			15 19 21	S-8	35.0 36.5	Medium compact brown SILT, little coal, cinder and ash, trace fine gravel, trace sand, trace glass and tile fragments. - FILL -
40			4 6 6	S-9	40.0 41.5	Loose gray ASH, COAL and CINDER, trace fine sand, trace silt, trace tile fragments. - FILL -
45			6 5 10	S-10	45.0 46.5	Medium compact gray ASH, COAL and CINDER, trace fine sand, trace silt, trace tile fragments. - FILL -
50			10 8 10	S-11	50.0 51.5	Medium compact black CINDER, little sand, trace silt, trace ash, wood and tile fragments. - FILL -
55			5 6 5	S-12	55.0 56.5	Loose gray ASH, COAL and CINDER, little medium to fine sand, trace tile fragments. - FILL -
60			5 6 7	S-13	60.0 61.5	Loose brown ASH, little sand, trace silt, trace tile and wood chips. - FILL -
65						

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: 82.0 ft.
4-10	Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: 18
30-50	Compact	8-15	Stiff	O _____ Open End Rod	
50+	Very Compact	15-30	Very Stiff	W _____ Wash Sample	
					HOLE NO. LK 73

TEST BORING REPORT

HOLE NO. LK 73

PAGE 3 OF 5

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
65			6	S-14	65.0	Loose black clayey SILT, little medium to fine sand, trace ash, coal and cinder, trace organics. Medium compact brown clayey SILT.
			6		66.0	
			12		66.5	
70			30	S-16	70.0	Compact brown coarse to fine sandy SILT, trace coarse gravel, trace clay.
			17		71.5	
			50			
75			25	S-17	75.0	Compact brown SILT, little weathered rock fragments, trace clay.
			45		76.5	
			36			
80			104/3	S-18	80.0 80.3	Very compact brown SILT, little clay, trace weathered rock fragments.
82.0						TOP OF ROCK AT 82.0 ft.
85						

PRELIMINARY

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: 82.0 ft.
4-10	Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: 18
30-50	Compact	8-15	Stiff	O _____ Open End Rod	
50+	Very Compact	15-30	Very Stiff	W _____ Wash Sample	
					HOLE NO. LK 73

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
80							* RQD based on core recovered. Begin coring at 82.0 ft.
	2	82.0			SL-SEV		Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Trace pits and vugs. Closely to moderately closely spaced argillaceous partings. IRONDEQUOIT LIMESTONE Severely weathered clayey partings at 82.9, 83.3, 84.0, 84.4, 84.7, 85.6, 87.1, 87.4, 88.0 and 88.3 ft. Rough, high angle joint from 82.0 to 82.4 ft. Pitted, vuggy zones from 85.0 to 85.4, 86.5 to 87.0 and 87.3 to 88.5 ft. Rough, high angle crack from 85.8 to 87.1 ft., intersecting a rough vertical joint from 86.6 to 87.1 ft. Short, rough low angle joint at 89.7 ft. Smooth high angle joint from 90.2 to 90.4 ft. IRONDEQUOIT LIMESTONE Rough, high angle crack from 92.0 to 92.3 ft. Rough, vertical crack from 93.0 to 93.3 ft. Smooth, moderately dipping joint at 94.7, intersecting rough, high angle joint from 94.7 to 95.3 ft. Parallel, rough high angle cracks from 96.8 to 97.2 and 97.5 to 97.6 ft. Rough vertical cracks from 98.0 to 98.5 and 99.5 to 99.8 ft.
	2						
85	2	R-1	80	95			
	2		74	88	SL-MOD		
	2						
	2	89.0					
90	2						
	2						
	2						
	2						
95	2	R-2	118	98	SL		
	2		106	88			
	2						
	2						
	2	99.0					
100	2					99.9	
	3				SL	>10	Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE Light gray, very thin Limestone beds at 101.1, 103.4, 105.6, 105.9 and 106.1 ft. Severely weathered moderately dipping joint at 100.9 ft. Parallel, rough low angle joints at 101.3 and 101.4 ft. Smooth, low angle joints at 101.6, 101.7, 101.8 and 102.0 ft. Very close, smooth, high angle joint set from 102.6 to 106.2 ft. Dark greenish gray to grayish brown Shale. Trace fossils. LOWER SODUS SHALE Eight light gray, thin to very thin shell Limestone beds from 106.2 to 112.7 ft. Vertical crack from 106.2 to 107.6 ft. Rough high angle joint in Limestone bed from 108.2 to 108.4 ft. Rough, high angle joint in very thin Limestone bed and Shale from 109.4 to 109.7 ft. Short vertical joint in Limestone at 111.6 ft. High angle joint in Limestone and Shale from 111.9 to 112.1 ft. Short vertical crack in very thin Limestone bed and severely weathered clayey parting at 112.7 ft.
	4				SEV	>10	
	4				MOD	2	
	3					1	
	4				SL	2	
105	3	R-3	118	98			
	4		95	79		2	
	4					2	
	4					0	
	4	109.0			SL	0	
110	4					0	
	4					0	
	4					0	
	3				SL	2	
	4	R-4	123	103			
	3		115	93*		0	
115	3					0	

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD
V. Hard	-- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	-- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	-- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	-- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	-- carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

H & A FORM 4E AR 77

TEST BORING REPORT

HOLE NO. LK 74
 FILE NO. 374813
 SHEET NO. 1 of 5
 LOCATION: RGE lot on Lake Ave.
 ELEVATION: 483.8 ft. NCD
 DATE START: 4 Sept. 1981
 DATE FINISH: 10 Sept. 1981
 DRILLER: G. Miller
 INSPECTOR: E. Hanna

477
 481

PROJECT: CSOAP, Phase II
 CLIENT: L-S-T
 CONTRACTOR: Drill and Test

GROUNDWATER		DEPTH TO: (ft.)			CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	SS	NX
9-10-81	8:00	85.0	85.0	135.0	in 3	1-3/8	2-1/8
					HAMMER WT lb	140	--
					HAMMER FALL in	30	--

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
0			1 6 16	S-1	0.0 1.5	Medium compact brown SILT, little coal and cinder, trace coarse to fine sand, trace tile, glass and organics. - FILL -
5			4 5 5	S-2	5.0 6.5	Loose brown medium to fine SAND, trace silt, trace coal, cinder, glass and tile fragments. - FILL -
10			8 8 12	S-3	10.0 11.5	Medium compact brown silty medium to fine SAND, trace fine gravel, trace coal, cinder, glass and organics. - FILL -
15			10 9 9	S-4	15.0 16.5	Medium compact brown coarse to fine SAND, little silt, trace cinder and ash. - FILL -
20			9 12 12	S-5	20.0 21.5	Medium compact brown coarse to fine SAND, little silt, little brick fragments, trace coal and cinder. - FILL -
25			8 8 8	S-6	25.0 26.5	Loose brown SILT, little coarse to fine sand, trace coarse to fine gravel, trace coal, cinder and tile. - FILL -
30						

PRELIMINARY

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>92.0 ft.</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>17</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. <u>LK 74</u>
50+	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

MSA FORM 7

TEST BORING REPORT

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
30			12 8 6	S-7	30.0 31.5	Medium compact brown SILT, trace fine sand, trace organics. - FILL -
35			15 8 21	S-8	35.0 36.5	Medium compact brown medium to fine sandy SILT, trace medium to fine gravel, trace cinder and tile. - FILL -
40			11 8 10	S-9	40.0 44.5	Medium compact black and gray WOOD and CRUSHED STONE, trace silt, trace cinder, glass and tile. - FILL -
45			4 3 4	S-10	45.0 46.5	Loose gray ASH, COAL and CINDER, little silt, trace coarse to fine sand, trace glass fragments. - FILL -
50			6 6 7	S-11	50.0 51.5	Loose gray ASH, CINDER and TILE, trace silt, trace sand. - FILL -
55			8 12 25	S-12	55.0 56.5	Medium compact brown coarse to fine SAND, little silt, little concrete fragments, trace tile and wood. - FILL -
60			9 8 7	S-13	60.0 61.5	Loose brown coarse to fine SAND, trace fine gravel, trace silt, trace coal, cinder, ash and tile. - FILL -
65						

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: <u>92.0 ft.</u>
4-10	Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: <u>17</u>
30-50	Compact	8-15	Stiff	O _____ Open End Rod	
50+	Very Compact	15-30	Very Stiff	W _____ Wash Sample	
					HOLE NO. <u>LK 74</u>

TEST BORING REPORT

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
65			6 6 7	S-14	65.0 66.5	Loose gray ASH, CINDER and TILE, trace fine sand, trace silt, trace organics. - FILL -
70			4 6 7	S-15	70.0 71.5	Loose black COAL, CINDER, ASH and TILE, little medium to fine sand, trace silt, trace wood chips. - FILL -
75			6 6 7	S-16	75.0 76.5	Loose black CINDERS, ASH, COAL and WOOD, little sand, trace silt. - FILL -
80			WOR WOR WOR	S-17	80.0 81.5	Very loose brown sandy SILT, trace fine gravel, trace weathered rock fragments. - FILL -
85	85.0		100/0			Begin coring at 85.0 ft.
90						
92.0						TOP OF ROCK AT 92.0 ft.
95						*WOR represents Weight of Rods
100						

PRELIMINARY

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: <u>92.0 ft.</u>
4-10	Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: <u>17</u>
30-50	Compact	8-15	Stiff	O _____ Open End Rod	
50+	Very Compact	15-30	Very Stiff	W _____ Wash Sample	
					HOLE NO. <u>LK 74</u>

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
80							(NOTE: Incomplete water return in run R-2. No water return below 118.0 ft.)
							Begin coring at 85.0 ft.
85	3	85.0					Boulder and till
	3						
	5						
	4						
	5						
90	4						
	5						
	4						
	5						
	4						
	5						92.0 TOP OF ROCK AT 92.0 ft.
	4		34	94	MOD-SEV		93.7 Gray, fine to medium-grained, thin-bedded fossiliferous Limestone interbedded with Shale. IRONDEQUOIT LIMESTONE
	5		14	39	MOD-SEV		93.7 7/10 Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE
95	4	95.0					Moderately to severely weathered high angle joint from 93.7 to 95.3 ft. Very thin, light gray Limestone beds at 94.8, 97.0, 98.9, 99.2 and 99.6 ft. Three non-parallel low angle joints from 96.5 to 96.8 ft. Severely weathered clayey parting at 97.0 ft. Smooth, low angle joint at 97.5 ft. Short high angle joint at 98.4 ft. Short vertical joint at 99.2 ft. Dark gray Shale from 99.0 to 99.9 ft.
	5						
	4						
	5						
	4						
	5						
	4						
	5						
	4						
	5						
100	4	R-2	115	96			Dark greenish gray to grayish brown Shale. Trace fossils. LOWER SODUS SHALE
	4		98	82	SL		
	5				MOD		
	4				SL		
	5				SL		
	4				MOD		
	5				SL		
	4				MOD		
	5				SL		
	4				MOD		
105	4	105.0					Severely weathered parting at 100.7 ft. Intersecting low angle and moderately dipping joints from 103.2 to 103.3 ft. Severely weathered clayey partings at 105.4 and 105.7 ft. Short, moderately dipping joint at 108.6 ft. LOWER SODUS SHALE
	5						
	4						
	5						
	4						
	5						
	4						
	5						
	4						
	5						
110	4		96	100			Smooth, low angle joint at 108.8 ft. Short moderately dipping joint at 109.3 ft. Intersecting severely weathered smooth high angle, moderately dipping and rough vertical joints from 109.3 to 109.9 ft. Severely weathered partings at 111.3, 111.8, 112.1 and 112.5 ft. Smooth, moderately dipping joint from 111.8 to 111.9 ft.
	5		79	82	SEV		
	4				SL-MOD		
	5				MOD		
	4				MOD-SEV		
	5				MOD-SEV		
	4				MOD-SEV		
	5				MOD-SEV		
	4				MOD-SEV		
	5				MOD-SEV		
115	4	115.0	18	75	MOD		113.0 REYNALES LIMESTONE
			17	94*			* RQD based on core recovered; some rock cored in R-3 was recovered in R-4.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Med. Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Soft	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS	
			in.	%				
115	3	115.0					<p>Light to medium gray, fine to medium-grained, crystalline, thin-bedded fossiliferous Limestone, interbedded with dark gray, very thin Shale beds. Trace pits and vugs. Closely to very closely spaced argillaceous partings, most of which are severely weathered and clayey.</p> <p>REYNALES LIMESTONE</p> <p>(NOTE: Drill rods dropped approximately 1 ft. at 120 ft.)</p> <p>Rough high angle joints from 113.1 to 113.3, 114.0 to 114.3, 114.8 to 114.9, 115.3 to 115.4, 115.9 to 116.0, 117.1 to 117.3, 117.6 to 117.7 and 118.4 to 118.8 ft. Smooth low angle joint at 120.0 ft. Smooth, vertical joint from 120.0 to 121.0 ft. Short high angle joint at 122.1 ft. Very thin, hard siliceous zones at 123.2 and 126.6 ft. Vertically cracked chert from 125.6 to 126.0 ft. Pitted parting at 126.0 ft. Pitted zone from 126.2 to 126.7 ft. Vertical crack from 128.2 to 128.8 ft.</p> <p>129.0 Red, medium-grained, oolitic, fossiliferous, hematitic Limestone</p> <p>129.2 FURNACEVILLE MEMBER REYNALES LIMESTONE</p> <p>Pitted zones with small vugs from 130.5 to 130.9 and 131.5 to 132.1 ft. Rough vertical joint from 131.8 to 132.1 ft.</p>	
120	3	R-4	102 71	85 59	MOD			
125	3	125.0						
130	3	R-5	120 114	100 95	SL- MOD			
132.3	3				SL	** 0		
135.0	3					1 -		
135								<p>Light greenish gray argillaceous Shale.</p> <p>MAPLEWOOD SHALE</p> <p>Smooth, sub-parallel high angle and moderately dipping joints from 133.4 to 133.8 ft.</p>
140								<p>** FRACTURE FREQUENCY (Fract./ft.) Bottom of Boring at 135.0 ft.</p> <p>Borehole grouted to surface.</p> <p>(NOTE: Some rock cored in run R-5 was left in borehole.)</p>
145								
150								

PRELIMINARY

HSA FORM 4B - 11-67

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	- carves			V. thick	V. wide	> 120"	< 25
							Excellent Good Fair Poor V. Poor

TEST BORING REPORT

MOLE NO. LK 77

PROJECT: CSOAP, Phase II

FILE NO. 374813

CLIENT: L.S.T.

SHEET NO. 1 of 4

CONTRACTOR: Warren George

LOCATION: Site 41 by Screen Hse

GROUNDWATER | DEPTH TO: (ft.)

CASING SAMPLER CORE BARREL

ELEVATION 444.6 NCD

DATE START 10 November 1981

DATE FINISH 12 November 1981

DRILLER A. Mason

INSPECTOR E. Hanna

DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF MOLE
11-12-81	10:00	24.0	5.0	82.5

TYPE	NW	SS	NO
SIZE ID in	3	--	1-13/16
HAMMER WT lb	--	300	--
HAMMER FALL in	--	14	--

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
5	1.5		3	S-1	0.0
			4		1.5
			2		
10			3	S-2	5.0
			6		6.5
			7		
15	15.5		130	S-3	10.0
					10.5
					15.5

FIELD CLASSIFICATION AND REMARKS

Loose black sandy SILT, little brick fragments and organics, trace cinder.
- FILL -

Loose brown clayey SILT.

Very compact gray weathered Shale.

TOP OF ROCK AT 15.5 ft.

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>15.5 ft.</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u>77.0 ft</u>
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>3</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	MOLE NO. <u>LK 77</u>
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
10							
15							Begin coring at 15.5 ft.
	4	15.5			MOD		<p>Light to dark gray, fine-grained, dolomitic Mudstone, very thinly color-banded. Trace pits, vugs and fossils. Closely to very closely spaced, moderately weathered partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds, most of which are vertically cracked.</p> <p>ROCHESTER SHALE Short, vertical joints at 18.1, 19.6 and 20.7 ft.</p> <p>Severely weathered, clayey shale partings at 19.5 and 19.8 ft. Smooth, high angle joint from 22.3 to 22.4 ft. Severely weathered, shaly parting at 25.0 ft. Very thin, vuggy zones at 26.9 and 29.5 ft. Intersecting vertical joints from 27.4 to 27.8 and 28.4 to 28.6 ft. Severely weathered, clayey partings at 28.7, 29.4 and 29.6 ft. Severely weathered, clayey Mudstone and low angle joint from 30.1 to 30.8 ft.</p> <p>ROCHESTER SHALE</p> <p>Small vugs at 32.2 and 35.2 ft. Moderately weathered, smooth, shaly low angle joint at 33.3 ft.</p>
	5	R-1	81 37	96 44	MOD		
	4						
	5				SEV		
20	4				MOD		
	5	22.5					
	4						
	4						
25	4	R-2	114 80	95 67	SL-MOD		
	4						
	4						
	4						
	4				MOD		
30	4				SEV		
	4	32.5			SL-MOD		
	4						
	3						
35	4						
	3	R-3	118 100	98 83	MOD		
	4						
40	3						
	4						
	3				SL		
	4	42.5			MOD		
	3						
	4				SL		
45	4						

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— indents	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— crumbles			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
45	3	R-4	84 71	101 85*	SL	49.4	Light to dark gray, fine-grained, dolomitic, fossiliferous Mudstone, very thinly color-banded. Trace pits and vugs. Closely to very closely spaced moderately weathered partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds, most of which are vertically cracked. ROCHESTER SHALE
	4				MOD		
	3						
	4						
50	3	52.5	35 33	94 89	MOD	49.4	Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Trace pits and vugs. Closely to moderately closely spaced argillaceous partings. IRONDEQUOIT LIMESTONE Moderately to severely weathered partings from 49.9 to 51.4 and 59.2 to 63.5 ft. Small vug at 49.5 ft. Pitted zone from 50.0 to 50.3 ft. Rough, vertical joint from 50.0 to 50.3 ft. Vertical crack from 52.1 to 52.3 ft. Very thin, pitted zones at 53.8, 54.1, 55.5 and 55.6 ft. Pitted parting at 54.9 ft. High angle crack from 58.3 to 58.8 ft. Smooth, low angle joint at 59.7 ft. High angle crack from 61.3 to 61.5 ft. IRONDEQUOIT LIMESTONE
	4						
	3						
	4						
55	3	R-5	115 87	96 73	SL	49.4	IRONDEQUOIT LIMESTONE Moderately to severely weathered partings from 49.9 to 51.4 and 59.2 to 63.5 ft. Small vug at 49.5 ft. Pitted zone from 50.0 to 50.3 ft. Rough, vertical joint from 50.0 to 50.3 ft. Vertical crack from 52.1 to 52.3 ft. Very thin, pitted zones at 53.8, 54.1, 55.5 and 55.6 ft. Pitted parting at 54.9 ft. High angle crack from 58.3 to 58.8 ft. Smooth, low angle joint at 59.7 ft. High angle crack from 61.3 to 61.5 ft.
	4						
	3						
	4						
60	3	62.5	56 38	106 68*	SL	49.4	IRONDEQUOIT LIMESTONE Rough low angle joint at 65.9 ft. * RQD based on core recovered.
	4						
	3						
	4						
65	3	R-6	63 63	94 94	SL	66.9	Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE Smooth, curved, high angle joint from 66.9 to 67.1 ft. Light gray, very thin Limestone bed with short, smooth, vertical joint at 67.8 ft. Several gray, very thin Limestone beds interbedded with black Shale, from 72.0 to 72.9 ft.
	4						
	3						
	4						
70	3	72.5	116 86	97 72	SL	72.9	Dark greenish gray to grayish brown Shale. Trace fossils. LOWER SODUS SHALE Five light gray, thin to very thin shell Limestone beds from 72.9 to 78.2 ft. Moderately dipping joint at 74.2 ft. Short, smooth, vertical joint at 74.3 ft. Rough, vertical joints in very thin shell Limestone beds at 76.0 and 78.2 ft. Severely weathered Shale from 78.5 to 78.9 ft.
	4						
	3						
	4						
75	3	R-7	116 86	97 72	MOD	72.9	FRACTURE FREQUENCY (Fract./ft.) 2 1 2 0 1 3 0 3 3 2 1 >10 4
	3						
	3						
	3						
80	3				SL		

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS		
			in.	%					
80	3	82.5			SL	86.4	0	Dark grayish-brown Shale. Trace fossils. LOWER SODUS SHALE Light gray, very thin shell Limestone bed at 79.7 ft. Grayish brown Shale from 79.4 to 84.6 ft. Dark greenish gray Shale from 84.6 to 86.4 ft. Rough low angle joint at 85.8 ft. Smooth low angle joint at 86.0 ft.	
	3				MOD				3
	3								2
	3								1
85	3	R-8	48 34	103 71*	MOD		4		
	3				SL				4
	3								4
	3								1
90	3	92.5	72 62	98 85	MOD			Light to medium gray, fine to medium-grained, crystalline, thin-bedded, fossiliferous Limestone, interbedded with dark gray, very thin Shale beds. Trace pits, vugs and stylolites. Closely to very closely spaced argillaceous partings. REYNALES LIMESTONE Severely weathered, clayey partings at 91.6 and 91.8 ft. Hard, siliceous zone with high angle crack from 91.9 to 92.1 ft.	
	3				SL				
	3								
	3				SL-MOD				
95								Bottom of Boring at 92.5 ft. Borehole grouted to depth of 24.0 ft. and backfilled to surface. *RQD based on core recovered.	
100									

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	— knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	— carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

H&A FORM 4B-4

TEST BORING REPORT

HOLE NO. LK 78

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Warren George

FILE NO. 374813
SHEET NO. 1 of 3
LOCATION: Site 41 on River Bank
ELEVATION: 399.0 MGD
DATE START: 11 Nov. 1981
DATE FINISH: 12 Nov. 1981
DRILLER: E. Fritsch
INSPECTOR: E. Hanna

GROUNDWATER			DEPTH TO: (ft.)		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	SS	NQ
1-12-81	12:00	2.0	--	58	---	---	1-13/16
					SIZE ID		
					HAMMER WT	140	
					HAMMER FALL	30	

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5	5.0		4	S-1	0.0	Loose black sandy SILT, little organics, trace medium gravel. - FILL -
			5		1.5	
10	5.0			S-2	5.0	(Roller bit refusal - used core barrel.) Brown sandy SILT, some boulders, rock and coarse gravel, little brick fragments. - FILL -
					10.0	
15	15.5					TOP OF ROCK AT 15.5 ft.

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPoon	OVERBURDEN 15.5 ft.
4-16	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK 58.0 ft.
16-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 2
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	HOLE NO. LK 78

H & A 11/81

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
10							(NOTE: The boring was drilled at a slight angle to vertical. The shale bedding in the Lower Sodus and Maplewood Shales indicates that this angle was approximately 5° to 7°.) (NOTE: No water return throughout boring. Core barrel blocked in R-2.)
15							Begin coring at 15.5 ft.
	3	15.5			MOD SEV	8	Greenish gray to grayish brown SHALE. Trace fossils.
	2				MOD SEV	>10	LOWER SODUS SHALE
	3				MOD SEV	>10	Light gray, thin to very thin shell Limestone beds at 16.0, 16.7 and 17.6 ft. Rough, vertical joint from 15.6 to 15.8 ft.
	1	R-1	54/16	60/18	MOD	>10	Small vugs in thin Limestone at 16.2 ft. Severely weathered, rough, high angle joint from 16.3 to 16.7 ft. Severely weathered, vertical joints from 17.7 to 18.5 and 19.4 to 27.7 ft.
	3				SEV	>10	
	2					>10	
	1	23.0				>10	LOWER SODUS SHALE
	3					>10	
	1					>10	
	2	R-2	0/0	0/0	SEV	>10	Five low angle joints, evenly spaced, from 27.8 to 28.8 ft. Severely weathered, clayey Shale from 28.8 to 29.0 ft.
	3					>10	
	3	28.0				>10	
	4		16/0	133/0	MOD SEV	>10	
	3					>10	
	4				MOD SEV		Light to medium gray, fine to medium-grained, crystalline, thin-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin Shale beds. Trace pits, vugs and stylolites. Closely to very closely spaced argillaceous partings. REYNALES LIMESTONE
	3						Several severely weathered, very thin beds of alternating Limestone and Shale with several low angle, high angle and moderately dipping joints from 29.0 to 32.4 ft. Secondary gypsum seam in stylolitic parting at 34.2 ft. Severely weathered, clayey parting at 34.8 ft. Vuggy, high angle crack from 35.1 to 35.2 ft. Severely weathered, shaly parting at 35.3 ft. REYNALES LIMESTONE
	4	R-3	94/63	87/58	SL-MOD		Secondary gypsum seams in partings, some severely weathered, from 36.4 to 41.5 ft. Vertical cracks from 39.8 to 40.1, 40.8 to 41.2, 42.0 to 43.3, and 44.4 to 45.1 ft. Very thin, hard, siliceous zones at 35.0 and 44.8 ft. Chert from 39.3 to 39.5, 41.6 to 41.8 and 42.0 to 42.2 ft.
	3						
	4				SL		
	4						
	4	38.0					
	4						
	3						
	4						
	3	R-4	118/96	98/80	SL		
	4						
45	3						

FRACTURE FREQUENCY (Fract./ft.)

HSA FORM 48 - MAR 77

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS			
			in.	%						
45	4	R-4 48.0	9 5	101 56*	SL	45.4	REYNALES LIMESTONE FURNACEVILLE MEMBER - Red, medium-grained, colitic, fossiliferous, hematitic Limestone. Rough, vertical cracks from 44.6 to 45.1 and 46.8 to 47.0 ft. Severely weathered clayey partings at 44.3, 47.2, 47.3, 47.8 and 48.0 ft. Heavily pitted zone from 48.1 to 48.4 ft.			
	3								45.7	
	4									
	3									
50	3	R-5 58.0	112 88	100 79	MOD	48.7	Light greenish-gray, argillaceous Shale. MAPLEWOOD SHALE Short, vertical joint at 49.9 ft. Iron-stained, smooth partings at 50.4 and 51.0 ft. Clayey, smooth partings at 53.3 and 53.6 ft. Short, smooth, moderately dipping joint at 52.2 ft.			
	3									
	3									
	3									
	3									
	3									
55	4				SL		MAPLEWOOD SHALE			
	3									
	4									
	4									

Bottom of Boring at 58.0 ft.

Borehole grouted to depth of 13.0 ft. and backfilled to surface.

* RQD based on core recovered.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	— White can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	— scratches diff	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	— indoves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	— carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

H&A FORM 4B - MAR 77

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. LK 79

PROJECT: CSOAP, Phase II

FILE NO. 374813

CLIENT: L.S.T.

SHEET NO. 1 of 3

CONTRACTOR: Warren George

LOCATION: Site 41 at River Edge

GROUNDWATER | DEPTH TO: (ft.)

CASING SAMPLER CORE BARREL

ELEVATION 392.4

DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE
11-14-81	12:00	0.0	9.0	52.0

TYPE	NW	SS	NQ
SIZE ID <u>in</u>	<u>3</u>	<u>1-3/8</u>	<u>1-13/16</u>
HAMMER WT <u>lb</u>	<u>---</u>	<u>140</u>	<u>---</u>
HAMMER FALL <u>ft</u>	<u>---</u>	<u>30</u>	<u>---</u>

DATE START 12 November 1981

DATE FINISH 13 November 1981

DRILLER: E. Fritsch

INSPECTOR: E. Hanna

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 4 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
			<u>3</u>		<u>0.0</u>
			<u>2</u>	<u>S-1</u>	<u>1.5</u>
			<u>2</u>		

FIELD CLASSIFICATION AND REMARKS

Very loose black sandy SILT, little organics, little fine to medium gravel.

- FILL -

(NOTE: Boulders and cobbles; unable to sample with split spoon; used core barrel.)

Brown sandy SILT, some boulders, cobbles and gravel. Trace brick fragments.

- FILL -

TOP OF ROCK AT 11.0 ft.

BLOWS FT.	DENSITY
0-4	VERY LOOSE
4-10	LOOSE
10-30	MEDIUM COMPACT
30-50	COMPACT
50+	VERY COMPACT

BLOWS FT.	CONSISTENCY
0-2	VERY SOFT
2-4	SOFT
4-8	MEDIUM STIFF
8-15	STIFF
15-30	VERY STIFF

SAMPLE IDENTIFICATION
S — SPLIT SPOON
T — THIN WALL TUBE
U — UNDISTURBED PISTON
O — OPEN END ROD
W — WASH SAMPLE

SUMMARY
OVERBURDEN <u>11.0</u>
ROCK <u>41.0</u>
SAMPLES <u>2</u>
HOLE NO. <u>LK 79</u>

H.B.A. 11/14/81

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
5							
10							Begin coring at 11.0 ft.
	4	11.0			MOD-SEV	11.9 >10	Dark greenish gray Shale. WILLIAMSON SHALE
	5				MOD	3	Dark greenish gray to grayish brown Shale.
	4				MOD-SEV	10	Trace fossils. LOWER SODUS SHALE
15	5					3	Light gray, very thin, moderately weathered, shell Limestones, with vertical cracks at 11.9, 14.0 (with small vug), 16.8, 17.1, 18.3 and 21.1 ft. Small vug in Shale at 13.2 ft.
	4	R-1	113	90	MOD	6	Twenty closely to very closely spaced, smooth, low angle joints from 19.2 to 26.6 ft.
	5		33	26	MOD-SEV	>10	Intersecting, rough, high angle and smooth, moderately dipping joints from 14.5 to 14.9 ft.
	4					6	LOWER SODUS SHALE
20	5	21.5			MOD	3	Rough, severely weathered, high angle joint from 17.6 to 18.0 ft. Grayish brown Shale from 18.0 to 24.8 ft. Rough, moderately dipping joint from 20.7 to 20.8 ft. Rough, moderately dipping joint from 21.2 to 21.3 ft. Rough, vertical joint from 22.7 to 23.5 ft. Moderately weathered, smooth, high angle joint from 24.2 to 24.5 ft. Low angle, slickensided shear at 42.5 ft. Short, high angle joints at 24.6 and 25.0 ft.
	4				MOD-SEV	>10	
	4		50	80	MOD	>10	
25	4	R-2	15	24	MOD	>10	
	4				SL-SEV	5	
	4		65	102	SL	4	Light to medium gray, fine to medium-grained, crystalline, thin-bedded, fossiliferous Limestone interbedded with dark gray, thin to very thin Shale beds. Trace pits, vugs and stylolites. Closely to very closely spaced argillaceous partings, many of which have secondary gypsum seams. REYNALES LIMESTONE
30	4	32.0	44	68*	SL		
	4				SEV		* RQD based on core recovered.
	4				SL		Rough, high angle joint lined with drusy dolomite crystals from 26.7 to 27.2 ft. Iron-stained, low angle joint at 27.2 ft. Severely weathered, shaly partings at 26.8, 27.2, 27.5, 27.8, 28.5 and 28.7 ft.
35	4	R-3	118	98	MOD		Smooth, moderately weathered, low angle joint at 31.3 ft. Severely weathered Shale from 32.0 to 32.5 ft.
	4		105	88	SL		Rough, curved, high angle crack, in hard, siliceous zone, from 35.2 to 35.8 ft. Severely weathered shaly partings at 36.1, 37.1 and 40.4 ft. (vuggy).
40	4						

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	— carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

H&A FORM 4B

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
40	4	R-4	42.0	46/39	106/85*	SL	Light to medium gray, fine to medium-grained, crystalline, fossiliferous Limestone interbedded with dark gray Shale. Trace pits, vugs and stylolites. 42.2 Red, medium-grained, oolitic, fossiliferous, 42.7 FURNACEVILLE HEMATITE hematitic Limestone. REYNALES LIMESTONE Rough, vertical cracks from 38.8 to 38.9, 39.7 to 40.4 ft., 40.7 to 41.2 and 44.1 to 44.2 ft. Hard, pitted, siliceous zone from 39.8 to 40.1 ft. Severely weathered, high angle joint in Shale from 44.3 to 44.5 ft.
4							
4							
4							
45	4						
4							
4							
4							
4							
4							
50	4	R-4	52.0	67/64	87/83	SL	Light greenish gray, argillaceous Shale. MAPLEWOOD SHALE Smooth, low angle joint at 45.7 ft., truncated by a rough, high angle joint from 45.6 to 45.8 ft. Smooth, vertical joints from 47.7 to 48.0 and 49.8 to 49.9 ft. Severely weathered partings at 47.9 and 49.8 ft. Smooth, low angle joints at 48.1, 49.0 and 51.0 ft.
4							
4							
4							
4							
4							
4							
4							
4							
4							

Bottom of boring at 52.0 ft.

Borehole grouted to depth of 11.0 ft. and backfilled to surface.

*RQD based on core recovered.

** FRACTURE FREQUENCY (Fract./ft.)

45.6
1
0
1
1
2
0
1

H&A FORM 4B - MAR 77

FIELD HARDNESS

WEATHERING

BEDDING/JOINT SPACING

RQD

V. Hard	— Knife can't scratch
Hard	— scratches diff.
Med. Hard	— scratches easily
Soft	— grooves
V. Soft	— carves

Fresh	Mod. Severe
V. slight	Severe
Slight	V. Severe
Moderate	Complete

V. thin	V. Close	< 2"	> 90%
Thin	Close	2" - 12"	90-75
Medium	Mod. Close	12" - 36"	75-50
Thick	Wide	36" - 120"	50-25
V. thick	V. wide	> 120"	< 25

Excellent
Good
Fair
Poor
V. Poor

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. LK 80

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR Warren George

FILE NO. 374813
SHEET NO. 1 of 4
LOCATION: Site 41-River Bank
ELEVATION 425.7 NCD
DATE START 17 November 1981
DATE FINISH 19 November 1981
DRILLER E. Fritsch
INSPECTOR E. Hanna

GROUNDWATER			DEPTH TO: (ft.)		CASING			SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	NW	SS	NO	
11-19-81	9:00	35.0	40.0	77	SIZE 1 D	3	7-3/8	1-13/16	
					HAMMER WT	16	140		
					HAMMER FALL	in	30		

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5			3	S-1	0.0	Medium compact, brown, sandy SILT, trace gravel and organics. - FILL -
			12		1.5	
			15			
10			3	S-2	5.0	Medium compact, brown, coarse to fine, silty SAND, little brick fragments, trace coarse gravel and cinder. - FILL -
			6		7.0	
			15			
15			17	S-3	10.0	Very compact, brown, coarse to fine SAND, little silt, trace brick, coal, cinder and ash. - FILL -
			18		11.1	
			18 1/1			
20			6	S-4	15.0	Medium compact, black COAL and CINDERS, little fine sand, trace silt and brick fragments. - FILL -
			9		17.0	
			12			
25			9	S-5	20.0	Medium compact, black COAL and CINDERS, little ash, trace sand and silt.
			7		22.0	
			14			
30			34	S-6	25.0	No recovery. - FILL -
			27		27.0	
			97			
			80			

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-2	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>41.0 ft.</u>
2-4	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u>36.0 ft.</u>
4-10	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>8</u>
10-30	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. <u>LK 80</u>
30-50	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

TEST BORING REPORT

HOLE NO. LK 80

PAGE 2 OF 4

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
30			9 7 13 17	S-7	30.0 32.0	Medium compact, black COAL, CINDERS, ASH, BRICK and TILE.
						- FILL -
35			17 24 37 40	S-8	35.0 37.0	Compact, gray, fine SAND, little silt and clay, trace brick, coal, cinders and tile
37.5						Clayey SILT. - TOPSOIL -
40						TOP OF ROCK 41.0 ft.
41.0						
45						
50						

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN: 41.0 ft.
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK: 36.0 ft.
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES: 8
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. LK 80
50+	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
35							(NOTE: The drill rig slipped on skids during R-1 and R-3. The angle of the shale bedding to the core indicates that the core was drilled approximately 7° to 12° from vertical.)
40							
	5	41.0				>10	Dark greenish gray Shale. Trace fossils.
	4				MOD-SEV	>10	WILLIAMSON SHALE
	5					>10	Light gray, very thin Limestone bed with iron-stained, vertical joint at 41.3 ft. Smooth, low angle joints at 41.5, 41.6 and 45.2 ft.
45	4	R-1	56/15	72/19		9	Smooth, moderately dipping joint at 41.8 ft.
	5				MOD	3	Moderately weathered, rough, high angle joints from 41.9 to 42.2 and 43.4 to 43.7 ft. Short, smooth, high angle joint at 44.9 ft. Rough, curved, moderately dipping joint at 45.6 ft.
	4				MOD-SEV	9	Severely weathered, vertical joint from 46.0 to 47.5 ft.
	5	47.5				>10	47.5
	4				MOD-SEV	10	
	4				MOD-SEV	4	Dark greenish gray to grayish brown Shale. Trace fossils.
50	4					2	LOWER SODUS SHALE
	4				MOD	0	Six light gray, very thin shell Limestone beds from 47.5 to 53.9 ft. Rough, vertical joints in Limestone beds at 47.5, 48.5, 48.9, 49.9 and 53.9 ft. Smooth, low angle joints at 54.2, 54.3, 56.3, 59.7, 60.1, two intersecting at 60.5, and at 60.9 ft.
	4	R-2	102/43	85/36		6	Grayish brown Shale from 54.2 to 59.4 ft.
	4					>10	
55	4				MOD-SEV	6	LOWER SODUS SHALE
	4					5	(NOTE: Lifter broke off core barrel.)
	4					4	Moderately weathered, rough, vertical joint in very thin Limestone bed at 60.7 ft.
	4					4	(Some rock cored in R-2 was recovered in R-3.)
	4	57.5				4	61.4
	4				MOD-SEV	1	
	4					5	Light to medium gray, fine to medium-grained, crystalline, thin-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin Shale beds. Trace pits, vugs and stylolites. Closely to very closely spaced, argillaceous partings, some of which have secondary gypsum seams.
60	4	R-3	46/28	98/60		6	REYNALES LIMESTONE
	4					6	Moderately weathered, smooth vug, 0.1 ft. wide, in shaly parting at 61.5 ft. Closely to very closely spaced, severely weathered, shaly partings from 61.6 to 63.8 ft.
	4					1	
	4				MOD-SEV		
65	4		64/43	95/64			
	4						
	4	67.0			SL		
	4						
70	4						

Begin coring at 41.0 ft.

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS

WEATHERING

BEDDING/JOINT SPACING

RQD

V. Hard	- Knife can't scratch
Hard	- scratches diff.
Med. Hard	- scratches easily
Soft	- grooves
V. Soft	- carves

Fresh	Mod. Severe
V. slight	Severe
Slight	V. Severe
Moderate	Complete

V. thin	V. Close	< 2"	> 90%
Thin	Close	2" - 12"	90-75
Medium	Mod. Close	12" - 36"	75-50
Thick	Wide	36" - 120"	50-25
V. thick	V. wide	> 120"	< 25

Excellent
Good
Fair
Poor
V. Poor

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		TEST BORING REPORT			HOLE NO. <u>LK 81</u>				
PROJECT: <u>CSOAP, Phase II</u>					FILE NO. <u>374813</u>				
CLIENT: <u>L.S.T.</u>					SHEET NO. <u>1 of 3</u>				
CONTRACTOR: <u>Warren George</u>					LOCATION: <u>Site 41 - River bank</u>				
GROUNDWATER		DEPTH TO: (ft.)			CASING	SAMPLER	CORE BARREL		
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	NW	SS	NX	
11-20-81	3:00	44.0	54.0	76.0	SIZE ID	1n	3	1-3/8	2-1/8
					HAMMER WT	16	---	300	---
					HAMMER FALL IN	---	---	14	---
					ELEVATION: <u>432.6 NCD</u>				
					DATE START <u>17 November 1981</u>				
					DATE FINISH <u>19 November 1981</u>				
					DRILLER: <u>A. Mason</u>				
					INSPECTOR: <u>E. Hanna</u>				

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5			2 19 17	S-1	0.0 1.5	Medium compact, brown, sandy SILT, trace clay, gravel, organics, cinders. - FILL -
			27 27 25	S-2	5.0 6.5	Medium compact, brown, fine SAND, little brick fragments, trace silt, gravel and cinder. - FILL -
			14 22 56	S-3	10.0 11.5	Very compact, brown, SILT, little coarse to fine sand, trace brick. - FILL -
15			9 13 29	S-4	15.0 16.5	Medium compact, brown, SILT, trace fragmented stone. - FILL -
			7 8 15	S-5	20.0 21.5	Medium compact, brown, fine SAND, trace silt and organics. - FILL -
			100.0	S-6	25.0	No recovery

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>54.0 ft.</u>
4-10	LOOSE	2-4	SOFT	T — TWIN WALL TUBE	ROCK <u>22.0 ft.</u>
10-16	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>12</u>
16-20	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. <u>LK 81</u>
20-30	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

H&A 11/20/81

TEST BORING REPORT

HOLE NO. LK 81

PAGE 2 OF 3

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
30			24	S-7	30.0	Very compact, brown, silty coarse to fine SAND, trace fine to coarse gravel.
			36		31.5	
			62			
35			6	S-8	35.0	Loose, brown, fine SAND.
			7		36.5	
			7			
40			3	S-9	40.0	Loose, brown, fine SAND.
			5		41.5	
			6			
45			5	S-10	45.0	Loose, brown, silty SAND, trace cinder.
			6		46.5	
			6			
50			9	S-11	50.0	Medium compact, gray SAND, some silt and clay, trace brick.
			16		51.5	
			13			
52.5			102	S-12	52.5	Very compact, weathered SHALE. TOP OF ROCK AT 54.0 FT.
54.0					53.0	
55						

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: 54.0 ft.
4-10	Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: 22.0 ft.
10-30	Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: 12
30-50	Compact	8-15	Stiff	O _____ Open End Rod	
50+	Very Compact	15-30	Very Stiff	W _____ Wash Sample	
					HOLE NO. LK 81

FORM SEP. 78

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
50							(NOTE: Core barrel blocked at 67.5 ft.; water return lost at 69.0 ft.) Begin coring at 54.0 ft.
55	5	54.0			MOD-SEV	57.2	>10 Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE
	6	R-1	32	84			>10 Very thinly interbedded light gray Limestone and black Shale from 56.0 to 57.2 ft. Two intersecting, smooth, high angle and one vertical joint from 56.0 to 57.2 ft.
	5				>10		
	6		17	77	8 MOD		
	5	59.0	4	18	MOD-SEV	>10 Dark greenish gray to grayish brown Shale. Trace fossils. LOWER SODUS SHALE	
60	6	R-2			MOD-SEV	>10	Six light gray, thin to very thin shell Limestone beds from 57.2 to 62.6 ft. Severely weathered, clayey partings at 58.3 and 59.7 ft. Closely to very closely spaced, smooth partings from 57.3 to 62.6 ft. Rough, vertical joints in very thin Limestone beds at 58.6, 60.0, 62.3 and 62.6 ft. Severely weathered, rough, vertical joints from 62.7 to 62.9 and 63.1 to 63.6 ft. Grayish brown Shale from 62.9 to 70.3 ft. Thinly to very thinly interbedded, moderately weathered Shale and severely weathered clay beds from 63.6 to 72.0 ft. LOWER SODUS SHALE
	5				MOD	>10	
	6		60	100		5	
	5			0	0		>10
65	6	64.0				>10	
	7	R-3	42	100	MOD-SEV	>10	
	8			0	0		>10
70	7	R-4	54	100	MOD-SEV	72.0	
	8			4	7		>10
	7	72.0				>10	Smooth, low angle joint at 70.4 ft. Severely weathered, rough, high angle joints from 70.9 to 71.2 and 71.5 to 72.0 ft. Intersecting, smooth, low angle joints at 71.6 ft.
	8	R-5	48	100	MOD-SEV		
7			26	54	SL-MOD		
75	7	76.0					Light to medium gray, fine to medium-grained, crystalline, thin-bedded, fossiliferous Limestone. Trace pits, vugs and stylolites. Closely to very closely spaced argillaceous partings. REYNALES LIMESTONE
	7						Very thinly interbedded Limestone and dark gray Shale from 72.0 to 73.8 ft.
80							Bottom of Boring at 76.0 ft.
							Borehole grouted to depth of 48.0 ft. and backfilled to surface.
85							

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

H & A FORM 48 - MAR 77

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. **LK 82**

PROJECT: **CSOAP, Phase II**

FILE NO. **374813**

CLIENT: **L.S.T.**

SHEET NO. **1 of 3**

CONTRACTOR: **Warren George**

LOCATION: **Site 41-River bank**

ELEVATION: **-395.6 NAD**

GROUNDWATER | DEPTH TO: (ft.)

CASING SAMPLER CORE BARREL

DATE START **20 November 1981**

DATE FINISH **23 November 1981**

DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	NW	SS	NQ
11-23-81	11:00	5.0	15.0	50.0	SIZE 10 in	3	1-3/8	1-13/16
					HAMMER WT lb	--	300	--
					HAMMER FALL in	--	14	--

DRILLER **A. Mason**

INSPECTOR **E. Hanna**

SCALE IN FEET	STRATA CHANGE (ft.)	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
			1		0.0	Very loose, brown, sandy SILT, little organics, trace cinder.
			3	S-1	1.5	
			2			
5					5.0	No recovery.
			100/2	S-2	5.2	
10						NOTE: Overburden consists of boulders, cobbles, gravel, brick fragments, coal, cinders and some sandy silt. No recovery.
			100/0			
15						No recovery. Begin coring at 15.0 ft.
			100/0			
20	19.8					TOP OF ROCK AT 19.8 ft.

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>19.8 ft.</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u>30.2 ft.</u>
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>2</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. <u>LK 82</u>
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

H & A 10/81/4

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
10							
15	8	15.0					Begin coring at 15.0 ft.
	7						
	8		6	10			
	7	R-1	--	--			
20	8					19.8	
	7		36	94	MOD-SEV		Dark greenish gray to grayish brown Shale. Trace fossils.
	8		11	29			LOWER SODUS SHALE
	7	23.0					Four thin to very thin, light gray, shell Limestone beds from 19.8 to 23.6 ft., most of which have rough, high angle to vertical joints. Severely weathered, clayey Shale from 20.7 to 20.9 and 21.1 to 21.3 ft. Severely weathered, rough, vertical joints from 21.8 to 22.3 and 22.7 to 22.9 ft. Short, high angle joint at 23.6 ft. Grayish brown Shale from 21.1 to 28.5 ft.
	6						LOWER SODUS SHALE
25	7						Smooth, low angle joints at 22.3, 23.1, 23.6, (smooth and parallel at 27.8 and 28.4), and 29.2 ft. Short, smooth high angle joint at 29.2 ft.
	6						
	7		86	102	MOD		
	6	R-2	53	62*			
	7						
30	6					30.0	
	7		8	33	MOD		Light to medium gray, fine to medium-grained, crystalline, thin-bedded, fossiliferous Limestone, interbedded with dark gray, very thin Shale beds. Trace pits, vugs and stylolites. Closely to very closely spaced, argillaceous partings, some of which have secondary gypsum seams.
	6	32.0	0	0			REYNALES LIMESTONE
	7						Severely weathered, rough, vertical joint from 30.5 to 31.5 ft. Clayey and moderately to severely weathered partings from 30.1 to 48.3 ft.
	6						Light reddish brown, fossiliferous zone from 34.3 to 34.5 ft. Very thin, hard, siliceous zones at 35.9, 38.1, 41.3 and from 42.2 to 42.4 ft.
35	7						
	6						
	7		96	89	SL-MOD		
	6	R-3	38	35			
	7						
40	6				SL		
	7	41.0					REYNALES LIMESTONE
	6						Rough, vertical cracks in hard, siliceous zones at 36.0 and 41.3 ft.
	7				MOD		Vertically cracked chert from 38.6 to 38.9 ft.
45	7				SL		*RQD based on core recovered.

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS		WEATHERING		BEDDING/Joint SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches drill	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
45	7	R-4 50.0	$\frac{87}{64}$	$\frac{81}{59}$	SL- MOD	45.5 REYNALES LIMESTONE 46.1 FURNACEVILLE MEMBER Red, medium-grained, oolitic, fossiliferous, hematitic Limestone. Light to medium gray, fine-grained, thin-bedded, fossiliferous Limestone. Closely to very closely spaced, argillaceous partings, some of which have secondary gypsum seams. REYNALES LIMESTONE Clayey and severely weathered partings from 45.5 to 48.3 ft.	
	7						
	7						
	7						
	7						
50	7					Bottom of Boring at 50.0 ft. Borehole grouted to depth of 5.0 ft. and backfilled to surface.	

FIELD HARDNESS

WEATHERING

BEDDING/JOINT SPACING

RQD

V. Hard	- Knife can't scratch
Hard	- scratches diff
Med. Hard	- scratches easily
Soft	- grooves
V. Soft	- carves

Fresh	Mod. Severe
V. slight	Severe
Slight	V. Severe
Moderate	Complete

V. thin	V. Close	< 2"
Thin	Close	2" - 12"
Medium	Mod. Close	12" - 36"
Thick	Wide	36" - 120"
V. thick	V. wide	> 120"

> 90%
90-75
75-50
50-25
< 25

Excellent
Good
Fair
Poor
V. Poor

77
M&A FORM 4B

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		TEST BORING REPORT			MOLE NO. <u>LK 83</u>	
PROJECT: <u>CSOAP, Phase II</u>					FILE NO. <u>374813</u>	
CLIENT: <u>L.S.T.</u>					SHEET NO. <u>1 of 4</u>	
CONTRACTOR: <u>Warren George</u>					LOCATION: <u>Site 41 - River bank</u>	
GROUNDWATER		DEPTH TO: (ft.)			ELEVATION: <u>420.6 NLD</u>	
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	DATE START
11-23-81	3:00	34.0	35.5	73.0	NW	20 November 1981
					SS	DATE FINISH
					NO	23 November 1981
					SIZE ID	DRILLER
					in 3	E. Fritsch
					HAMMER WT	INSPECTOR
					lb ---	E. Hanna
					HAMMER FALL	
					in ---	

SCALE IN FEET	STRATA CHANGE (ft.)	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5			5	S-1	0.0	Medium compact, brown, sandy SILT, little organics, trace brick fragments, cinder. - FILL -
			10		2.0	
			13			
			7			
10			115/0	S-2	5.0	No recovery. - FILL -
					5.0	
15			6	S-3	10.0	Medium compact, black ASH, BRICK, CINDER, COAL and TILE, trace fine sand and silt. - FILL -
			4		12.0	
			21			
			4			
20			12	S-4	15.0	Medium compact, black ASH, BRICK, CINDER, COAL and TILE, trace fine sand and silt. - FILL -
			15		17.0	
			17			
			15			
25			9	S-5	20.0	Medium compact, brown, sandy SILT, trace brick, cinder and ash, trace coarse gravel.
			14		22.0	
			12			
			17			
28.0			10	S-6	25.0	Medium compact, brown, silty SAND. PRELIMINARY
			17		27.0	
			30			
			23			
30						

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>35.5 ft.</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u>37.5 ft.</u>
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>7</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	MOLE NO. <u>LK 83</u>
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

TEST BORING REPORT

HOLE NO. LK 83

PAGE 2 OF 4

SCALE IN FEET	STRATA CHANGE (ft.)	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
30			11 16 26 34	S-7	30.0 32.0	Compact, brown SILT, little clay and weathered shale.
35	35.5					
40						
45						
50						

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN: <u>35.5 ft.</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK: <u>37.5 ft.</u>
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES: <u>7</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. <u>LK 83</u>
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
30							<p style="text-align: center; font-size: 2em; opacity: 0.5;">PRELIMINARY</p> <p>Begin coring at 35.5 ft.</p> <p>Light to medium gray, fine to medium-grained, fossiliferous Limestone. Closely to very closely spaced, severely weathered, shaly partings.</p> <p>IRONDEQUOIT LIMESTONE</p> <p>Dark greenish gray Shale. Trace fossils.</p> <p>WILLIAMSON SHALE</p> <p>Yellowish green, iron-stained, severely weathered clay bed from 37.7 to 37.9 ft. Intersecting, rough, vertical joints and smooth, low angle joints from 38.2 to 38.4 ft. Severely weathered, clayey Shale from 39.6 to 41.9 ft.</p> <p>Light gray, very thin Limestone beds interbedded with black Shale from 43.2 to 43.5 ft.</p> <p>Dark greenish gray to grayish brown Shale. Trace fossils.</p> <p>LOWER SODUS SHALE</p> <p>Five light gray, thin to very thin shell Limestone beds from 43.5 to 49.6 ft. Severely weathered, clayey partings at 44.7, 45.0, 45.4, 46.4, 48.7, 49.6, 51.2, 53.4, 55.6 and 56.1 ft. Vuggy zone in Limestone bed from 44.9 to 45.0 ft. Severely weathered, rough, high angle joints from 46.8 to 47.3 ft. Smooth, curved, low angle joint at 47.8 ft. Rough, vertical joint from 50.7 to 50.9 ft. Moderately weathered, smooth, vertical joint from 51.8 to 52.4 ft. Severely weathered, clayey, smooth, low angle joints at 54.3 and 56.1 ft. Smooth, low angle joint at 56.6 ft. Very thin, severely weathered, clay bed at 56.7 ft.</p> <p>*RQD based on core recovered.</p> <p>(NOTE: Water return lost in R-3; at approximately 60 ft.)</p> <p>Light to medium gray, fine to medium-grained, crystalline, thin-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin Shale beds. Trace pits, vugs, and stylolites. Closely to very closely spaced, argillaceous partings, some with secondary gypsum seams.</p> <p>REYNALES LIMESTONE</p> <p>Vug, 0.2 ft. wide, lined with drusy calcite, at 57.3 ft. Severely weathered, clayey Shale from 57.8 to 58.1 ft. Curved, vertical joint from 58.3 to 58.4 ft. Severely weathered, clayey Shale parting at 59.0 ft.</p>
35							
	7	35.5	19/0	79/0	MOD-SEV	37.5	
	6				SEV		
	7	R-1			MOD-SEV		
	6		30/0	56/0	SEV		
40	5				SEV		
	6	42.0					
	5		18/2	100/11	MOD	43.5	
	6				SL-MOD		
45	5						
	6						
	5						
	5	R-2	100/80	98/78	MOD		
	5						
50	5				SL-MOD		
	5	52.0					
	5						
	5		65/19	104/29*	MOD		
55	5						
	6	R-3				57.2	
	5				MOD		
	5				SEV		
	5		54/47	94/82	MOD		
60	4						
	5	62.0					
	4						
	5				SL		
65	4						

FRACTURE FREQUENCY (Fract./ft.)

>10
>10
>10
>10
10
2
1
2
4
4
4
1
3
0
4
6
5
4
6
2

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Med. Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Soft	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
65	5	R-4	120 105	91 80	SL	Light to medium gray, fine to medium-grained, crystalline, thin-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin Shale beds. Trace pits, vugs and stylolites. Closely to very closely spaced argillaceous partings. REYNALES LIMESTONE. Vertical crack from 59.1 to 59.5 ft. Rough, moderately dipping joints at 61.6 and 63.0 ft. (NOTE: Core barrel blocked at 66 ft.) Vertical joint from 63.7 to 64.4 ft. Severely weathered, shaly partings at 65.8, 66.4, and 69.0 ft. Smooth, vertical joint from 66.5 to 66.9 ft. Hard, very thin, siliceous zones at 63.0, 64.4, 67.7, 68.8 and 70.1 ft.	
	4						
	5						
	4						
70	5	73.0				Vertical joint from 63.7 to 64.4 ft. Severely weathered, shaly partings at 65.8, 66.4, and 69.0 ft. Smooth, vertical joint from 66.5 to 66.9 ft. Hard, very thin, siliceous zones at 63.0, 64.4, 67.7, 68.8 and 70.1 ft.	
	5						
	5						
75						Bottom of Boring at 73.0 ft. Borehole grouted to depth of 35.0 ft., and backfilled to surface.	

PRELIMINARY

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

TEST BORING REPORT

HOLE NO. LY 3
 FILE NO. 374813
 SHEET NO. I of 6
 LOCATION: Lyell & Whitney
 ELEVATION: 517.3 ft. NOD
 DATE START: 20 Feb. 1981
 DATE FINISH: 24 Feb. 1981
 DRILLER: K. Reid
 INSPECTOR: E. Hanna

PROJECT: CSOAP Phase II
 CLIENT: L.S.T.
 CONTRACTOR: Warren George

GROUNDWATER		DEPTH TO:		CASING	SAMPLER	CORE BARREL	
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	SS	NO
24 Feb.	1400	15 ft.	—	176	SIZE ID in. 3	2	1 13/16
					HAMMER WT lb. 140		
					HAMMER FALL in. 30		

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
4.5			3	S1	0.0	Medium compact brown coarse-fine SAND, little coarse gravel, trace bricks and Silt.
			5		1.5	
			9			
5			10	S2	5.0	Medium compact brown silty fine Sand, trace medium Sand and wood.
			8		6.5	
			9			
10			42	S3	10.0	Very compact brown SILT, trace medium to fine Sand.
			50		11.5	
			30			
15	16.8		61	S4	15.0	Very compact gray brown silty fine Sand, trace fine gravel. Top of Rock at 16.8 ft.
			77		16.5	
			96			
20						
25						

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>16.8</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK _____
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>4</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. <u>LY 3</u>
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
15.							Begin coring at 16.8 ft.
	2	16.8					Light to medium-gray, fine to medium-grained, thin to medium-bedded Dolomite, thinly color-banded and mottled. Trace pits, vugs and fossils. Secondary gypsum seams in closely to very closely spaced partings. LOCKPORT DOLOMITE Moderately weathered shaly partings at 17.8, 18.9, 19.1, 20.3 and 23.9 ft.
	2						
20	2	R-1	100/87	102/87*	SL		
	2						
	2						
	2						
	2						
	2						
	2	25.0					
25	2						
	2						Low angle joint at 26.2 ft.
	2						26.8 LOCKPORT DOLOMITE
	2						28.1 * RQD based on core recovered.
30	2	R-2	112/104	93/87	SL	PT5	Vug at 30.1 ft.
	2						
	2						
	2						
	2						
	2	35.0					Very thin, severely weathered Shale bed at 30.3 ft.
35	2						Vertical crack from 35.1 to 35.4 ft.
	2						(Contact gradational)
	2						
	2						
40	2	R-3	119/111	99/93	SL		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, vugs and fossils. Secondary gypsum seams in closely to very closely spaced partings.
	2						ROCHESTER SHALE
	2						
	2						
	2						
	2	45.0					
45	2						
	2						
	2						
	2						
	2	R-4	120/117	100/98	SL		ROCHESTER SHALE
50	2						

HSA FORM 41 .R77

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
50	2						Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, vugs and fossils. Secondary gypsum seams in closely to very closely spaced partings. ROCHESTER SHALE
	2						
	2						
	2						
	2						
55	2	55.0				53.9	Very small gypsum nodules at 51.5 and 52.3 ft. ROCHESTER SHALE
	2						
	2						
	2						
	2						
60	2	R-5	119 116	99 97	SL	60.0	ROCHESTER SHALE Light gray, very thin Limestone beds from 62.7 to 133.8 ft. Small gypsum nodule at 64.1 ft.
	2						
	2						
	2						
	2						
65	2	R-6 66.0	6 5	50 42	SL		Very thin, moderately weathered shale bed at 64.9 ft. (NOTE: Core barrel blocked at 66.0 ft.) ROCHESTER SHALE
	2						
	2						
	2						
	2						
70	2	R-7	102 99	94 92	SL		Small gypsum nodule at 72.4 ft. ROCHESTER SHALE
	2						
	2						
	2						
	2						
75	2	75.0					ROCHESTER SHALE
	2						
	2						
	2						
	2						
80	2	R-8	121 120	101 99*	SL	77.5 78.8	ROCHESTER SHALE (NOTE: Gas odor at 80.0 ft.) * RQD based on core recovered. Moderately weathered shaly parting at 85.0 ft.
	2						
	2						
	2						
	2						
85	2	85.0					

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	- carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

AR 77
MSA FORM 4

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
85	2	85.0					Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, vugs and fossils. Secondary gypsum seams in closely to very closely spaced partings. ROCHESTER SHALE Four low angle parallel joints at 86.6, 86.8, 88.3 and 88.9 ft. Small gypsum nodule at 94.5 ft.
	2						
	2						
	2						
90	2	R-9	117	98	SL		
	2		108	90			
	2						
	2						
	2						
	2						
95	2	95.0					ROCHESTER SHALE Very thin, moderately weathered Shale bed at 101.0 ft. Darker gray mudstone from 105.6 to 133.8 ft. ROCHESTER SHALE Moderately weathered partings at 118.4 and 118.8 ft. ROCHESTER SHALE Rough vertical joint from 118.8 to 119.3 ft.
	2						
	2						
	2						
100	2	R-10	120	100	SL		
	2		119	99			
	2						
	2						
	2						
	2						
105	2	105.0					
	2						
	2						
	2						
110	2	R-11	118	98	SL		
	2		115	96			
	2						
	2						
	2						
115	2	115.0					
	2						
	2						
	2						
	2	R-12	119	99	SL		
	2		115	96			
120	2						

MSA FORM 4

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Slight	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves	Moderate		V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
120	2	125.0					Dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Very fossiliferous. Secondary gypsum seams in closely to very closely spaced partings.
	2						
	2						
	2						
	2						
125	2	R-13					ROCHESTER SHALE Rough vertical joint from 129.1 to 129.3 ft.
	2						
	2						
	2						
	2						
130	2	R-14	119	99	SL		ROCHESTER SHALE Low angle joint with gypsum seams at 133.7 ft.
	2		119	99			
	2						
	2						
	2						
135	2	R-15					Light to medium gray, fine to medium-grained, thin to medium-bedded fossiliferous Limestone, interbedded with dark gray, very thin dolomitic Shale. 137.6 IRONDEQUOIT LIMESTONE 138.7 *RQD based on core recovered.
	2						
	2						
	2						
	2						
140	2	R-16	74	103	SL		Very dark gray shaly limestone from 139.8 to 151.5 ft. Very thin, moderately weathered clayey shale at 141.1 ft. (NOTE: Core barrel blocked at 141.0 ft.) IRONDEQUOIT LIMESTONE Secondary gypsum seams in closely to very closely spaced partings from 133.8 to 151.5 ft. IRONDEQUOIT LIMESTONE
	2		69	93*			
	2						
	2						
	2						
145	2	R-16					151.5 Dark greenish gray Shale, trace fossils. WILLIAMSON SHALE. Light gray, very thin limestone bed at 152.4 ft. Vertical joint from 153.8 to 154.5 ft.
	2						
	2						
	2						
	2						
150	2	R-16	66	100	SL		152.5 153.7
	2		66	100			
	2						
	2						
	2						
155	2		52	96	SL		151.9
	2		51	94			0
	2						0
	2						1

FIELD HARDNESS

WEATHERING

BEDDING/JOINT SPACING

RQD

V. Hard	- Knife can't scratch
Hard	- scratches diff.
Med. Hard	- scratches easily
Soft	- grooves
V. Soft	- carves

Fresh	Mod. Severe
V. slight	Severe
Slight	V. Severe
Moderate	Complete

V. thin	V. Close	< 2"
Thin	Close	2" - 12"
Medium	Mod. Close	12" - 36"
Thick	Wide	36" - 120"
V. thick	V. wide	> 120"

> 90%	Excellent
90-75	Good
75-50	Fair
50-25	Poor
< 25	V. Poor

IR 77
H & A FORM 4

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS	
			in.	%				
155	2	156.0				PT2 1		Dark greenish gray Shale, trace fossils. WILLIAMSON SHALE
	2				SL	0	157.0	Vertical joint from 155.9 to 156.2
	2					158.0	0	Dark greenish gray to grayish brown Shale, trace fossils. LOWER SODUS SHALE
	2					159.9	0	Five light gray, thin to very thin shell limestone beds from 157.6 to 160.0 ft.
160	2	R-17	122	102	SL	1		Light gray, thin shell limestone bed at 162.2 ft. Grayish brown shale from 163.2 to 168.0 ft.
	2		104	85*		0		
	2					161.0	0	
	2					161.9	0	
	2					PT1	0	
165	2	166.0				2		LOWER SODUS SHALE Severely weathered clay from 166.0 to 166.3 ft. Three non-parallel slickensided, low angle shears from 167.9 to 168.3 ft., and one at 169.4 ft.
	2					5		Five moderately weathered partings from 166.3 to 166.9 ft.
	2		48	104	SL	0	168.0	
	2		30	63*		0		
170	2					169.8	2/8	
	2					172.0		Light to medium gray, fine to medium-grained, crystalline, thin to medium-bedded Limestone, interbedded with dark gray, thin, closely spaced Shale. REYNALES LIMESTONE
	2	R-18	74	100	SL			
	2		59	80				
175	2	176.0						* RQD based on core recovered.
	2							Bottom of Boring at 176.0 ft.
								Observation well installed in completed borehole.

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS

WEATHERING

BEDDING/JOINT SPACING

RQD

V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

M&A FORM 46-AR77

GROUND WATER MONITORING REPORT

OW/PZ NUMBER: OW LY 3

NCD
ELEVATION SUBTRAHEND 517.3 ft.

FILE NO. 374813
PAGE NO. 2 of 2

DATE	TIME	ELAPSED TIME	DEPTH OF WATER FROM <u>surface</u>	ELEVATION OF WATER	REMARKS	READ BY
24 Feb. 1981	PM	0	0.0 ft.	517.3 ft.	Flush Test	ERH
		4	21.0		"	
		8	21.0		"	
		15 min.	21.0	496.3	0.5% gas reading	
25 Feb. 1981	AM	1 day	21.0	496.3	0.5% gas reading	ERH
26 Feb. 1981	AM	2	20.5	496.8	1.0% gas reading	ERH
15 Apr. 1981	PM	19	20.1	497.2		FS
1 June 1981	AM	66 days	21.0	496.3		ERH
19 June 1981	PM	115 days	20.0	497.3		MW
17 July 1981	AM	143 days	20.5	496.8		FS
7 Aug. 1981	AM	169 days	20.5	496.8	0% gas reading	ERH
22 Sept. 1981	AM	210 days	24.8	492.5	0% gas reading	ERH
21 Oct. 1981	PM	239 days	23.4	493.9		SMV
4 Nov. 1981	PM	253 days	23.0	494.3		ERH
		0 min.	23.0	494.3	Flush Test (Poured in 5 gal.)	ERH

H&A FORM 4
JAN 79

GROUND WATER OBSERVATION WELL REPORT

PROJECT: CSOAP, PHASE II
 LOCATION: Rochester, NY
 CLIENT: L.S.T.
 CONTRACTOR: Warren George Inc.
 DRILLER: K. Reid INSPECTOR: E. Hanna
 INSTALLATION DATE 24 February 1981

FILE NO. 374813
 WELL NO. OW LY3
 BORING NO. LY3
 LOCATION Lyell & Whitney
 SHEET 1 OF 2

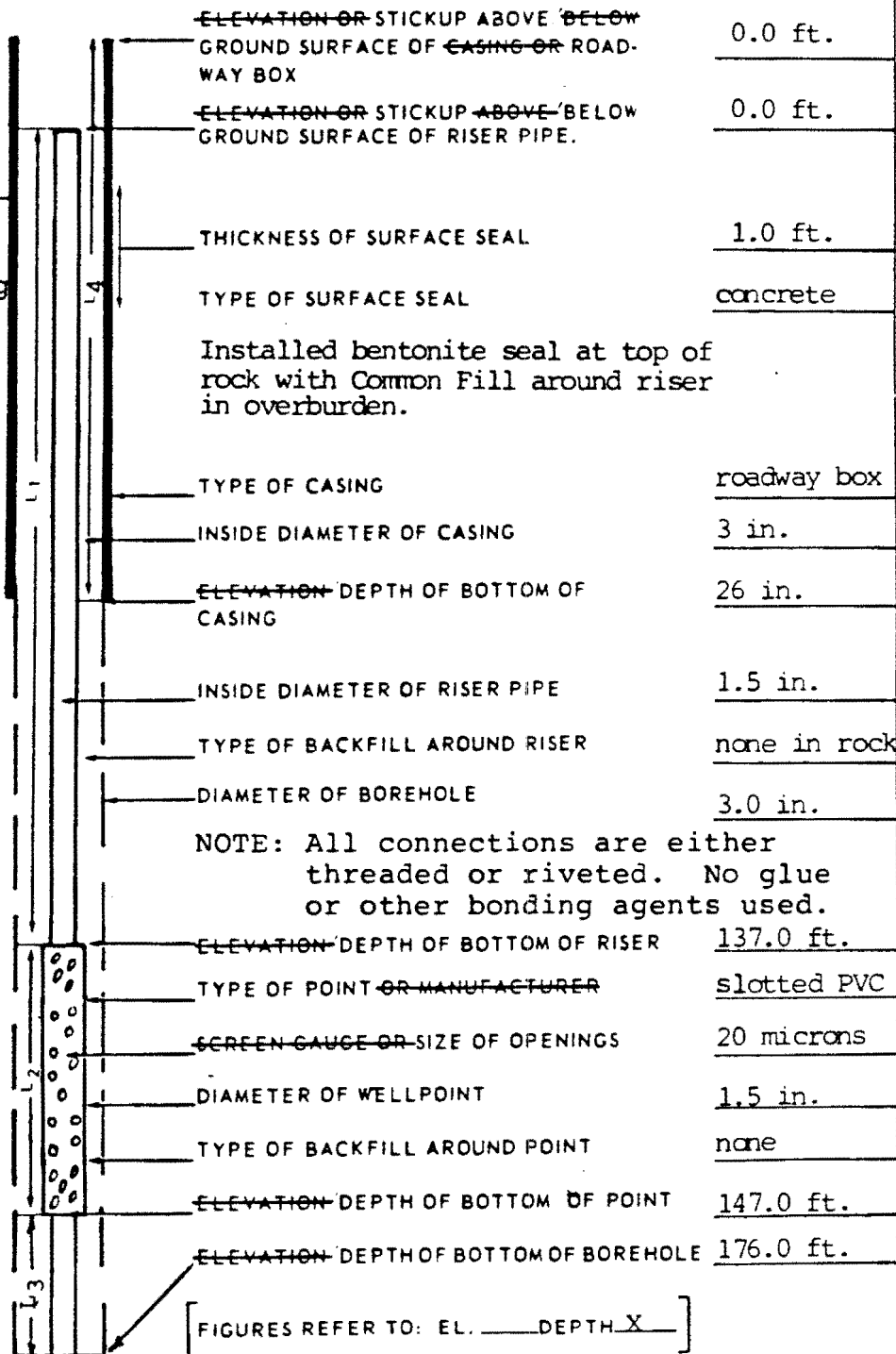
SURVEY DATUM NCD

GROUND ELEVATION 517.3 ft.

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)

Refer to test boring log for description of soil and rock conditions.

OVERBURDEN THICKNESS (ft) 16.8



$$\left[\frac{2.2 \text{ ft.}}{\text{LENGTH OF CASING } L_4} \right] \left[\frac{166.0}{\text{LENGTH OF RISER PIPE } (L_1 + L_3)} + \frac{10.0}{\text{LENGTH OF POINT } (L_2)} \right] = \frac{176.0 \text{ ft.}}{\text{PAY LENGTH}}$$

TEST BORING REPORT

MOLE NO. LY 6

PROJECT: CSOAP Phase III
CLIENT: L.S.T.
CONTRACTOR: Warren George

FILE NO. 374813
SHEET NO. 1 of 6
LOCATION: Lyell & Amber

GROUNDWATER		DEPTH TO		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF MOLE	TYPE	
26 Feb.	700	14.5ft.	14ft.	160ft.	SIZE ID in.	SS NO
					HAMMER WT lb.	1-13/16
					HAMMER FALL in.	

ELEVATION: 507.0 ft. *508.1 ACD*
DATE START: 24 Feb. 1981
DATE FINISH: 25 Feb. 1981
DRILLER: K. Reid
INSPECTOR: E. Hanna

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
			5	S1	1.0	- Asphalt and Fill -
			3		2.5	Loose brown medium to fine Sand, trace silt, asphalt and coarse sand.
	4.0					- Fill -
5			15	S2	5.0	Very compact brown silty fine SAND, trace medium SAND.
			23		6.5	
			51			
10	11.0		28	S3	10.0	Coarse-fine SAND, (Wash Material) Top of rock at 11.0 ft.
			89		11.0	

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 11.0 ft.
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 3
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	MOLE NO. LY 6
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

H & A FORM 4

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
40	/	R-4			SL		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings.
	2						
	/						
	/						
45	2	45.0					ROCHESTER SHALE
	/						Vertical crack from 45.3 to 45.4 ft.
	/						Gypsum nodule, 0.1 ft. wide, at 47.8 ft.
50	/	R-5	122 / 119	102 / 98*	SL		ROCHESTER SHALE
	2						
	/						
	/						
55	/	55.0					* RQD based on core recovered.
	2						Severely weathered shaly parting at 57.4 ft.
	/						Light gray, thin to very thin, closely spaced Limestone beds from 57.6 to 149.4 ft.
	/						Gypsum nodule, 0.1 ft. wide, at 59.3 ft.
60	2	R-6	119 / 113	99 / 94	SL		ROCHESTER SHALE
	/						
	/						
	/						
65	2	65.0					Four very close, severely weathered shaly partings from 59.9 to 60.1 ft. (NOTE: Lost some water during R-6.)
	/						
70	/	R-7	119 / 116	99 / 97	SL		ROCHESTER SHALE
	2						
	/						
	/						
75	2	75.0					Severely weathered shaly parting at 69.3 ft. Smooth, moderately dipping joint at 72.0 ft.

FIELD HARDNESS

WEATHERING

BEDDING/JOINT SPACING

RQD

V. Hard	- Knife can't scratch
Hard	- scratches diff
Med. Hard	- scratches easily
Soft	- grooves
V. Soft	- carves

Fresh	Mod. Severe
V. slight	Severe
Slight	V. Severe
Moderate	Complete

V. thin	V. Close	< 2"	> 90%
Thin	Close	2" - 12"	90-75
Medium	Mod. Close	12" - 36"	75-50
Thick	Wide	36" - 120"	50-25
V. thick	V. wide	> 120"	< 25

Excellent
Good
Fair
Poor
V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
75	/	R-8	116 114	97 95	SL		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely spaced Limestone beds.
/							
✓							
/							
/							
80	/	85.0					ROCHESTER SHALE
/							
✓							
/							
/							
85	/	R-9	112 112	93 93	SL		Severely weathered clay parting at 86.0 ft. Moderately weathered high angle joint from 87.4 to 87.5 ft.
✓							
/							
/							
✓							
90	/	95.0					ROCHESTER SHALE Smooth vertical joint from 89.7 to 90.6 ft.
/							
/							
✓							
/							
95	/	R-10	130 128	108 98*	SL		Vertical crack from 98.3 to 98.5 ft. Smooth vertical joint from 99.0 to 99.3 ft.
✓							
/							
/							
✓							
100	/	105.0					ROCHESTER SHALE
/							
/							
✓							
/							
105	/	R-11	118 118	98 98	SL		ROCHESTER SHALE
/							
/							
✓							
✓							
110	✓						

* RQD based on core recovered.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

M&A FORM 48 - 7

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS	
			in.	%				
110	2	R-11 115.0			SL		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace fossils. Secondary gypsum seams in closely to very closely spaced partings.	
115	2						Light gray, thin to very thin, closely spaced Limestone beds. ROCHESTER SHALE Dark gray Mudstone from 110.0 to 131.2 ft.	
120	2		R-12 125.0	122 122	102 100*	SL		Increasingly fossiliferous from 122.5 to 131.2 ft. ROCHESTER SHALE
125	2							* RQD based on core recovered. Severely weathered shaly partings at 123.9 and 124.6 ft.
130	2	R-13 135.0		73 73	99 99	SL		ROCHESTER SHALE
135	2				45 45	98 98	SL	131.2
140	2		R-14 145.0	116 116	97 97	SL		Low angle joints with gypsum seams and trace slickensides at 133.2 and 133.6 ft. IRONDEQUOIT LIMESTONE
145	2							

PRELIM.

77
M&A FORM 48

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS	
			in.	%				
145	2		53	100	SL			Dark gray, dolomitic fossiliferous Shale with light gray, thin to very thin, closely to moderately closely spaced Limestone beds. IRONDEQUOIT LIMESTONE
150	2	R-15	69	103	SL	149.4	1/6	Dark greenish gray Shale, trace fossils. WILLIAMSON SHALE Light, very thin Limestone beds at 150.4, 152.6, 154.1, 154.2 and 154.5 ft. Horizontal slickensided shears at 150.2 and 154.1 ft.
155	2	155.0	69	100*			0	* RQD based on core recovered.
160	2	R-16	62	103	SL	155.5	1	Dark greenish gray to grayish brown Shale, trace fossils. LOWER SODUS SHALE. Light gray, thin to very thin shell Limestone beds at 155.8, 156.4, 157.6, 159.7 and 159.9 ft. <u>Low angle</u> slickensided shear at 157.6 ft.
165		160.0	62	100*			0	Bottom of Boring at 160.0 ft. Borehole grouted to depth of 8.0 ft., then backfilled to surface.

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

MOLE NO. LY 10

PROJECT: CSOAP, Phase II

FILE NO. 374813

CLIENT: L.S.T.

SHEET NO. 1 of 7

CONTRACTOR: Warren George

LOCATION: Lyell & Haque

GROUNDWATER		DEPTH TO			CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF MOLE	TYPE	S/S	NQ
14 May 81	8 am	14	7.3	40.7	SIZE ID in. 4 & 8	1-3/8	1-13/16
15 May 81	7 am	12.5	7.3	150.7	HAMMER WT lb. 300	140	
15 May 81	12 pm	7.6	7.3	181.7	HAMMER FALL in. 24	30	

ELEVATION 519.9 ft. NCD

DATE START 13 May 1981

DATE FINISH 15 May 1981

DRILLER J. Texeira

INSPECTOR M. Tierney

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5	3.0	8	3	S-1	0.5	Loose black CINDERS, little sand and gravel, trace silt, trace organics. - FILL -
		8	2		1.5	
5	7.3	28		S-2	4.0	Compact brown SILT, some fine gravel, trace medium to fine sand. - GLACIAL TILL - Top of rock at 7.3 ft.
		20			5.5	
		61	16 17 15			
		205				
			162/3			

PRELIMINARY

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 7.3
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	RDCK —
10-20	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 2
20-30	COMPACT	8-15	STIFF	O — OPEN END ROD	
30-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	MOLE NO. LY 10

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
40	3	40.7			SL		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, vugs, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. ROCHESTER SHALE
	2						
	2						
	2						
	2						
45	2	R-7	120	100	SL	44.1	Severely weathered shaly parting at 37.3 ft. Vug, 0.1 ft. wide, in parting at 39.3 ft. Moderately weathered partings at 45.4 and 46.2 ft. Smooth low angle joint at 46.4 ft. Low angle parting with trace crystalline sulfur at 46.8 ft. Severely weathered shaly partings at 48.6, 49.4 and 49.9 ft. Moderately weathered parting with trace crystalline sulfur at 53.4 ft. Very thin, heavily pitted zone at 53.4 ft.
	2		117	98			
	2						
	2						
	2						
50	2	50.7				50.0	ROCHESTER SHALE Light gray, thin to very thin, closely to moderately closely spaced Limestone beds from 59.4 to 129.8 ft. *RQD based on core recovered. Gypsum nodule, 0.2 ft. wide, in parting at 60.6 ft.
	2						
	3						
	3						
	2						
55	2	R-8	116	112	SL		ROCHESTER SHALE Light gray, thin to very thin, closely to moderately closely spaced Limestone beds from 59.4 to 129.8 ft. *RQD based on core recovered. Gypsum nodule, 0.2 ft. wide, in parting at 60.6 ft.
	2		115	99*			
	2						
	2						
	2						
60	3	R-9	18	113	SL	61.1	ROCHESTER SHALE
	2	60.7	18	100*			
	3					62.1	
	3						
	3						
65	2	R-10	120	100	SL		ROCHESTER SHALE
	3		120	100			
	3					67.4	
	3					67.5	
	2						
70	3	70.7					ROCHESTER SHALE
	2						
	2						
	3	R-11			SL		
	3						
75	3						

FREED

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
110	4	110.7			SL		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Very thin, light gray, closely spaced Limestone beds. ROCHESTER SHALE
	4						
	4						
	4						
	4						
115	4	R-15	119	99	SL		Increasingly fossiliferous Mudstone from 120.3 to 129.8 ft. ROCHESTER SHALE
	4		119	99			
	4						
	4						
	4						
120	4	120.7					Increasingly fossiliferous Mudstone from 120.3 to 129.8 ft. ROCHESTER SHALE
	4						
	4						
	4						
	4						
125	4	R-16	122	102	SL		Increasingly fossiliferous Mudstone from 120.3 to 129.8 ft. ROCHESTER SHALE
	4		122	100*			
	3.5						
	3						
	4						
130	4	130.7				129.8	Light to medium gray, fine to medium-grained, thin to medium-bedded fossiliferous Limestone, interbedded with dark gray, thin dolomitic Shale. 132.8 Secondary gypsum seams in closely to moderately closely spaced partings. 133.9 IRONDEQUOIT LIMESTONE
	4						
	3						
	4						
	3						
135	4	R-17	116	97	SL	134.1	IRONDEQUOIT LIMESTONE
	3		115	96			
	3					PT4	
	3						
	4						
140	4	140.7				140.0	IRONDEQUOIT LIMESTONE
	3						
	3						
	4	R-18			SL		
	4						
145	4						

*RQD based on core recovered.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
145	4	R-18	84	102	SL	147.1	Light to medium gray, fine to medium-grained, fossiliferous Limestone. IRONDEQUOIT LIMESTONE Moderately weathered shaly parting at 146.7 ft.
	4		83	101*			
	4						
	6						
	7	R-19	38	100	SL	PT3	Dark greenish gray Shale, trace fossils. WILLIAMSON SHALE Smooth, vertical joint from 149.1 to 149.8 ft. Light gray, very thin Limestone beds at 147.8, 148.9, 150.8, 151.2, 152.6 and 153.1 ft. Very thin black Shale zone at 152.8 ft.
150	7		31	82			
	4						
	4						
	4	R-20			SL	PT2	Dark, greenish gray to grayish brown Shale, trace fossils. LOWER SODUS SHALE Three light gray, thin to very thin shell Limestone beds from 154.1 to 155.9 ft. Grayish brown Shale from 157.4 to 164.3 ft. **Samples from 150.7 to 151.8, 153.0 to 154.0, and 155.3 to 155.4 ft. LOWER SODUS SHALE Parallel, intersecting low angle joints with trace slickensides at 165.2 and 165.7 ft.
	5		117	98			
	4		116	97			
	5						
	5	R-21			SL	PT1	Light to medium gray, fine to medium-grained, crystalline, thin to medium-bedded, fossiliferous Limestone, interbedded with dark gray, very thin, closely to very closely spaced Shale beds. Trace stylolites. Secondary gypsum seams in closely spaced partings. REYNALES LIMESTONE Gypsum nodule, 0.2 ft. wide, at 166.1 ft. Moderately dipping, slickensided joint at 171.0 ft. Very thin, hard siliceous zones at 174.9, 176.0, and 178.3 ft.
155	4						
	4						
	5						
	4	R-22			SL	PT1	REYNALES LIMESTONE
	5		73	101			
	5		73	100*			
	4						
160	5						
	7						
	6						
	5						
165	6						
	5						
	6						
	5						
	5						
170	4						
	5						
	5						
	4						
175	5						
	5						
	5						
	4						
180	5						

*RQD based on core recovered.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
180	5	R-22			SL		180.7 <u>Red, medium-grained, oolitic, fossiliferous, hematitic Limestone.</u> 181.0 <u>FURNACEVILLE MEMBER</u> <u>REYNALDES LIMESTONE</u>
	5	181.7					Bottom of boring at 181.7 ft. Observation well installed in completed borehole
185							

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
V. Hard — Knife can't scratch Hard — scratches diff. Med. Hard — scratches easily Soft — grooves V. Soft — carves	Fresh V. slight Slight Moderate Mod. Severe Severe V. Severe Complete	V. thin V. Close < 2" Thin Close 2" - 12" Medium Mod. Close 12" - 36" Thick Wide 36" - 120" V. thick V. wide > 120"	> 90% 90-75 75-50 50-25 < 25 Excellent Good Fair Poor V. Poor

HBA FORM 4B

GROUND WATER MONITORING REPORT

OW/PZ NUMBER: <u>OW LY10</u>		NCD	ELEVATION SUBTRAHEND <u>519.9 Ft.</u>		FILE NO. <u>374813</u>	PAGE NO. <u>2 of 2</u>
DATE	TIME	ELAPSED TIME	DEPTH OF WATER FROM <u>G.S.</u>	ELEVATION OF WATER	REMARKS	READ BY
19 May 81	AM	0	5.7 Ft.	514.2 Ft.	At installation	MTT
	PM		6.2	513.7		
21 May 81	PM	00min.	5.0	514.9	After flushing	MTT
		01	5.4	514.5	" "	
		02	5.8	514.1	" "	
		03	5.8	514.1	" "	
		04	5.9	514.0	" "	
22 May 81	AM	3 days	6.0	513.9		MTT
1 June 81	AM	13 days	7.5	512.4		ERH
24 June 1981	PM	36 days	6.3	513.6		MW
17 July 1981	AM	59 days	6.8	513.1		FS
5 Aug. 1981	AM	78 days	5.3	514.6	0% gas reading	ERH
22 Sept. 1981	AM	124 days	--	--	Covered by wood pile	ERH
21 Oct. 1981	AM	156 days	--	--	" " " "	SMV

GROUND WATER OBSERVATION WELL REPORT

PROJECT: CSOAP, PHASE II
 LOCATION: Rochester, NY
 CLIENT: L.S.T.
 CONTRACTOR: Warren George
 DRILLER: J. Teixeira INSPECTOR: M. Tierney
 INSTALLATION DATE: 16 May 1981

FILE NO. 374813
 WELL NO. OW LY 10
 BORING NO. LY 10
 LOCATION Iyell & Haque St.
 SHEET 1 OF 2

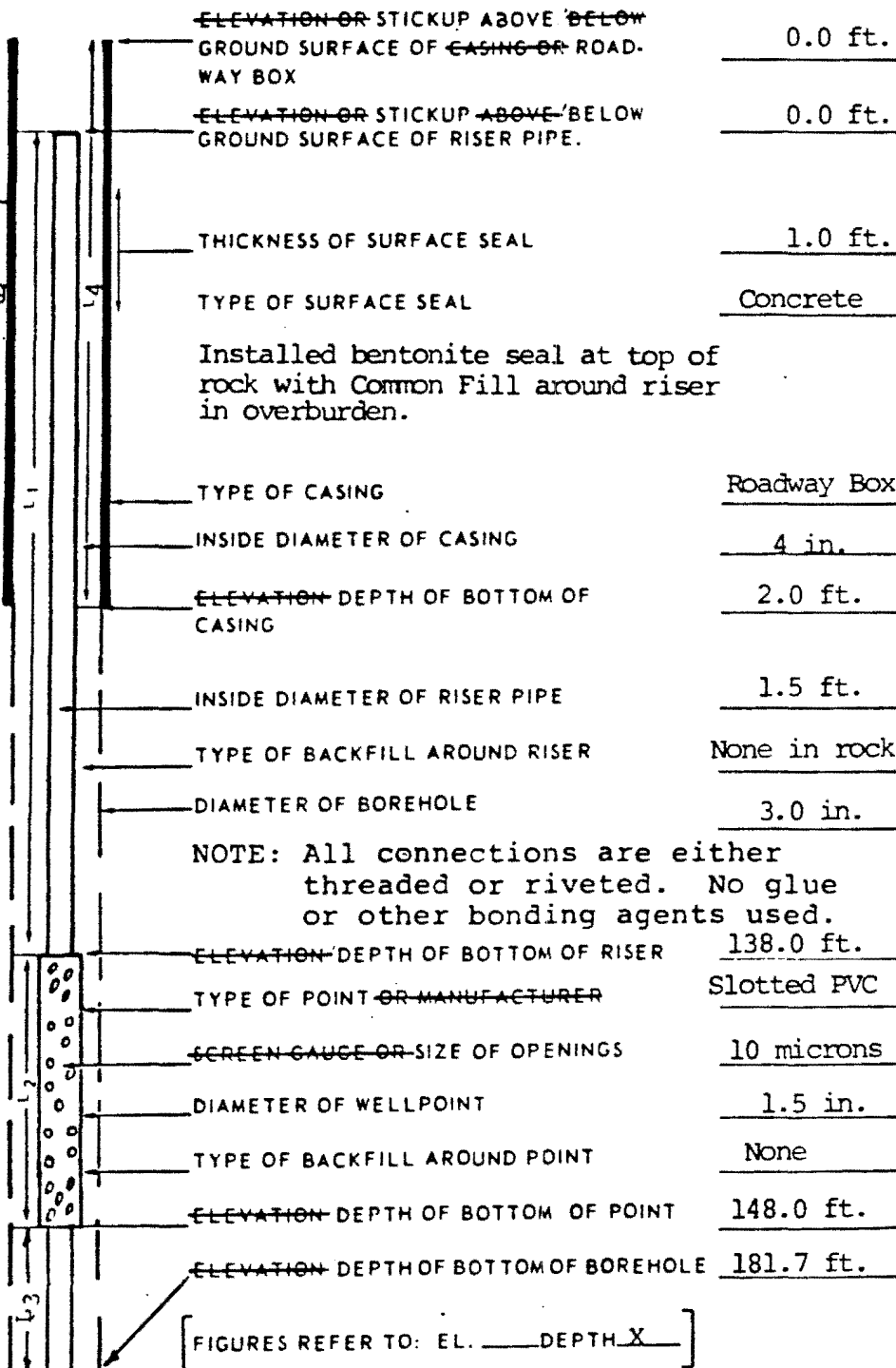
SURVEY DATUM NCD

GROUND ELEVATION 519.9

Refer to test boring log for description of soil and rock conditions.

OVERBURDEN THICKNESS (ft) 7.3

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)



[FIGURES REFER TO: EL. _____ DEPTH X]

$$\left[\frac{2.0}{\text{LENGTH OF CASING } (L_4)} \right] + \left[\frac{171.7}{\text{LENGTH OF RISER PIPE } (L_1 + L_3)} \right] + \left[\frac{10.0}{\text{LENGTH OF POINT } (L_2)} \right] = 181.7 \text{ ft. PAY LENGTH}$$

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LY 10	TEST NO. 1
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Warren George					LOCATION: Lyell & Hague	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 519.9 ft. NCD	
TYPE	Pneumatic	Digital	Dial	Air	DATE START: 15 May 1981	
MFG.	W.G.	Gam. Cal.	Ashcroft	W.G.	DATE FINISH: 15 May 1981	
MODEL NO.	---	7406690	---	---	DRILLER: J. Texeira	
					INSPECTOR: M. Tierney	
					GEOLOGIST: ---	

M.G.P. = (0.586 to 1.0) x Z
 COMPUTED MAX GAUGE PRESS: (MGP) 130 psi
 COMPUTED INTERNAL FRICTION: ---

ROCK TYPE: Reynales lms. HOLE SIZE 3 in.
 RECOVERY (%) 98 to 101
 R O D (%) 98 to 100

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 7.3 TO TOP LOWER PACKER 179.0
 TO BOTTOM OF BORING 181.7 TO BOTTOM UPPER PACKER (Z) 173.1
 TO WATER TABLE 7.6 LENGTH OF TEST SECTION 5.9
 HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1336	0	250	50	25.1		PRELIMINARY
	1			25.1		
	2			25.1		
	3			25.1	0.0	
1340	0		75	25.1		
	1			25.1		
	2			25.1		
	5			25.1		
	7			25.1	0.0	
1349	0		100	25.3		
	1			25.3		
	2			25.3		
	5			25.3		
	10			25.3	0.0	

78 63
HL

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LY 10	TEST NO. 2
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Warren George					LOCATION: Lyell & Hague	
PACKER SYSTEM		WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 519.9 ft. NCD	
TYPE		Digital	Dial	Air	DATE START: 15 May 1981	
MFG.		W.G.	Gam. Cal.	Ashcroft	DATE FINISH: 15 May 1981	
MODEL NO.		---	7406690	---	DRILLER: J. Texeira	
					INSPECTOR: M. Tierney	
					GEOLOGIST: ---	

M.G.P. = (0.586 to 1.0) x Z		ROCK TYPE: Lower Sodus Shale		HOLE SIZE 3 in.	
COMPUTED MAX GAUGE PRESS: (MGP) 115 psi		RECOVERY (%) 98 to 105			
COMPUTED INTERNAL FRICTION: ---		R O D (%) 97 to 100			

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 7.3	TO TOP LOWER PACKER 163.0
TO BOTTOM OF BORING 181.7	TO BOTTOM UPPER PACKER (Z) 157.1
TO WATER TABLE 7.6	LENGTH OF TEST SECTION 5.9
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.0	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1450	0	200	25	28.4		Probable leak around packer at 50 psi.
	1			28.4		
	2			28.4		
	3			28.4	0.0	
1454	0	200	50	28.7		
	1			30.5		
	2			32.5		
	3			35.1		
	5			40.3	2.3	
1501	0	275	75	66.4		
	1			66.4		
	2			66.4		
	5			66.5		
	7			66.5	0.0	
1510	0	325	100	67.5		
	1			67.5		
	2			67.5		
	5			67.5		
	10			67.5	0.0	

78 63
MB.

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LY 10	TEST NO. 3
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Warren George					LOCATION: Lyell & Hague	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 519.9 ft. NCD	
TYPE	Pneumatic	Digital	Dial	Air	DATE START: 15 May 1981	
MFG.	W.G.	Gam. Cal.	Ashcroft	W.G.	DATE FINISH: 15 May 1981	
MODEL NO.	—	7406690	—	—	DRILLER: J. Texeira	
					INSPECTOR: M. Tierney	
					GEOLOGIST: —	

M.G.P. = (0.588 to 1.0) x \bar{z}	ROCK TYPE: Williamson Shale	HOLE SIZE: 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 110 psi	RECOVERY (%) 98 to 100	
COMPUTED INTERNAL FRICTION: —	R O D (%) 82 to 97	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 7.3 TO TOP LOWER PACKER 153.0

TO BOTTOM OF BORING 181.7 TO BOTTOM UPPER PACKER (Z) 147.1

TO WATER TABLE 7.6 LENGTH OF TEST SECTION 5.9

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1605	0	300	25	73.2		
	1			73.2		
	2			73.2		
	3			73.2	0.0	
1610	0		50	73.3		
	1			73.3		
	2			73.3		
	5			73.3	0.0	
1645	0		75	73.7		
	1			73.7		
	2			73.7		
	5			73.7		
	7			73.7	0.0	
1647	0		100	73.7		
	1			73.7		
	2			73.7		
	5			73.7		
	10			73.7	0.0	

HL 78 63

PROJECT: CSOAP, Phase II					FILE NO. 374813
CLIENT: L.S.T.					SHEET NO. 1 of 1
CONTRACTOR: Warren George					LOCATION: Lyell & Hauge
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 519.9 ft. NCD
TYPE	Pneumatic	Digital	Dial	Air	DATE START: 16 May 1981
MFG.	W.G.	Gam. Cal.	Ashcroft	W.G.	DATE FINISH: 16 May 1981
MODEL NO.	---	7406690	---	---	DRILLER: J. Teixeira
					INSPECTOR: M. Tierney
					GEOLOGIST: ---

M.G.P. = (0.566 to 1.0) x \bar{z}	ROCK TYPE: Irondequoit Lms.	HOLE SIZE: 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 100 psi	RECOVERY (%) 97	
COMPUTED INTERNAL FRICTION: ---	R Q D (%) 98	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 7.3 TO TOP LOWER PACKER 140.0

TO BOTTOM OF BORING 181.7 TO BOTTOM UPPER PACKER (±) 134.1

TO WATER TABLE 7.6 LENGTH OF TEST SECTION 5.9

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
0853	0	300	25	74.1		
	1			74.1		
	2			74.1		
	5			74.1	0.0	
0859	0		50	74.1		
	1			74.1		
	2			74.1		
	5			74.1	0.0	
0907	0		75	74.1		
	1			74.1		
	2			74.1		
	5			74.1	0.0	
0914	0		100	74.1		
	1			74.1		
	2			74.1		
	5			74.1		
	10			74.1	0.0	

78 83
 H.

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. LY 10	TEST NO. 5
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Warren George					LOCATION: Lyell & Hague	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 519.9 ft. NCD	
TYPE	Pneumatic	Digital	Dial	Air	DATE START: 16 May 1981	
MFG.	W.G.	Gam. Cal.	Ashcroft	W.G.	DATE FINISH: 16 May 1981	
MODEL NO.	---	7406690	--	---	DRILLER: J. Texeira	
					INSPECTOR: M. Tierney	
					GEOLOGIST: ---	

M.G.P. = (0.566 to 1.0) x Z	ROCK TYPE: Rochester Shale	HOLE SIZE: 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 30 psi	RECOVERY (%) 100	
COMPUTED INTERNAL FRICTION: ---	R O D (%) 98	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 7.3	TO TOP LOWER PACKER 50.0
TO BOTTOM OF BORING 181.7	TO BOTTOM UPPER PACKER (2) 44.1
TO WATER TABLE 12.5	LENGTH OF TEST SECTION 5.9
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.0	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
0947	0	300	10	74.2		
	1			74.2		
	2			74.2		
	5			74.2	0.0	
0953	0		20	74.2		
	1			74.2		
	2			74.2		
	5			74.2		
	7			74.2	0.0	
1002	0		30	74.2		
	1			74.2		
	2			74.2		
	5			74.2		
	10			74.2	0.0	

H. 78 63

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. LY 10 TEST NO. 6

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Warren George

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Lyell & Hague

ELEVATION: 519.9 ft. NCD

DATE START: 16 May 1981

DATE FINISH: 16 May 1981

DRILLER: J. Texeira

INSPECTOR: M. Tierney

GEOLOGIST: ---

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	Air
MFG.	W.G.	Gam. Cal.	Ashcroft	W.G.
MODEL NO.	---	7406690	---	---

M.G.P. = (0.566 to 1.0) x z

COMPUTED MAX GAUGE PRESS: (MGP) 15 psi

COMPUTED INTERNAL FRICTION: ---

ROCK TYPE: Lockport Dolomite HOLE SIZE 3 in.

RECOVERY (%) 98 to 99

ROD (%) 93 to 99

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 7.3 TO TOP LOWER PACKER 25.0

TO BOTTOM OF BORING 181.7 TO BOTTOM UPPER PACKER (Z) 19.1

TO WATER TABLE 7.6 LENGTH OF TEST SECTION 5.9

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1034	0	300	5	81.9		
	1			81.9		
	2			81.9		
	5			81.9	0.0	
1040	0		10	81.9		
	1			81.9		
	2			82.0		
	5			82.3	0.1	
1047	0		15	82.3		
	1			82.4		
	2			82.5		
	5			82.8		
	10			83.3	0.1	

78 63
 Hc

TEST BORING REPORT

HOLE NO. LY 11

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Warren George

FILE NO. 374813

SHEET NO. 1 of 6

LOCATION: Jones & Ambrose

ELEVATION: 502.9 ft. NCD

DATE START: 16 May 1981

DATE FINISH: 19 May 1981

DRILLER: J. Texeira

INSPECTOR: M. Tierney

GROUNDWATER		DEPTH TO		CASING	SAMPLER	CORE BARREL	
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	S/S	NO
18 May 81	7:00	13.5	19	21.0	SIZE 1.0 in.	3	1-3/8 1-13/16
19 May 81	7:00	13.0	19	21.0	HAMMER WT lb.	300	140
19 May 81	12:30	2.2	19	171.3	HAMMER FALL in.	24	30

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
3.0			11	S-1	1.0	Compact brown silty coarse to fine SAND, trace fine gravel, trace red brick. - FILL -
			22		2.5	
			15			
5			14	S-2	4.0	Medium compact brown fine sandy SILT, trace fine gravel, trace coarse sand.
			14		5.5	
			14			
10			15	S-3	9.0	Compact brown fine sandy SILT, trace fine gravel, trace coarse to medium sand.
			18		10.5	
			22			
15			37	S-4	14.0	Very compact gray silty coarse to fine SAND, trace fine gravel.
			103		15.5	
			100			
20	19.0		109/0			Top of rock at 19.0 ft.
25						

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 19.0 ft.
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 4
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	
50+	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	HOLE NO. LY 11

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Wash.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
15							(NOTE: Incomplete water return throughout boring.) Begin coring at 19.0 ft.
20	4 4 3 3 3 3	19.0 R-1 25.8	 74 66	 90 80	 SL		Light to medium gray, fine-grained, thin to medium-bedded Dolomite, very thinly color-banded and mottled. Trace pits and vugs. Secondary gypsum seams in closely to very closely spaced partings. Vertical cracks, 0.1 to 0.2 ft. long, closely spaced from 19.9 to 24.8 ft. LOCKPORT DOLOMITE (Contact gradational)
25	3 3 3 3 3 3	25.8 R-2 35.8	 113 110	 94 92	 SL	25.4	Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, vugs, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. ROCHESTER SHALE Severely weathered clayey partings at 25.4 and 32.7 ft. Vertical joint from 26.9 to 27.1 ft. Vertical crack from 27.7 to 27.9 ft.
30	4 4 3 3 3 3	35.8 R-3 45.3	 120 118	 105 98*	 SL		Severely weathered shaly parting at 27.6 ft. Short vertical cracks at 34.6 and 35.1 ft. Short vertical joint at 38.1 ft.
35	4 3 3 3 3 3	45.3 R-4 50	 121 119	 101 98*	 SL		ROCHESTER SHALE Severely weathered clayey Shale parting at 41.5 ft. Small gypsum nodule at 43.2 ft. Small vug at 44.8 ft. Gypsum nodule, 0.1 ft. wide, in parting at 45.1 ft.
40	4 3 3 3 3 3	50					*RQD based on core recovered.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— urooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

7
MSA FORM 48

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
50	3	R-4			SL		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, vugs, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings.
	3						
	4						
	3						
	3						
55	3	55.3					ROCHESTER SHALE
	3	R-5	$\frac{119}{117}$	$\frac{99}{98}$	SL		Light gray, thin to very thin, closely to moderately closely spaced Limestone beds from 52.3 to 117.4 ft. Vertical joint in Limestone from 56.5 to 56.6 ft. Short vertical crack in Limestone at 56.9 ft. Severely weathered shaly parting at 58.7 ft.
	3						
	3						
	3						
	3						
60	4	R-6	$\frac{121}{120}$	$\frac{101}{100^*}$	SL		ROCHESTER SHALE
	4						
	4						
	3						
	4						
65	5	65.3					Short vertical cracks in Limestone at 63.6 and 67.5 ft.
	4	R-7	$\frac{5}{5}$	$\frac{83}{83}$	SL		Very thin, severely weathered clay bed at 69.3 ft.
	4						
	4						
	4						
	4						
70	4	70.3					Short, high angle joint at 74.6 ft. Vug, 0.1 ft. wide, at 74.8 ft.
	4	R-8	$\frac{108}{108}$	$\frac{100}{100}$	SL		*RQD based on core recovered.
	4						
	4						
	4						
	4						
75	3	75.3					ROCHESTER SHALE
	5	75.8					Severely weathered clayey parting at 82.6 ft.
	4	R-8	$\frac{108}{108}$	$\frac{100}{100}$	SL		
	4						
	4						
	4						
	4						
80	4	80.3					
	4	R-8	$\frac{108}{108}$	$\frac{100}{100}$	SL		
	4						
	3						
	4						
	4						
85	4	84.8					

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. Thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

MBA FORM 48

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
85	3	R-9	117 117	98 98	SL	Light to dark gray, fine-grained, dolomitic Mudstone, very thinly color-banded. Trace pits, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced limestone beds. ROCHESTER SHALE Small gypsum nodules at 92.5 and 97.7 ft.	
3							
3							
3							
3							
3							
3							
3							
90	3	R-10	120 119	100 99	SL	Short vertical crack in Limestone bed at 99.0 ft. ROCHESTER SHALE (NOTE: Gas forced water up casing.)	
3							
3							
3							
3							
3							
3							
3							
95	3	R-11	117 117	98 98	SL	Increasingly fossiliferous Mudstone from 108.0 to 117.4 ft. ROCHESTER SHALE	
3							
3							
3							
3							
3							
3							
3							
100	3	R-12	80 80	108 100*	SL	*RQD based on core recovered. Light to medium gray, fine to medium-grained, thin to medium-bedded fossiliferous Limestone. IRONDEQUOIT LIMESTONE	
3							
3							
3							
3							
3							
3							
3							
105	4	R-12	80 80	108 100*	SL	Light to medium gray, fine to medium-grained, thin to medium-bedded fossiliferous Limestone. IRONDEQUOIT LIMESTONE	
3							
3							
3							
3							
3							
3							
3							
110	3	R-12	80 80	108 100*	SL	Light to medium gray, fine to medium-grained, thin to medium-bedded fossiliferous Limestone. IRONDEQUOIT LIMESTONE	
3							
3							
3							
3							
3							
3							
3							
115	4	R-12	80 80	108 100*	SL	Light to medium gray, fine to medium-grained, thin to medium-bedded fossiliferous Limestone. IRONDEQUOIT LIMESTONE	
4							
4							
4							
4							
4							
4							
4							
120	4	R-12	80 80	108 100*	SL	Light to medium gray, fine to medium-grained, thin to medium-bedded fossiliferous Limestone. IRONDEQUOIT LIMESTONE	
4							
4							
4							
4							
4							
4							
4							

MSA FORM 4B - 77

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
120	4	121.0			SL		Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Secondary gypsum seams in closely to moderately closely spaced partings. IRONDEQUOIT LIMESTONE Gypsum nodule, 0.1 ft. wide, at 118.3 ft. IRONDEQUOIT LIMESTONE
	3						
	3						
	4	R-13	52/50	87/83	SL		
125	3						
	3	126.0					
	3						
	4						
130	3	R-14	122/122	102/100*	SL		
	3						
	3						
	3						
135	3	136.0				134.9	2/9 Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE Light gray, very thin Limestone beds at 135.1, 136.3 and 140.0 ft. Black zone from 140.4 to 140.6 ft.
	4						0
	4						0
	4						0
140	4	R-15	104/104	90/100*	SL	140.6	1
	3						1/6
	3						0
	3						0
	3						0
145	4	145.7					0
	4						0
	4						0
	4						3
150	4	R-16	122/120	113/98*	SL		0
	5						0
	4						0
	5						0
155	5	154.7				154.0	3

FRACTURE FREQUENCY (Fract./ft.)

REYNALES LIMESTONE

*RQD based on core recovered.
Rock cored in R-15 recovered in R-16.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	- carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

TEST BORING REPORT

MOLE NO LY 12

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Warren George

FILE NO 374813

SHEET NO 1 of 6

LOCATION Ambrose & N. Plymouth

ELEVATION 503.5 ft. NCD

DATE START 20 May 1981

DATE FINISH 26 May 1981

DRILLER J. Texeira

INSPECTOR M. Tierney

GROUNDWATER		DEPTH TO			CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF MOLE	TYPE	S/S	NO
21 May	AM	12.5	16.4		SIZE ID in. 4	1-3/8	1-13/16
26 May	PM	5.0	16.4	146.0	HAMMER WT lb. 300	140	---
					HAMMER FALL in. 24	30	---

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
3.0			4	S-1	0.0	Loose gray medium to fine SAND, some silt, trace fine gravel, trace organics. - TOPSOIL -
			5		1.5	
			7			
5			10	S-2	5.0	Compact brown silty medium to fine SAND, trace clay, trace fine gravel.
			17		6.5	
			19			
8.0			60	S-3	9.5	Very compact red-brown silty coarse to fine SAND, trace clay, trace gravel. - GLACIAL TILL -
			100		11.0	
			91			
15			49	S-4	14.5	Very compact red-brown silty coarse to fine SAND, trace clay, trace gravel.
	15.8		52		15.8	
			121 / .3			
20						Top of rock at 15.8 ft. Spun casing into rock and began coring at 16.4 ft.
25						

PRELIM

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPDM	OVERBURDEN 15.8
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 4
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	MOLE NO. LY 12

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
15							Begin coring at 16.4 ft.
	3	16.4					Light to medium gray, fine-grained, thin-bedded Dolomite, very thinly color-banded and mottled. Trace pits and vugs. Secondary gypsum seams in closely spaced partings. LOCKPORT DOLOMITE Partings moderately to severely weathered from 16.7 to 22.8 ft. Short vertical joint at 17.2 ft. Five closely spaced high angle cracks about 0.2 ft. long, from 17.3 to 20.8 ft. (Contract gradational)
	3						
	3						
20	3				SL-MOD		
	3						
	3	R-1	117 111	98 93			
	3						
	3				SL		
25	3					25.0	
	3	26.4					
	3						Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, vugs, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. ROCHESTER SHALE Heavily pitted zone and two partings from 24.9 to 25.1 ft. Vuggy parting at 28.7 and 32.3 ft. Severely weathered shaly partings at 31.0, 32.9 and 34.6 ft. Short vertical joints at 29.0 and 38.2 ft. (NOTE: Incomplete water return throughout boring.)
	3						
	3						
	3						
30	3						
	3	R-2	122 118	102 97*	SL		
	3						
	3						
35	3						
	3	36.4					
	3						ROCHESTER SHALE *RQD based on core recovered. Gypsum nodule, 0.1 ft. wide, at 41.3 ft. Severely weathered shaly parting at 41.4 ft. Moderately dipping vuggy parting from 47.2 to 47.3 ft.
	3						
	3						
	3						
40	3						
	3	R-3	122 120	102 98*	SL		
	3						
	3						
45	3						
	3	46.4					
	4						
	3				SL		
50	3						

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	— carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

H&A FORM 4E

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
50	4	R-4	120 108	100 90	SL	Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, vugs, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. ROCHESTER SHALE	
	3						
	3						
	3						
55	4	56.4				Light gray, thin to very thin, closely to moderately closely spaced Limestone beds from 57.3 to 120.2 ft.	
	3						
	3						
	4						
60	4	R-5	114 112	95 93	SL	Severely weathered iron-stained, shaly parting at 61.2 ft. ROCHESTER SHALE	
	3						
	4						
	4						
65	3	66.4				Short vertical crack in Limestone bed at 66.2 ft. Small gypsum nodule at 66.6 ft. Moderately weathered shaly partings at 70.2 and 70.4 ft. <u>High angle crack</u> from 72.0 to 72.5 ft.	
	4						
	3						
	4						
70	3	R-6	123 120	103 98*	SL	ROCHESTER SHALE *RQD based on core recovered.	
	4						
	4						
	4						
75	4	76.0				Short, moderately weathered moderately dipping joint at 76.8 ft.	
	4						
	4						
	4						
80	4	R-7	117 108	98 90	SL	ROCHESTER SHALE	
	4						
	4						
	4						
85	5						
	4						

PREPARED

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
V. Hard - Knife can't scratch Hard - scratches diff. Med. Hard - scratches easily Soft - grooves V. Soft - carves	Fresh V. slight Slight Moderate	Mod. Severe Severe V. Severe Complete	> 90% 90-75 75-50 50-25 < 25
		V. thin Thin Medium Thick V. thick	Excellent Good Fair Poor V. Poor
		V. Close Close Mod. Close Wide V. wide	
		< 2" 2" - 12" 12" - 36" 36" - 120" > 120"	

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
85	4	86.0			SL		Light to dark gray, fine-grained dolomitic Mudstone. Very thinly color-banded. Trace gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds. ROCHESTER SHALE Moderately weathered shaly partings at 85.4 and 86.6 ft. *RQD based on core recovered. Gypsum nodule, 0.2 ft. wide, at 96.9 ft.
	4						
	4						
	4						
	4						
-90	4						
	4	R-8	122 118	102 97*	SL		
	4						
	4						
	4						
-95	4	96.0					
	4						
	4						
	4						
	4						
-100	4		120 120	100 100	SL		
	4	R-9					
	4						
	4						
	4						
-105	4	106.0					
	4						
	4						
	4						
	4						
-110	4		117 117	98 98	SL		
	4	R-10					
	4						
	4						
	4						
-115	4	116.0					
	4						
	4						
	4						
	4						
120	4				SL		
	4	R-11					

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	- carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

77
H&A FORM 45

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
120	4	R-11	120 120	100 100	SL	120.2	Light to medium gray, fine to medium-grained, thin-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Trace pits and gypsum nodules. Secondary gypsum seams in closely spaced partings.
	4						
	4						
	5						
125	5	126.0					IRONDEQUOIT LIMESTONE Moderately weathered low angle joint with trace slickensides at 123.9 ft. Gypsum nodule, 0.2 ft. wide, at 124.3 ft. Severely weathered parting with gypsum seam at 124.8 ft. Severely weathered shaly parting at 127.8 ft. Smooth, moderately dipping joints with gypsum seams at 127.4 and 128.3 ft.
	5						
	4						
	4						
130	4	R-12	120 119	100 99	SL	130.0	IRONDEQUOIT LIMESTONE Severely weathered shaly partings at 130.6 and 134.4 ft.
	4						
	4						
	4						
135	4	136.0					Moderately weathered shaly parting at 136.5 ft.
	4						
	4						
	4						
140	4	R-13	122 122	102 100*	SL	137.6	Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE Three light gray, very thin Limestone beds from 137.7 to 138.7 ft. Smooth, curved low angle joint at 142.3 ft. Short vertical joint at 142.5 ft. *RQD based on core recovered. Black Shale from 143.0 to 143.4 ft.
	4						
	4						
	4						
	4						
145	4	R-14	118 118	98 98	SL	143.4	Dark greenish gray to grayish brown Shale. Trace fossils. LOWER SODUS SHALE Six light gray, thin to very thin shell limestone beds from 143.4 to 148.6 ft. High angle joint from 144.9 to 145.2 ft. Low angle joint with trace slickensides, at top of shell Limestone, at 145.2 ft. Moderately dipping joint with trace slickensides at base of shell limestone bed, from 145.4 to 145.5 ft. LOWER SODUS SHALE Grayish brown Shale from 149.0 to 155.1 ft. Low angle joint at 153.5 ft.
	5						
	5						
	4						
150	5						
	5.5						
	6						
	6						
	5						
155	6						

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

FRACTURE FREQUENCY (Fract./ft.)

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	F.F.	FIELD CLASSIFICATION AND REMARKS
			in.	%				
155	8	156.0			SL		2	Dark greenish gray Shale. Trace fossils. LOWER SODUS SHALE
	5					156.6	1/6	Light to medium gray, fine to medium-grained, crystalline, thin-bedded, fossiliferous Limestone, interbedded with dark gray, very thin Shale beds. Trace vugs and stylolites. Secondary gypsum seams in closely spaced partings. REYNALES LIMESTONE Very thin, siliceous, silty zones at 165.5 and 166.3 ft. Light gray, vertically cracked chert bed from 167.2 to 167.5 ft. Very thin chert zones at 167.9 and 168.3 ft. REYNALES LIMESTONE Very thin, siliceous, silty zone at 170.8 ft. 172.1 <u>Red, medium-grained, colitic</u> , fossiliferous 172.6 FURNACEVILLE MEMBER hematitic Limestone Zone of small vugs from 174.9 to 175.1 ft. Moderately dipping joint with trace slickensides from 175.8 to 175.9 ft.
	4							
	5							
160	5							
	5							
	4	R-15	120	100	SL			
	4		119	99				
	4							
	6.5							
165	5	166.0						
	5							
	5							
	5							
	6							
170	7							
	6							
	6	R-16	118	99	SL			
	5		115	96				
	7							
175	9	176.0				175.3	1/7	MAPLEWOOD SHALE
								Bottom of Boring at 176.0 ft. Borehole grouted to 3.0 ft., then backfilled to surface.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

77
H&A FORM 4

HALEY & ALDRICH, INC
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO LY 13

PROJECT CSOAP, Phase II

FILE NO 374813

CLIENT L.S.T.

SHEET NO 1 of 5

CONTRACTOR Drill and Test

LOCATION Heinrich Chevy Lot

GROUNDWATER DEPTH TO CASING SAMPLER CORE BARREL

ELEVATION 483.3 ft. NCD

DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	S/S	NX
26 May 81	AM	18.2	15.0	75.5	SIZE ID in.	1-3/8	2-1/8
27 May 81	AM	18.0	15.0	149.0	HAMMER WT lb.	140	---
					HAMMER FALL in.	30	---

DATE START 22 May 1981

DATE FINISH 27 May 1981

DRILLER G. Miller

INSPECTOR S. Putney

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
---------------	---------------	-----------------------	--------------------------	---------------	--------------------

FIELD CLASSIFICATION AND REMARKS

0.5					1.0	BLACKTOP
			18 100/.4	S-1		Very compact asphalt, cinders, little fine sand, trace brick fragments.
2.5					1.9	
			6 9 3	S-2	5.0 6.5	Medium compact black SILT, some sand, trace gravel, wood fragments, trace brick fragments.
- 5						
			3 2 2	S-3	10.0 11.5	Loose gray sandy SILT, little gravel.
- 10						- FILL -
					15.0	Very compact brown silty CLAY, some weathered bedrock.
- 15			100/.3	S-4	15.3	Top of rock at 15.5 ft.
- 20						
- 25						

FR

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 15.5 ft.
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK 133.5
10-20	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 4
20-30	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO LY 13
30-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
15							Begin coring at 15.5 ft.
	2	15.5					Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, gypsum nodules and fossils. Closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds, most of which are vertically cracked. ROCHESTER SHALE Severely weathered shaly partings at 16.8, 20.2, 21.0, 22.1, 28.0 and 30.1 ft.
	2						
	1						
	2						
20	2	R-1	118	98	MOD		
	2		112	93			
	2						
	2						
	2						
	2						
25	2	25.5					Curved, <u>high angle</u> joint from 17.3 to 17.5 ft. Smooth <u>vertical</u> joint from 18.6 to 19.4 ft. Short, <u>moderately dipping</u> joint at 19.9 and 28.0 ft. Short <u>vertical</u> joints at 31.2, 32.1, and from 33.8 to 33.9 ft. Severely weathered shaly parting at 33.9 ft. ROCHESTER SHALE Secondary gypsum seams in partings from 35.6 to 39.4 ft. Gypsum nodule, 0.1 ft. wide, at 37.7 ft. Vertical crack from 38.0 to 39.0 ft. Vertical <u>joint</u> from 39.9 to 40.1 ft.
	2						
	3						
	2				MOD		
	2						
30	1	R-2	117	98			
	2		108	90			
	2						
	1						
	2				SL		
35	2	35.5					
	1						
	1						
	2						
	1						
40	1	R-3	118	98	SL		
	1		118	98			
	2						
	1						
	1						
45	1	45.5					Curved <u>vertical</u> joint from 42.2 to 42.7 ft. ROCHESTER SHALE Severely weathered shaly partings at 42.9, 43.0 and 51.4 ft. Curved <u>vertical</u> joint from 48.6 to 48.8 ft. Short <u>vertical</u> joint at 51.5 ft.
	1						
	2						
	1	R-4			SL		
	1						
50	1						

PRELIMINARY

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
50	1 2	R-4	118 116	98 97	SL		Light to dark gray, fine-grained dolomitic mudstone. Trace pits and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds, most of which are vertically cracked.
	1						
	1						
	1						
55	1	55.5					
	1						ROCHESTER SHALE
	1						Short high angle joint at 56.7 ft.
60	1	R-5	118 117	98 98	SL		Severely weathered clayey parting at 59.5 ft. Severely weathered shaley partings at 61.5 and 62.1 ft Vertical joint from 64.4 to 64.8 ft.
	1						
	2						
	1						
	2						
65	2	65.5					
	1						ROCHESTER SHALE
	1						
	1						
70	1	R-6	108 108	90 90	SL		
	1						
	2						
	1						
	2						
75	2	75.5					
	2						
	2						
	2						
80	2	R-7	118 117	98 98	SL		ROCHESTER SHALE
	2						
	2						
	2						
	2						
85	2						
	2						

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
85	2	85.5			SL		Light to dark gray, fine-grained, dolomitic, fossiliferous Mudstone. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds. ROCHESTER SHALE
	2						
	3						
	2						
90	2	R-8	120	102	SL		
	2		120	100			
	2						
	3						
	2						
95	2	95.3				94.3	
	2						Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin, dolomitic Shale. Secondary gypsum seams in closely to moderately closely spaced partings. IRONDEQUOIT LIMESTONE Vertical joint from 94.3 to 94.5 ft. Severely weathered shaly partings at 95.8, 96.5, 97.2 and 98.2 ft. *RQD based on core recovered. Moderately to severely weathered shaly partings at 105.6, 108.2, 109.0 and 111.5 ft. IRONDEQUOIT LIMESTONE Short moderately dipping joint at 111.9 ft.
	2						
	3						
	2						
100	3	R-9	120	101	SL		
	2		119	99*			
	3						
	3						
	2						
105	2	105.2					
	3						
	2						
	2						
	3						
110	2	R-10	88	100	SL		
	3		79	90			
	3						
	4					112.5 F.F.	
	4		29	91	MOD		
	4		8	25	SL		
115	4	115.2					
	5						
	5		34	100			
	4	R-11	30	88		118.0	
	5						
	5		81	94	SL		
120	5		49	57			

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS	
			in.	%				
120	5	R-11			SL		5	Dark greenish gray to grayish brown Shale. Trace fossils.
	5					0	LOWER SODUS SHALE	
	5					0	Six light gray, thin to very thin shell Limestones from 118.0 to 123.5 ft.	
	5					4	Smooth, <u>low angle joint</u> at 119.4 ft.	
125	5		125.2				Short, <u>vertical joints</u> at 120.2 and 120.5 ft.	
	5	R-12			SL		2	Severely weathered partings at 123.4, 123.6 and 124.1 ft.
	6		78	100		0	LOWER SODUS SHALE	
	5		72	92		0	Severely weathered vertical joint from 124.1 to 124.4 ft.	
	3					0	Severely weathered <u>low angle joint</u> at 130.8 ft.	
130	3					1		
	4			>10				
	4			0				
	3		45	107		131.7		Light to medium gray, fine to medium-grained, crystalline, thin-bedded, fossiliferous Limestone, interbedded with dark gray, very thin shale beds.
	4		37	82*				Trace stylolites. Trace secondary gypsum seams in closely to very closely spaced partings.
135	2	135.2						REYNALES LIMESTONE
	2							Very thin, siliceous silty zones at 144.4 and 144.8 ft.
	4							<u>Low angle joints</u> with trace slickensides at 137.8 and 145.7 ft.
140	6	R-13	121	103	SL			*RQD based on core recovered.
	6		116	96*			REYNALES LIMESTONE	
	10							
	7							
	5							
145	6	145.0						147.2 Red, medium-grained, oolitic, fossiliferous
	7	R-14	49	103	SL			147.3 <u>FURNACEVILLE MEMBER</u> hematitic Limestone.
	5		45	92*				
	6							
	6	149.0						Bottom of Boring at 149.0 ft.
150								Borehole grouted to 4.0 ft., then backfilled to surface.

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS		WEATHERING		BEDDING/Joint SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

TEST BORING REPORT

MOLE NO. LY 14

PROJECT: CSOAP, Phase II

FILE NO 374813

CLIENT: L.S.T.

SHEET NO 1 of 6

CONTRACTOR: Warren George

LOCATION: Saratoga & Ambrose

ELEVATION: 503.6 ft. NCD *ck*

GROUNDWATER		DEPTH TO		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF MOLE	TYPE	
29 May	AM	10.7	15.0	180.9	SIZE 10 in.	3
					HAMMER WT lb.	140
					HAMMER FALL in.	30

DATE START: 27 May 1981

DATE FINISH: 29 May 1981

DRILLER: J. Texeira

INSPECTOR: M. Tierney

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
			3		0.0	
			7	S-1	1.5	Medium compact black medium to fine SAND, some silt, trace organics, trace fine gravel.
			9			- TOPSOIL -
3.0						
			10		5.0	
5			9	S-2	6.5	Medium compact brown SILT, trace clay.
			13			
			3		9.0	
10			9	S-3	10.5	Medium compact brown clayey SILT, trace coarse sand, trace fine gravel.
	10.8		12			
			66		10.8	
			50	S-4	12.3	Very compact coarse to fine SAND, some gravel, trace silt and clay.
15	15.0					Top of rock at 15.0 ft.
			150/1.0			
20						
25						

PRELIMINARY

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 15.0
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-20	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 4
20-50	COMPACT	8-15	STIFF	O — OPEN END ROD	
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	MOLE NO. LY 14

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
10							
		15.0					Begin coring at 15.0 ft.
15	3		12/8	92/62	SL		Light to medium gray, fine-grained, thin-bedded Dolomite, very thinly color-banded and mottled. Trace pits, vugs and fossils. Secondary gypsum seams in closely to very closely spaced partings. LOCKPORT DOLOMITE Partings moderately weathered from 15.4 to 25.7 ft. Smooth, vertical joint from 21.4 to 21.6 ft. (Contact gradational)
	3	16.1					
	3						
	3						
20	3						
	3	R-2	119/114	99/95	SL		
	3						
	3						
25	4						
	3	26.1				25.7	
	3						Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, vugs, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. ROCHESTER SHALE Vertical crack from 27.9 to 28.1 ft. Moderately weathered high angle joint from 28.4 to 29.0 ft. Vug, 0.1 ft., at 31.5 ft.
	3						
	3						
30	3						
	3	R-3	120/110	100/92	SL		
	3						
	3						
	3						
35	3						
	3	36.1					
	3						ROCHESTER SHALE Gypsum nodule, 0.1 ft. wide, in parting at 46.1 ft.
	3						
	3						
40	3						
	3	R-4	120/109	100/91	SL		
	3						
45	3						

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
45	3	46.1			SL		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. ROCHESTER SHALE Severely weathered shaly parting at 53.6 ft.
	3						
	3						
	3						
	3						
	3						
50	3	R-5	120	100	SL		
	3		119	99			
	3						
	3						
55	3	56.1					
	3						
	3						
	3						
	3						
60	3	R-6	120	100	SL		
	3		114	95			
	3						
	3						
	3						
65	3	66.1					
	3						
	3						
	3						
	3						
70	3	R-7	116	97	SL		
	3		113	94			
	3						
	3						
	3						
75	3	76.1					
	3						
	3						
	3						
	3						
80	3	R-8			SL		
	3						
	3						
	3						
	3						

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
V. Hard - Knife can't scratch Hard - scratches diff. Med. Hard - scratches easily Soft - grooves V. Soft - carves	Fresh V. slight Slight Moderate Mod. Severe Severe V. Severe Complete	V. thin Thin Medium Thick V. thick V. Close Close Mod. Close Wide V. wide < 2" 2" - 12" 12" - 36" 36" - 120" > 120"	> 90% 90-75 75-50 50-25 < 25 Excellent Good Fair Poor V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
80	3	R-8	120 118	100 98	SL		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds.
	3						
	3						
	3						
	3						
85	3	86.1					ROCHESTER SHALE
	3						Severely weathered shaly partings at 81.6, 81.7 and 93.0 ft.
	3						
	3						
90	3	R-9	113 113	94 100*	SL		
	3						
	3						
	3						
	3						
95	3	96.1					
	3						
	3						
	3						
	3						
100	3	R-10	75 73	127 97*	SL		
	3						
	3						
	3						
	3						
	3	101.0					
	3						
	3						
	3						
	3						
105	3	R-11	62 62	103 100*	SL		
	3						
	3						
	3						
	3						
	3	106.0					
	3						
	3						
	3						
	3						
110	3	R-12	123 123	100 100	SL		
	3						
	3						
	3						
	3						
115	3						

PREPARED

ROCHESTER SHALE

*RQD based on core recovered, rock cored in R-9 was recovered in R-10.

(NOTE: Gas forced water up casing at 106.0 ft.)

(NOTE: Incomplete water return from 106.0 ft. to bottom of boring.)

ROCHESTER SHALE

Smooth low angle joint with secondary gypsum seam at 111.6 ft. Vertical crack in Limestone bed from 112.7 to 113.0 ft. Increasingly fossiliferous Mudstone from 113.1 to 122.2 ft.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS	
			in.	%				
115	3	116.3					<p>Medium to dark gray, fine-grained, dolomitic, fossiliferous Mudstone, very thinly color-banded. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely spaced Limestone beds.</p> <p>ROCHESTER SHALE</p> <p>Vertical crack in Limestone bed from 116.5 to 116.6 ft.</p>	
	3							
	3							
	3							
120	3	R-13	116	97	SL	122.2		
	3		116	97				
	3							
	3							
125	3	126.3						<p>Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Secondary gypsum seams in closely to moderately closely spaced partings.</p> <p>IRONDEQUOIT LIMESTONE</p> <p>Low angle joint with trace slickensides at 123.4 ft.</p> <p>Low angle, vuggy partings at 124.7, 124.8 and 124.9 ft. High angle, vuggy but partly sealed joint from 125.1 to 125.3 ft. Low angle slickensided shear at 126.7 ft.</p> <p>* RQD based on core recovered.</p> <p>IRONDEQUOIT LIMESTONE</p>
	3							
	3							
	3	R-14	121	103	SL	136.1		
130	3		121	100*				
	3							
	3							
	3							
135	3	136.1						
	3							
	3							
140	3	R-15	120	100	SL	141.7		
	3		120	100				
	4							
	4							
145	5	146.1					<p>F.F.</p> <p>Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE. Light gray, very thin Limestone beds at 142.0, 142.9 and 145.5 ft. Very thin, black Shale zone at 147.2 ft.</p>	
	4							
	4							
	4	R-16			SL	147.4		
	4							
	4							
150	4							

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS						
			in.	%									
150	4	R-16	114 114	95 95	SL		0 0 0 1	Dark greenish gray to grayish brown Shale. Trace fossils.					
	4												LOWER SODUS SHALE
155	4							156.1				0	Grayish brown Shale from 150.8 to 158.3 ft.
	4											0	Curved, low angle joint with trace slickensides at 153.4 ft.
	4					0	Moderately weathered low angle joint at 159.2 ft.						
	4					0	Low angle joint with trace slickensides at 159.8 ft.						
160	4	R-17	115 114	97 97	SL	160.2	0 0 4 0	Light to medium gray, fine to medium-grained, crystalline, thin-bedded, fossiliferous Limestone, interbedded with dark gray, very thin Shale beds. Trace stylolites. Secondary gypsum seams in very closely to moderately closely spaced partings. REYNALES LIMESTONE					
	5												Low angle joint with trace slickensides at 161.4 ft.
	4												Cherty Siltstone from 172.4 to 172.8 ft. Very thin chert zone with vertical crack at 173.1 ft. REYNALES LIMESTONE
165	4							165.9					175.4 Red, medium-grained, oolitic, fossiliferous 175.6 FURNACEVILLE MEMBER hematitic Limestone REYNALES LIMESTONE
	4												
	4												
170	6	R-18	124 124	103 100*	SL								
	4												
	4												
175	4							175.9					
	4												
	4												
	4	R-19	50 50	83 100*	SL	178.5	0 0	Light greenish gray, argillaceous Shale. MAPLEWOOD SHALE.					
180	5							180.9					* ROD based on core recovered. Some rock left in borehole.
	1							Bottom of Boring at 180.9 ft.					
185								Borehole grouted to 3.0 ft., then backfilled to surface.					

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

TEST BORING REPORT

HOLE NO. LY 15

PROJECT: CSOAP, Phase II
CLIENT: L-S-T
CONTRACTOR: Drill and Test

FILE NO. 374813
SHEET NO. 1 of 5
LOCATION: RGE lot (Lake Ave.)
ELEVATION: 481.3 ft. NCD
DATE START: 20 Aug. 1981
DATE FINISH: 25 Aug. 1981
DRILLER: J. Jensen
INSPECTOR: E. Hanna

GROUNDWATER		DEPTH TO:			CASING SAMPLER CORE			
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	Auger	SS	NO
8-24-81	9:00	58	60	65	SIZE I D	in 4	1-3/8	1-7/8
8-25-81	8:00	74	60	108.5	HAMMER WT	lb --	140	--
					HAMMER FALL	in --	30	--

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 4 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5			7 8 18	S-1	0.0 1.5	Medium compact black COAL and CINDER, trace fine sand. - FILL -
			9 2 2	S-2	4.5 6.0	Loose brown medium-fine SAND, little coal, cinder and ash, trace silt and tile fragments. - FILL -
			3 7 16	S-3	9.5 11.0	Medium compact gray ASH, little coal, cinder and tile fragments, trace silt. - FILL -
15			17 2 8	S-4	14.5 16.0	No recovery.
			10 7 7	S-5	19.5 21.0	Medium compact brown coarse to fine SAND, trace fine gravel, trace silt, trace coal, cinder and tile fragments. - FILL -
25			1 5 7	S-6	24.5 26.0	Loose black SILT, little tile and wood fragments, trace fine sand, organics, coal, cinder and glass fragments. - FILL -
30			12		29.5	

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 60.0 ft.
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-15	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 12
15-30	COMPACT	8-15	STIFF	O — OPEN END ROD	
30+	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	HOLE NO. LY 15

TEST BORING REPORT

HOLE NO. LY 15

PAGE 2 OF 5

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
30			25 12	S-7	31.0	Medium compact black fine SAND, little silt, coal and wood fragments, trace fine gravel, trace glass. - FILL - (NOTE: Sampling terminated at 31.0 ft. in LY15a due to auger deflection. Offset 5 ft. south to hole LY15, augered to 34.5 ft., and continued.)
35			49 18 15	S-8	34.5 36.0	No recovery.
40			8 5 12	S-9	39.5 41.0	Medium compact black silty coarse to fine SAND, little coal and cinder, trace fine gravel, trace tile fragments. - FILL -
45			22 22 23	S-10	44.5 46.0	No recovery.
50			18 22 29	S-11	49.5 51.0	Medium compact brown clayey SILT, trace fine sand. - FILL -
55					54.5	
55			100/3	S-12	54.8	Very compact brown clayey SILT, trace medium to fine sand and clay. - FILL -
60	60.0		100/0			TOP OF ROCK AT 60.0 ft.
60						(NOTE: Drilled with roller bit from 59.5 to 60.0 ft.)

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: 60.0 ft.
4-10	Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: 12
30-50	Compact	8-15	Stiff	O _____ Open End Rod	
50+	Very Compact	15-30	Very Stiff	W _____ Wash Sample	
					HOLE NO. LY 15

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
55							(NOTE: Core barrel blocked at 83.9 ft.) Begin coring at 60.0 ft.
60	4 5 4 5	60.0 R-1	60 33	100 55	MOD-SEV		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, vugs and fossils. Closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds, most of which have rough vertical joints. ROCHESTER SHALE
65	2 2 2 2	R-2	104 80	100 77	MOD-SEV		Partings moderately to severely weathered from 60.4 to 73.7 ft. Iron-stained vertical joints from 60.3 to 60.9, 61.1 to 61.4, 62.1 to 62.4, 62.9 to 63.1, 64.6 to 65.0, 65.6 to 65.8, 67.7 to 68.1 and 69.1 to 69.3 ft. Vug, 0.1 ft. wide, in parting at 66.6 ft. Iron-stained, smooth, curved high angle joints from 72.4 to 72.8 and from 73.0 to 73.6 ft. Severely weathered shaly partings at 74.0 and 81.5 ft. ROCHESTER SHALE
70	2 2 2	73.7					
75	3 2 3 3	R-3	119 118	99 98	SL		Increasingly fossiliferous Mudstone from 74.2 to 82.9 ft.
80	3 3 3 3	83.7			MOD	82.9	
85	3 3 3	R-4 83.9	3 0	125 0	SEV		* RQD based on core recovered; some rock cored in R-5 was recovered in R-6. Light to medium gray, fine to medium-grained, thin to medium-bedded fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Trace pits and vugs, closely to very closely spaced argillaceous partings. IRONDEQUOIT LIMESTONE
90	3 3	R-5 88.9	49 48	82 98*	SL-MOD-SEV		Rough high angle joint, coated with drusy calcite from 83.3 to 83.7 ft. Moderately dipping joint faced with 0.1 ft. of clay from 83.7 to 83.9 ft.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	-- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	-- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
90	3	R-6	117 115	107 98*	SL-MOD	102.1	Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone; interbedded with dark gray, thin to very thin dolomitic Shale. Trace pits and vugs. Closely to very closely spaced argillaceous partings. IRONDEQUOIT LIMESTONE Rough high angle joint from 84.1 to 84.3 ft. Smooth, moderately dipping joint with severely weathered clay seam from 84.5 to 84.7 ft. Vug, 0.2 ft. wide in vuggy zone from 85.1 to 85.8 ft. *RQD based on core recovered; some rock cored in R-5 was recovered in R-6. Rough high angle joint from 86.3 to 86.7 ft. Severely weathered clayey partings at 87.0, 87.3, 88.8, 91.2, 93.5, 100.8 and 101.1 ft. Severely weathered clay bed from 98.3 to 98.4 ft. Severely weathered, iron-stained vuggy zones from 88.6 to 88.8 and 89.8 to 90.2 ft.
	3						
	3						
	3						
95	3	R-6	117 115	107 98*	SL	102.1	Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone; interbedded with dark gray, thin to very thin dolomitic Shale. Trace pits and vugs. Closely to very closely spaced argillaceous partings. IRONDEQUOIT LIMESTONE Rough high angle joint from 84.1 to 84.3 ft. Smooth, moderately dipping joint with severely weathered clay seam from 84.5 to 84.7 ft. Vug, 0.2 ft. wide in vuggy zone from 85.1 to 85.8 ft. *RQD based on core recovered; some rock cored in R-5 was recovered in R-6. Rough high angle joint from 86.3 to 86.7 ft. Severely weathered clayey partings at 87.0, 87.3, 88.8, 91.2, 93.5, 100.8 and 101.1 ft. Severely weathered clay bed from 98.3 to 98.4 ft. Severely weathered, iron-stained vuggy zones from 88.6 to 88.8 and 89.8 to 90.2 ft.
	4						
	3						
	4						
100	3	R-7	126 94	100 75	SL	102.1	Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE Light gray, very thin Limestone beds at 102.2, 103.0, 105.3, 107.5, 108.0 and 108.4 ft. Dark gray Shale from 108.0 to 108.4 ft. Smooth high angle joints from 103.1 to 103.8 (with calcite and drusy pyrite) and 104.9 to 110.8 ft.
	4						
	4						
	4						
105	4	R-7	126 94	100 75	SL	102.1	Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE Light gray, very thin Limestone beds at 102.2, 103.0, 105.3, 107.5, 108.0 and 108.4 ft. Dark gray Shale from 108.0 to 108.4 ft. Smooth high angle joints from 103.1 to 103.8 (with calcite and drusy pyrite) and 104.9 to 110.8 ft.
	5						
	4						
	5						
110	4	R-8	117 75	98 63	SL-MOD	108.4	Dark greenish gray Shale. Trace fossils. LOWER SODUS SHALE Six light gray very thin shell Limestone beds from 109.3 to 111.5 ft. Rough, moderately dipping joint from 110.5 to 110.6 ft. Smooth high angle to vertical joint, one side of which is severely weathered, with compact clay, showing drag, from 113.2 to 119.2 ft. Severely weathered clay bed from 113.9 to 114.2 ft. Intersecting vertical joints from 115.4 to 116.3 ft. LOWER SODUS SHALE Severely weathered clayey parting at 120.5 ft. Smooth, high angle joint from 120.5 to 120.8 ft. Short high angle joint and severely weathered clayey parting at 121.5 ft. *RQD based on core recovered.
	5						
	5						
	5						
115	5	R-8	117 75	98 63	SL-MOD	108.4	Dark greenish gray Shale. Trace fossils. LOWER SODUS SHALE Six light gray very thin shell Limestone beds from 109.3 to 111.5 ft. Rough, moderately dipping joint from 110.5 to 110.6 ft. Smooth high angle to vertical joint, one side of which is severely weathered, with compact clay, showing drag, from 113.2 to 119.2 ft. Severely weathered clay bed from 113.9 to 114.2 ft. Intersecting vertical joints from 115.4 to 116.3 ft. LOWER SODUS SHALE Severely weathered clayey parting at 120.5 ft. Smooth, high angle joint from 120.5 to 120.8 ft. Short high angle joint and severely weathered clayey parting at 121.5 ft. *RQD based on core recovered.
	5						
	5						
	5						
120	5	R-9	85 60	101 71*	SL	121.5	Light to medium gray, fine-grained, thin to very thin-bedded fossiliferous Limestone, interbedded with dark gray, very thin Shale. REYNALES LIMESTONE Smooth vertical joint from 122.5 to 122.7 ft.
	5						
	5						
	5						
125	3	R-9	85 60	101 71*	MOD	121.5	Light to medium gray, fine-grained, thin to very thin-bedded fossiliferous Limestone, interbedded with dark gray, very thin Shale. REYNALES LIMESTONE Smooth vertical joint from 122.5 to 122.7 ft.

FRACTURE FREQUENCY (Fract./ft.)

102.1

108.4

121.5

FIELD HARDNESS

WEATHERING

BEDDING/JOINT SPACING

RQD

V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- urooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- Carves			V. thick	V. wide	> 120"	< 25	V. Poor

M&A FORM MAR 77

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
125	3	R-9 128.5			MOD		Light to medium gray, fine to medium-grained, crystalline, thin-bedded fossiliferous Limestone, interbedded with dark gray, very thin Shale beds. Trace pits, vugs and stylolites. Closely to very closely spaced argillaceous partings. REYNALES LIMESTONE
	3						
	3				SL		
	3						
130	2	R-10 138.5					Rough high angle joint in Shale, one side of which is compact clay showing drag from 123.0 to 123.5 ft. Rough vertical joint in Limestone, moderately to severely weathered, open and vuggy, with drusy pyrite, from 123.5 to 129.0 ft. Vertical crack from 129.0 to 129.7 ft. Very thin, hard siliceous zone at 131.2 ft.
	2						
	2						
	2						
	2				SL		
	2						
135	2	R-10 138.5	122	102			Chert from 133.4 to 134.1, 134.4 to 134.6 and 135.0 to 135.8 ft. Rough vertical crack from 133.4 to 137.0 ft. 137.4 Red, medium-grained, oolitic, fossiliferous, 137.9 <u>FURNACEVILLE MEMBER</u> hematitic Limestone REYNALES LIMESTONE
	2		116	95*			
	2						
	2						
140	5	R-11 148.5	23	96	SL		Light greenish gray argillaceous Shale. MAPLEWOOD SHALE Five low angle joints from 140.5 to to 140.8 ft. Smooth low angle joints at 140.9, 141.7, 145.1, 146.1 and 146.8 ft. Smooth moderately dipping joints at 142.3 and 146.5 ft. Rough vertical joint from 146.0 to 146.1 ft. Short high angle joint at 146.6 ft. Low angle slickensided shear at 146.9 ft. Smooth vertical joint from 146.9 to 147.3 ft. * RQD based on core recovered, some rock left in hole.
	5		23	96	SEV		
	5						
	5						
	5						
	5						
145	5	R-11 148.5	81	84	SL		Bottom of Boring at 148.5 ft. Borehole grouted to depth of 12.0 ft. and backfilled to surface. ** FRACTURE FREQUENCY (Fract./ft.)
	5		70	73*			
	5				MOD-SEV		
	5						
150	-						

FIELD HARDNESS

WEATHERING

BEDDING/JOINT SPACING

RQD

V. Hard	-- Knife can't scratch
Hard	-- scratches diff.
Med. Hard	-- scratches easily
Soft	-- grooves
V. Soft	-- carves

Fresh	Mod. Severe
V. Slight	Severe
Slight	V. Severe
Moderate	Complete

V. thin	V. Close	< 2"	> 90%	Excellent
Thin	Close	2" - 12"	90-75	Good
Medium	Mod. Close	12" - 36"	75-50	Fair
Thick	Wide	36" - 120"	50-25	Poor
V. thick	V. wide	> 120"	< 25	V. Poor

M&A FORM 4-L AR 77

COMBUSTIBLE GAS MEASUREMENT

PROJECT CSOAP, Phase II FILE NO. 374813 BORING NO. LY 15

INSPECTOR E. Hanna DRILLER J. Jensen

DATE	ELAPSED TIME (MIN.)	BOTTOM OF HOLE (FT)	METER READING (%)	REMARKS
21 Aug. 1981	0	65.0	0	
24 Aug. 1981	0	73.7	0	
	0	88.9	0	
	0	108.5	0	
25 Aug. 1981	0	118.5	0	
25 Aug. 1981	0	148.5	0	End of Boring

PROJECT: CSOAP, Phase II
 CLIENT: L-S-T
 CONTRACTOR: Parratt-Wolff Inc.

FILE NO. 374813
 SHEET NO. 1 of 6
 LOCATION: RG&E lot Lake Ave.
 ELEVATION: 486.2 ft. NCD
 DATE START: 3 Oct. 1981
 DATE FINISH: 8 Oct. 1981
 DRILLER: G. LaRock
 INSPECTOR: S. Vinci

GROUNDWATER			DEPTH TO: (ft.)		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE		
5-10-81	8:45AM	54.2	70.0	71.0	Auger	SS	NX
					SIZE ID in	1-3/8	2-1/8
					HAMMER WT lb	140	
					HAMMER FALL in	30	

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 4 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
2.5			4	S-1	0.0	Medium compact black CINDERS, little silt. - FILL -
			13		1.5	
			11			
5			3	S-2	5.0	Loose brown coarse to fine SAND, trace silt, trace brick. - FILL -
			3		6.5	
			2			
10	11.0		6	S-3	10.0	Loose black COAL and CINDERS, little silt. - FILL -
			2		11.5	
			4			
15			3	S-4	15.0	Medium compact black ASH, trace cinder.
			7		16.5	
			5			
20			2	S-5	20.0	Loose black SILT, little coarse to fine sand, little brick, trace cinders. - FILL -
			4		21.5	
			1			
25			10	S-6	25.0	NO RECOVERY.
			12		26.5	
			11			
30						

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 74.5 ft.
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 16
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. LY 18
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

H&A CORP.

TEST BORING REPORT

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
30			7 12 15	S-7	30.0 31.5	Medium compact silty coarse to fine SAND, trace wood, trace cobble. - FILL -
35			11 8 12	S-8	35.0 36.5	Medium compact black SILT, little coarse to fine sand, little ash, trace wood.
40			11 11 9	S-9	40.0 41.5	Medium compact black ASH, little silt, trace coal. - FILL -
45			9 7 7	S-10	45.0 46.5	Medium compact black CINDER, COAL and ASH, trace silt, trace brick.
50			9 6 7	S-11	50.0 51.5	Medium compact black SILT and ASH. - FILL -
55			4 5 5	S-12	55.0 56.5	Medium compact black SILT, little ash, brick and cinder, little sand.
60			5 8 7	S-13	60.0 61.5	Medium compact black CINDERS, GLASS and ASH, little silt, little sand. - FILL -
65						

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: 74.5 ft.
4-10	Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: 16
30-50	Compact	8-15	Stiff	O _____ Open End Rod	
50+	Very Compact	15-30	Very Stiff	W _____ Wash Sample	
					HOLE NO. IY 18

H & A SEP. 71

TEST BORING REPORT

HOLE NO. LY 18

PAGE 3 OF 6

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
65	65.5		12 28 37	S-14	65.0 66.5	Very compact brown SILT, trace fine sand, trace clay.
70			17 100/5	S-15	70.0 71.0	Very compact brown SILT, trace fine sand, trace organics.
					74.3	Decomposed SHALE.
75			100/2	S-16	74.5	TOP OF ROCK AT 74.5 FT.

PRELIMINARY

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	Very Loose	0-2	Very Soft	S _____ Split Spoon	Overburden: 74.5 ft.
4-10	Loose	2-4	Soft	T _____ Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U _____ Undisturbed Piston	Samples: 16
30-50	Compact	8-15	Stiff	O _____ Open End Rod	
50+	Very Compact	15-30	Very Stiff	W _____ Wash Sample	
					HOLE NO. LY 18

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
70							(NOTE: Intermittent and incomplete water return throughout boring.)
75	4	75.2			SEV		Begin coring at 75.2 ft.
	4				MOD		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace fossils. Closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds. ROCHESTER SHALE
	4						
	4						
	4						
80	4	R-1	103	95			Partings severely weathered and clayey from 75.3 to 79.2 ft. Intersecting rough vertical and high angle joints from 75.5 to 75.7 ft. Short vertical joint at 76.3 ft. Vertical joint in limestone bed from 76.7 to 77.1' ft. Short rough vertical joint at 77.3 ft. Rough high angle joint from 78.9 to 79.7 ft. Rough vertical joint from 81.3 to 81.6 ft. Increasingly fossiliferous from 81.0 to 89.1 ft. Moderately weathered low angle joints at 87.2 and 88.4 ft.
	2		91	84			
	2						
	3				SL		
	2	84.2					
	3						
85	2						
	2				MOD		
	3				SL		
	2	R-2	119	100	MOD	89.1	Light to medium gray, fine to medium-grained, thin to medium-bedded fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Trace pits and vugs. Very closely to moderately closely spaced argillaceous partings, most of which are severely weathered and clayey. IRONDEQUOIT LIMESTONE Severely weathered, vertical joint in Shale from 90.2 to 90.3 ft. Severely weathered clayey partings at 90.6, 91.2, 91.6, 91.8, 93.2, 93.6, 93.8, 96.4, 97.1, 97.3, 98.1, 98.7, 98.9, 101.0 and 102.0 ft. Smooth, short, moderately dipping joint with trace slickensides at 92.7 ft. IRONDEQUOIT LIMESTONE Moderately to severely weathered vuggy partings at 94.1 and 95.2 ft. Severely weathered, clayey low angle joints at 97.2 and 103.1 ft.
	2		93	78	SL		
	2				SEV		
	2				SL		
	3						
	2	94.1					
95	2						
	2				MOD		
	4						
	2						
	2	R-3	119	100			Smooth, short, moderately dipping joint with trace slickensides at 92.7 ft. IRONDEQUOIT LIMESTONE Moderately to severely weathered vuggy partings at 94.1 and 95.2 ft. Severely weathered, clayey low angle joints at 97.2 and 103.1 ft.
	4		108	91			
100	4						
	4				SL		
	2						
	2						
	2	104.0					
	2				MOD		
105	2						

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	- carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

HSA FORM 48

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
105	2	R-4	116 108	97 90	MOD	107.1	Light to medium gray Limestone and dark gray Shale. IRONDEQUOIT LIMESTONE
	3						Severely weathered shaly partings at 105.9 and 106.1 ft.
	3						Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE
	2						Light gray, very thin Limestone beds at 107.2 (vertically cracked), 108.1, 112.4, 112.8 and 112.9 ft.
110	3						Smooth high angle joint from 108.7 to 108.8 ft.
	3						Intersecting smooth vertical and high angle joints from 112.4 to 112.8 ft. Dark gray to black Shale beds from 112.3 to 113.3 ft.
	3						114.0
	3						113.3
	3						115
	3						115
	6	R-5	115 111	96 93	SL-MOD	113.3	Dark greenish gray to grayish brown Shale. Trace fossils. LOWER SODUS SHALE
	3						Nine light gray, very thin shell Limestone beds from 113.3 to 119.3 ft. Rough, iron-stained, moderately dipping joint from 114.7 to 114.8 ft. Rough, iron-stained high angle crack in very thin Limestone bed at 115.3 ft. Rough, iron-stained vertical joint in very thin Limestone bed at 116.5 ft.
	3						Grayish brown Shale from 116.6 to 124.7 ft. LOWER SODUS SHALE
	4						Short rough vertical joint in very thin Limestone bed at 118.6 ft. Smooth low angle joint at 118.7 ft. Severely weathered clayey partings at 125.1 and 126.0 ft.
120	3						124.0
	3						125
	3						125
	3						125
	3						125
	3						125
	2	R-6	89 80	93 83	SL-MOD	126.0	Light to medium gray, fine to medium-grained, crystalline, thin-bedded fossiliferous Limestone, interbedded with dark gray, very thin Shale beds. Trace pits, vugs and stylolites. Closely to very closely spaced argillaceous partings. REYNALES LIMESTONE
	2						Very thin, severely weathered clayey Shale bed at 128.3 ft. Vertical joint from 128.3 to 128.6 ft.
	2						Severely weathered clayey partings at 131.7, 136.1, 136.9, 137.1, 137.7 and 139.4 ft. Very thin, hard siliceous zones at 132.2, 138.1 and 138.3 ft. Smooth high angle joint from 134.6 to 134.7 ft. Secondary gypsum seams in partings at 132.2, 132.6, 132.9, 133.1 and 133.4 ft. REYNALES LIMESTONE
130	1						134.0
	2						135
	1						135
	2						135
	1						135
	2						135
	3						135
	3	R-7	120 116	100 97	SL-MOD	135	Finely pitted chert from 137.0 to 137.6 ft.
	1						135
	2						135
	3						135
10	2	135					

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
- Knife can't scratch - scratches diff. Hard - scratches easily - grooves Soft - carves	Fresh V. slight Slight Moderate Mod. Severe Severe V. Severe Complete	V. thin Thin Medium Thick V. thick V. Close Close Mod. Close Wide V. wide < 2" 2" - 12" 12" - 36" 36" - 120" > 120"	> 90% 90-75 75-50 50-25 < 25 Excellent Good Fair Poor V. Poor

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
140	2 3 2 2	R-7 144.0			SL MOD		Light to medium gray, fine to medium-grained Limestone. REYNALES LIMESTONE 141.5 Red, medium-grained, oolitic, fossiliferous 142.1 FURNACEVILLE MEMBER hematitic Limestone. Very thin, hard siliceous zone at 140.2 ft. Severely weathered shaly partings at 140.7, 142.6 and 143.1 ft. Low angle joint at 143.9 ft.
145	3 3 4 4 5	R-8 149.0	14 12	130 86*	SL	144.9	** 5 3 3 3 Light greenish gray argillaceous Shale. MAPLEWOOD SHALE ** FRACTURE FREQUENCY (Fract./ft.)
150							Bottom of Boring at 149.0 ft. Borehole grouted to depth of 52.5 ft. and backfilled to surface. *RQD based on core recovered.
155							

PRELIMINARY

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
V. Hard - Knife can't scratch Hard - scratches diff. Med. Hard - scratches easily Soft - grooves V. Soft - carves	Fresh V. slight Slight Moderate Mod. Severe Severe V. Severe Complete	V. thin V. Close < 2" Thin Close 2" - 12" Medium Mod. Close 12" - 36" Thick Wide 36" - 120" V. thick V. wide > 120"	> 90% Excellent 90-75 Good 75-50 Fair 50-25 Poor < 25 V. Poor

H & A FORM 4B - M-1-1977

TEST BORING REPORT

HOLE NO. SM 2

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

FILE NO. 374813
SHEET NO. 1 of 6
LOCATION: Spencer & Cliff
ELEVATION: 482.0 ft. 483.1 ⁴⁸²
DATE START: 12 Feb. 1981
DATE FINISH: 16 Feb. 1981
DRILLER: J. Jensen
INSPECTOR: S. Putney

GROUNDWATER		DEPTH TO:		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	
					SS	NX
					SIZE I D in	3
					HAMMER WT lb	300
					HAMMER FALL in	24
						1-3/8
						2-1/8
						140
						30

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
5			4	S-1	1.5
			16		3.0
			34		
5			5	S-2	4.5
			3		6.0
			3		
8.0					
10			3	S-3	9.5
			4		11.0
			7		
12.0					
15			100/1	S-4	14.5
					14.6
18.3			100/0		
20					
25					

FIELD CLASSIFICATION AND REMARKS

Compact brown silty fine SAND, little fine gravel, trace brick fragments.

Loose black cinders, decomposed coal.

- FILL -

Medium compact brown SILT, little fine sand, little clay.

Brown clayey SILT and decomposed rock fragments.

TOP OF ROCK AT 18.3 ft.

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 18.3 ft.
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-6	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 4
30-50	COMPACT	8-15	STIFF	B — OPEN END ROD	HOLE NO. SM 2
50+	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
							Begin coring at 18.3 ft.
20	4.0 3.0 3.5 3.0 2.5 2.5 2.0	18.3 R-1	120 98	100 82	SL- MOD		Light to medium gray, fine-grained dolomitic mudstone, very thinly color banded. Secondary gypsum seams in closely to very closely spaced partings. Trace pits, small vugs and fossiles. ROCHESTER SHALE Very thin, light gray, closely spaced limestone beds from depth of 22.0 to 89.8 ft. Many of these beds vertically cracked.
25	2.0 2.5 2.0 2.0 2.5	28.3					High angle, moderately weathered curved joint from depth of 21.2 to 21.4 ft.
30	3.0 2.5 3.0 3.0 2.5	R-2	120 109	100 91	SL		Severely weathered shaley partings at depths of 21.0, 22.3 and 23.9 ft. Thin beds of severely weathered clayey shale at depths of 27.6 and 34.1 ft. ROCHESTER SHALE
35	2.0 2.5 2.5 2.8						Gypsum nodule, 0.1 ft. wide, at depth of 38.5 ft.
40	10.0 11.0 11.5 10.0 5.0 3.0	38.3 R-3 41.3	37 27	103 73*	SL		* RQD based on core recovered. ROCHESTER SHALE (NOTE: Replaced bit after R-3.)
45	2.0 3.0 4.0 3.0 3.0 4.0	R-4	117 104	98 87	SL	43.3 PT4 50.0	ROCHESTER SHALE

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	-- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	-- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	-- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	-- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	-- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS		
			in.	%					
50	3.0	51.3					Light to medium gray, fine-grained dolomitic Mudstone, very thinly color banded. Secondary gypsum seams in closely spaced partings. ROCHESTER SHALE		
	5.0								
	6.0								
	3.0								
	3.5								
55	3.5	R-5 55.9	120	100	SL	55.9	Small vug, partly filled with gypsum, at depth of 50.1 ft. Thin severely weathered clayey shale beds at depths of 52.1 and 52.6 ft.		
	2.5		114	95					56.9
	2.5								
	3.5								
	4.0								
60	3.0	61.3					ROCHESTER SHALE		
	3.0								
	2.5								
	2.5								
	2.5								
65	2.0	R-6 71.3	120	100	SL		ROCHESTER SHALE		
	2.5		118	98					
	2.5								
	2.5								
	3.0								
70	2.5	71.3					ROCHESTER SHALE		
	2.5								
	3.0								
	2.5								
	2.5								
75	2.5	R-7 81.3	120	100	SL		ROCHESTER SHALE		
	3.0		98	82					
	3.5								
	3.5								
	2.5								
80	2.0	81.3					Gypsum nodule, 0.1 ft. wide, at depth of 80.5 ft. ROCHESTER SHALE		
	4.0								
	4.0								
	3.5								
	3.5								
85	3.5								

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

MSA FORM 48

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
5	3.5	R-8	120 110	100 92	SL	89.8	Light to medium gray fine-grained dolomitic mudstone, very thinly color banded. Secondary gypsum seams in closely spaced partings. ROCHESTER SHALE High angle curved joint at depth of 87.3 to 87.7 ft.
	3.5						
	3.0						
	2.5						
	2.5						
90	2.5	91.3					Light to medium gray, fine to medium-grained fossiliferous limestone, thin to medium bedded. Interbedded with very thin, dark gray dolomitic shale. IRONDEQUOIT LIMESTONE
	4.5						
	3.0						
	3.0						
	3.5						
95	3.0	R-9	121 120	101 99*	SL		Thin to very thin severely weathered shale beds at depths of 101.0, 102.0, 102.6, 103.4, 110.0 and 110.5 ft. * RQD based on core recovered.
	3.0						
	2.5						
	2.5						
	2.5						
-100	2.0	101.3					
	4.0						
	5.5						
	4.0						
-105	4.0	R-10	119 105	99 88	SL	106.6 107.6	IRONDEQUOIT LIMESTONE
	3.0						
	2.0						
	2.0						
	2.5						
-110	3.5	111.3					Several very thin, severely weathered shale beds from depth of 112.9 to 117.5 ft.
	3.0						
	5.5						
	3.5						
	4.0						
-115	3.0	R-11	74 46	100 62	SL-MOD	110.3 PT3 117.0 117.5	IRONDEQUOIT LIMESTONE
	5.0						
	4.0						
	8.0						
	4.0						
-120	5.0		46 43	100 93		119.5 120 2 6	Dark greenish gray shale. Trace fossils. WILLIAMSON SHALE

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
120	7.0	121.3				9	Dark greenish gray shale. Trace fossils.
	4.0					120.6	Dark gray to black shale with very thin light gray, very closely spaced limestone beds from depth of 122.8 to 123.4 ft.
	4.0		36/16	100/44	SL	>10	WILLIAMSON SHALE
	4.0					6	123.8
125	3.0	R-12				123.9	Dark greenish gray to grayish brown Shale.
	4.0					124.3	
	5.0					125.7	FRACTURE FREQUENCY
	4.0		84/61	100/73	SL-MOD	6	LOWER SODUS SHALE
	4.0					6	Several thin to very thin light gray shell limestone beds from depth of 124.6 to 126.6 ft.
130	5.0	131.3				PT2	Low angle joint at depth of 129.5 ft.
	4.5					7	Grayish brown shale from depth of 129.6 to 135.3 ft.
	5.0					>10	
	4.5					10	LOWER SODUS SHALE
	3.5		59/41	100/69	SL-MOD	>10	Severely weathered clayey partings at depths of 129.6, 134.7 and 135.3 ft.
135	3.5	R-13				>10	
	5.0					1	
	3.5					136.2	Light to medium gray, fine to medium-grained, thin-bedded fossiliferous Limestone, interbedded with very thin dark gray, closely to very closely spaced shale beds. Trace stylolites.
	4.0		61/53	100/87	SL	136.3	
140	3.0	141.3				PT1	
	2.5						
	3.0						
	4.5						
	3.5					143.0	REYNALES LIMESTONE
145	4.5	R-14					Three very thin, very closely spaced, severely weathered clayey shale beds from depth of 137.0 to 137.6 ft.
	3.0		120/114	100/95	SL		
	3.5					147.0	
	4.0						
	5.0					148.2	
150	4.0	151.3					
	4.0						
	5.0					151.4	Red, medium-grained, oolitic, fossiliferous hematitic Limestone.
	5.0		44/34	100/77	SL	152.1	FURNACEVILLE MEMBER
155	4.0					REYNALES LIMESTONE	

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- wooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
155	4.0	156.6	19 0	100 0	MOD- SEV.	155.0	<p><i>FRACTURE FREQUENCY</i></p> <p>>10 Light greenish gray argillaceous Shale.</p> <p>10 MAPLEWOOD SHALE</p> <p>Bottom of boring at 156.6 ft.</p> <p>Observation well installed in completed borehole.</p>
160							

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD	
V. Hard - Knife can't scratch Hard - scratches diff. Med. Hard - scratches easily Soft - grooves V. Soft - carves	Fresh V. slight Slight Moderate	Mod. Severe Severe V. Severe Complete	V. thin V. Close < 2" Thin Close 2" - 12" Medium Mod. Close 12" - 36" Thick Wide 36" - 120" V. thick V. wide > 120"	> 90% Excellent 90-75 Good 75-50 Fair 50-25 Poor < 25 V. Poor

OW/PZ NUMBER: <u>OW SM 2</u>		NCD ELEVATION SUBTRAHEND <u>483.1 ft.</u>		FILE NO. <u>374813</u> PAGE NO. <u>2 of 2</u>		
DATE	TIME	ELAPSED TIME	DEPTH OF WATER FROM <u>surface</u>	ELEVATION OF WATER	REMARKS	READ BY
20 Feb. 1981	PM		26.0 ft.	457.1 ft.		SP
		0	0.0	483.1	Flush Test	
		1	23.5		"	
		2	25.3		"	
		3	25.5		"	
		4 min.	26.1	457.0	"	
23 Feb. 1981	AM	3 days	30.0	453.1		SP
15 Apr. 1981	PM	54	31.3	451.8		FS
1 May 1981	AM	70	29.7	453.4		SP
		0 min.	28.2	454.9	Flush Test (Poured in 1 gal.)	
		1	28.9		"	
		2	29.0		"	
		5 min.	29.0	454.1	"	
1 June 1981	AM	101 days	29.0	454.1		SP
24 June 1981	PM	124 days	29.0	454.1		MW
20 July 1981	AM	150 days	29.0	454.1		FS
5 Aug. 1981	AM	166 days	29.5	453.6	0% gas reading	ERH
21 Sept. 1981	AM	214 days	29.5	453.6	0% gas reading	ERH
20 Oct. 1981	PM	243 days	30.4	452.7		SMV
4 Nov. 1981	PM	258 days	29.0	454.1		ERH
		0 min.	26.0	457.1	Flush Test (Poured in 5 gal.)	ERH
6 Nov. 1981	PM	260 days	30.0	453.1		SMV
				455.0		

COMBUSTIBLE GAS MEASUREMENT

PROJECT CSOAP, Phase II FILE NO. 374813 BORING NO. SM 2

INSPECTOR S. Putney DRILLER J. Jensen

DATE	ELAPSED TIME (MIN.)	BOTTOM OF HOLE (FT)	METER READING (%)	REMARKS
13 Feb. 1981	0	61.3	0	
	0	71.3	0	
	0	81.3	0	
	0	91.3	0	
	0	101.3	0	
	10	101.3	0	
	0	111.3	0	
	10	111.3	0	
16 Feb. 1981	2 days	111.3	0	Hole capped over weekend
	0	121.3	0	
	0	131.3	0	
	0	141.3	0	
	10	141.3	0	
	0	151.3	0	
	0	156.3	0	
	10	156.3	0	End of Boring

GROUND WATER OBSERVATION WELL REPORT

PROJECT: CSOAP, PHASE II
 LOCATION: Rochester, NY
 CLIENT: L.S.T.
 CONTRACTOR: Drill and Test
 DRILLER: J. Jensen INSPECTOR: S. Putney
 INSTALLATION DATE: 20 Feb. 1981

FILE NO. 374813
 WELL NO. OW SM 2
 BORING NO. SM 2
 LOCATION Spencer
and Cliff
 SHEET 1 OF 2

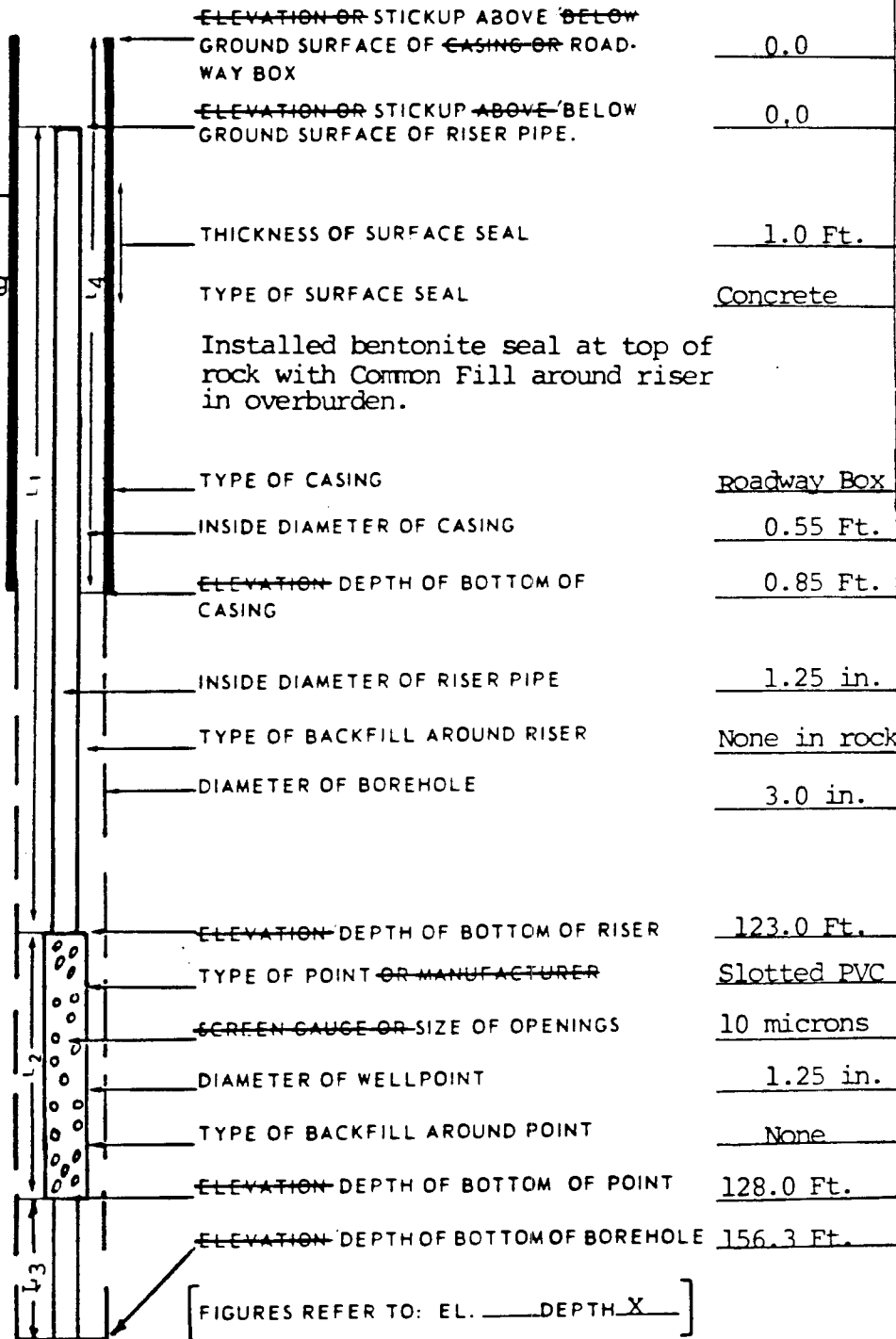
SURVEY DATUM NCD

GROUND ELEVATION 483.1 ft.

Refer to test boring log for description of soil and rock conditions.

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)

OVERBURDEN THICKNESS (ft) 18.3



ELEVATION OR STICKUP ABOVE BELOW GROUND SURFACE OF CASING OR ROADWAY BOX	0.0
ELEVATION OR STICKUP ABOVE BELOW GROUND SURFACE OF RISER PIPE.	0.0
THICKNESS OF SURFACE SEAL	1.0 Ft.
TYPE OF SURFACE SEAL	Concrete
Installed bentonite seal at top of rock with Common Fill around riser in overburden.	
TYPE OF CASING	Roadway Box
INSIDE DIAMETER OF CASING	0.55 Ft.
ELEVATION DEPTH OF BOTTOM OF CASING	0.85 Ft.
INSIDE DIAMETER OF RISER PIPE	1.25 in.
TYPE OF BACKFILL AROUND RISER	None in rock
DIAMETER OF BOREHOLE	3.0 in.
ELEVATION DEPTH OF BOTTOM OF RISER	123.0 Ft.
TYPE OF POINT OR MANUFACTURER	Slotted PVC
SCREEN GAUGE OR SIZE OF OPENINGS	10 microns
DIAMETER OF WELLPOINT	1.25 in.
TYPE OF BACKFILL AROUND POINT	None
ELEVATION DEPTH OF BOTTOM OF POINT	128.0 Ft.
ELEVATION DEPTH OF BOTTOM OF BOREHOLE	156.3 Ft.

[FIGURES REFER TO: EL. _____ DEPTH X]

$$\left[\frac{0.85 \text{ Ft.}}{\text{LENGTH OF CASING } L_4} \right] + \left[\frac{151.3 \text{ Ft.}}{\text{LENGTH OF RISER PIPE } (L_1 + L_3)} \right] + \left[\frac{5.0 \text{ Ft.}}{\text{LENGTH OF POINT } (L_2)} \right] = 156.3 \text{ Ft.} \text{ PAY LENGTH}$$

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM 2

TEST NO. 1

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill and Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Spencer & Cliff

ELEVATION: 482.0 ft.

DATE START: 19 Feb. 1981

DATE FINISH: 20 Feb. 1981

DRILLER: J. Jensen

INSPECTOR: S. Putney

GEOLOGIST: ---

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Harvard	---
MODEL NO.	---	Trident	--	---

M.G.P. = (0.566 to 1.0) x \bar{z}

COMPUTED MAX GAUGE PRESS: (MGP) 100

COMPUTED INTERNAL FRICTION: _____

ROCK TYPE: REYNALES IMS HOLE SIZE 3 in.

RECOVERY (%) 100

ROD (%) 87 to 95

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 18.3 TO TOP LOWER PACKER 143.0

TO BOTTOM OF BORING 156.3 TO BOTTOM UPPER PACKER (Z) 136.3

TO WATER TABLE 30.0 LENGTH OF TEST SECTION 6.7

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 3.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
10:45	0	150	25	118.0		Water coming up casing at 75 PSI. Probable leak around packer.
	1			118.1		
	2			118.1		
	3			118.1	0.0	
	0		50	118.6		
	1			118.7		
	2			118.8		
	3			118.8	0.1	
	0	175	75	122.5		
	1			129.0		
	2			138.0		
	3			147.0		
	4			156.0		
	5			165.0		
	6			174.0	9.0	

1 63

H&A

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM 2

TEST NO. 2

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill & Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Spencer & Cliff

ELEVATION: 482.0 ft.

DATE START: 20 Feb. 81

DATE FINISH: 20 Feb. 81

DRILLER: J. Jensen

INSPECTOR: S. Putney

GEOLOGIST: ---

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Harvard	---
MODEL NO.	---	Trident	---	---

M.G.P. = (0.566 to 1.0) x z

COMPUTED MAX GAUGE PRESS: (MGP) 90

COMPUTED INTERNAL FRICTION: --

ROCK TYPE: Sodus Shale HOLE SIZE 3 in.

RECOVERY (%) 100

R Q D (%) 69 to 73

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 18.3 TO TOP LOWER PACKER 132.0

TO BOTTOM OF BORING 156.3 TO BOTTOM UPPER PACKER (z) 125.3

TO WATER TABLE 30.0 LENGTH OF TEST SECTION 6.7

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 3.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
11:05	0	175	25	180.8		Possible leak around packer at 90 psi. Water not visible in casing.
	1			181.0		
	2			181.3		
	3			181.5	0.2	
	0		50	182.2		
	1			182.5		
	2			182.9		
	3			183.2	0.3	
	0		75	183.8		
	1			184.2		
	2			184.7		
	3			185.0		
	4			185.4	0.4	
	0		90	186.0		
	1			187.7		
	2			189.5		
	3			191.8		
	4			194.0		
	5			196.1	2.0	

H&A 63

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM 2 TEST NO. 3

PROJECT: CSOAP, Phase II

FILE NO. 374813

CLIENT: L.S.T.

SHEET NO. 1 of 1

CONTRACTOR: Drill & Test

LOCATION: Spencer & Cliff

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia.Drill	Neptune	Harvard	---
MODEL NO.	---	Trident	---	---

ELEVATION: 482.0 ft.

DATE START: 20 Feb. 1981

DATE FINISH: 20 Feb. 1981

DRILLER: J. Jensen

INSPECTOR: S. Putney

GEOLOGIST: ---

M.G.P. = (0.588 to 1.0) x \bar{z}

COMPUTED MAX GAUGE PRESS: (MGP) 80

COMPUTED INTERNAL FRICTION: ---

ROCK TYPE: Irondequoit Lms HOLE SIZE 3 in.

RECOVERY (%) 99 to 100

R O D (%) 62 to 88

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 18.3 TO TOP LOWER PACKER 117.0

TO BOTTOM OF BORING 156.3 TO BOTTOM UPPER PACKER (Z) 110.3

TO WATER TABLE 30.0 LENGTH OF TEST SECTION 6.7

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 3.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
11:30	0	150	20	198.1		Water rose to near surface in casing at 80 PSI. Probable leak around packer.
	1			198.1		
	2			198.1	0.0	
	0		50	198.5		
	1			198.7		
	2			198.7		
	3			198.7	0.1	
	0		80	200.2		
	1			208.2		
	2			214.0		
	3			221.0		
	4			229.0		
	5			236.5		
	6			244.0		
	7			252.2	7.4	

83

PISA

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO SM 5

PROJECT: CSOAP Phase II

FILE NO 374813

CLIENT: L.S.T.

SHEET NO 1 of 5

CONTRACTOR: DRILL & TEST, INC.

LOCATION State & Jay

GROUNDWATER

DEPTH TO

CASING

SAMPLER

CORE BARREL

ELEVATION 502.6 ft. R.W.C.

DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE
24 Feb.	8:15		14.5	45.0

TYPE	SIZE ID	HAMMER WT lb	HAMMER FALL in	S/S	NX
	in	300	30	1-3/8	2-1/8
				140	
				30	

DATE START 20 Feb. 1981

DATE FINISH 26 Feb. 1981

DRILLER B. Scura

INSPECTOR T. Wood

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
0.5			7	S-1	0.5
			7		
			10		2.0
5			5	S-2	5.0
			6		
			5		6.5
8.0					
10			45	S-3	10.0
			30		
			45		11.5
15.0					
20					
25					

FIELD CLASSIFICATION AND REMARKS

Concrete sidewalk

Medium compact, brown coarse-fine SAND, little coarse-fine GRAVEL and Silt.

- FILL -

Coarse to fine SAND and GRAVEL. (Wash)

Very compact brown fine SAND, little SILT, trace fine GRAVEL.

Top of Rock at 15.0 ft.

BLOWS FT.	DENSITY
0-4	VERY LOOSE
4-10	LOOSE
10-30	MEDIUM COMPACT
30-50	COMPACT
50-	VERY COMPACT

BLOWS FT	CONSISTENCY
0-2	VERY SOFT
2-4	SOFT
4-8	MEDIUM STIFF
8-15	STIFF
15-30	VERY STIFF

SAMPLE IDENTIFICATION	
S	SPLIT SPOON
T	THIN WALL TUBE
U	UNDISTURBED PISTON
O	OPEN END ROD
W	WASH SAMPLE

SUMMARY	
OVERBURDEN	15.0
ROCK	
SAMPLES	3
HOLE NO.	SM 5

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
10							Begin coring at 15.0 ft.
15	3	15.0					Light to medium gray, fine-grained, thin to medium-bedded Dolomite, very thinly color-banded and mottled. Trace pits, vugs, gypsum nodules and fossils. Secondary gypsum seams in very closely to moderately spaced partings. LOCKPORT DOLOMITE Partings moderately to severely weathered from 15.2 to 41.6 ft. Smooth vertical joint from 19.5 to 20.1 ft. Very closely spaced, severely weathered shaly partings from 30.2 to 30.4 ft. and from 31.7 to 31.9 ft. Short, severely weathered high angle joints at 31.8, 33.8 and 34.3 ft. LOCKPORT DOLOMITE Rough high angle joints from 34.3 to 34.5 ft. Severely weathered high angle joint at 34.7 ft. Rough vertical joint from 40.5 to 40.8 ft. (NOTE: Incomplete water return from 20.0 to 65.5 ft.) LOCKPORT DOLOMITE *RQD based on core recovered. (Contact gradational)
	2						
	3						
	3				SL-MOD		
20	3	R-1	116	97			
	3		95	79			
	3						
	2.5				SL		
	3						
25	3	25.0					
	3				MOD		
	3.5						
	3.5						
	4						
30	4	R-2	119	99	SL-MOD		
	3.5		93	78			
	4						
	4						
	4						
35	4	35.0					
	4						
	4.5						
	4						
	4		85	101	SL-MOD		
40	3.5	R-3	59	69*			
	4						
	4						
	4						
45	4.5	45.0	32	89	SL-MOD		
	4.5		32	89			

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

HSA FORM 4B

Scale in feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
80	3	84.8			SL	Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds.	
	3						
	3						
	2.5						
85	3	R-8	120	100	SL	ROCHESTER SHALE Severely weathered shaly partings at 89.8, 90.4 and 91.8 ft.	
	3						
	3						
	2.5						
90	2.5	94.8	120	100	SL	ROCHESTER SHALE	
	2.5						
	2.5						
	3						
95	3	R-9	120	100	SL	Very thin, severely weathered clay bed at 96.6 ft. Severely weathered shaly partings at 96.8, 97.0, 99.2 and 99.9 ft.	
	3						
	2.5						
	3						
100	3	104.8	120	100	SL	ROCHESTER SHALE	
	3						
	3						
	2.5						
105	2.5	115.0	120	100	SL	Severely weathered shaly parting at 103.3 ft. Vertical joint from 104.7 to 104.8 ft. Severely weathered shaly partings at 106.8 and 111.5 ft. ROCHESTER SHALE	
	3						
	3						
	3						
110	3	115.0	120	100	SL		
	3						
	3						
	3						
115	2.5						

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

MSA FORM 48-1

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
115	2.5	R-11	121 120	101 99*	SL		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds. ROCHESTER SHALE Gypsum nodule, 0.1 ft. wide at 116.5 ft. Severely weathered shaly partings at 117.2 and 119.9 ft. *RQD based on core recovered. Gypsum nodule, 0.1 ft. wide, at 123.3 ft. Severely weathered shaly partings at 124.2, 128.7, 128.8 and 130.3 ft. Short, moderately weathered vertical joint at 126.0 ft. ROCHESTER SHALE Increasingly fossiliferous Mudstone from 130.6 to 139.5 ft.
	2.5						
	3						
	3						
120	2.5						
	3						
	3						
	2.5						
125	3	125.0					
	2.5	R-12	112 108	96 93	SL		ROCHESTER SHALE Increasingly fossiliferous Mudstone from 130.6 to 139.5 ft.
	3						
	3						
	3						
130	3						
	3						
	3						
	3						
135	3	134.7					
	3	R-13	118 117	100 99	SL	139.5	Light to medium gray, fine to medium-grained, thin bedded fossiliferous Limestone, interbedded with dark gray. Very thin dolomitic shale. Secondary gypsum seams in closely spaced partings. IRONDEQUOIT LIMESTONE
	3						
	2.5						
	3						
140	3						
	3						
	2.5						
	3						
145	3	144.5					Bottom of Boring at 144.5 ft. Borehole grouted to surface.
150							

HSA FORM 45 - 11-71

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

COMBUSTIBLE GAS MEASUREMENT

PROJECT CSOAP, Phase II FILE NO. 374813 BORING NO. SM 5

INSPECTOR T. Wood DRILLER B. Scura

DATE	ELAPSED TIME ()	BOTTOM OF HOLE (FT)	METER READING (%)	REMARKS
				No gas measurements were recorded in this borehole.

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. SM 7

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

FILE NO. 374813
SHEET NO. 1 of 6
LOCATION: E.Main & S.Water
ELEVATION: 514.3 ft. 515.4 ft.
DATE START: 3 Mar. 81
DATE FINISH: 6 Mar. 81
DRILLER: T. Smith
INSPECTOR: M. Tierney

GROUNDWATER			DEPTH TO:		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	S/S	NX
					SIZE I.D. in	1-3/8	2-1/8
					HAMMER WT lb	140	--
					HAMMER FALL in	30	--

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5	AUGER	10				Compact brown SAND and GRAVEL, trace silt and clay.
		14	S-1	*0.5		
		32		2.0		
5	AUGER	24				Compact brown coarse to fine SAND, some red brick fragments. - FILL - TOP OF ROCK AT 9.0 FT.
		24	S-2	5.0		
		39		6.5		
10		100%				* Laboratory grain size analysis.

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 9.0
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 2
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. SM 7
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

CORE BORING REPORT

HOLE NO. SM 7 PAGE 3 OF 6

GEOLOGIST Fred Amos

Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
		in.	%			
6	R-4	$\frac{120}{119}$	$\frac{100}{99}$	SL	41.2	<p>Light gray, fine-grained, thin to medium-bedded, cross-bedded Dolomite. Closely to moderately closely spaced wavy argillaceous bands, some of which are partings.</p> <p>LOCKPORT DOLOMITE</p> <p>Moderately dipping argillaceous partings with trace slickensides at 45.2, 45.4 and 45.8 ft. Smooth, moderately dipping, moderately weathered vertical joint at 47.7 ft.</p> <p>Moderately dipping argillaceous parting with trace slickensides at 50.5 ft. High angle slickensided shear from 50.7 to 50.9 ft. Moderately dipping and high angle intersecting slickensided shears from 54.6 to 55.1 ft. Rough, vertical joint in argillaceous seam, with trace slickensides from 55.4 to 56.4 ft.</p>
6						
5.5						
4						
3						
3						
4						
4						
48.0						
48.0						
4	R-5	$\frac{120}{119}$	$\frac{100}{99}$	SL	51.3	<p>Moderately dipping argillaceous parting with trace slickensides at 50.5 ft. High angle slickensided shear from 50.7 to 50.9 ft. Moderately dipping and high angle intersecting slickensided shears from 54.6 to 55.1 ft. Rough, vertical joint in argillaceous seam, with trace slickensides from 55.4 to 56.4 ft.</p> <p>LOCKPORT DOLOMITE</p> <p>High grade joint with trace sulphur crystals from 62.5 to 62.7 ft.</p>
4						
4						
5						
4						
5						
4						
4						
4						
58.0						
58.0						
4	R-6	$\frac{122}{122}$	$\frac{102}{100^*}$	SL	61.0	<p>LOCKPORT DOLOMITE</p> <p>* RQD based on core recovered.</p> <p>Light to medium gray, fine-grained, thin to medium bedded Dolomite, very thinly color-banded. Secondary gypsum seams in closely to moderately closely spaced partings. Trace pits, gypsum nodules and fossils, from 65.0 to 93.4 ft.</p> <p>LOCKPORT DOLOMITE</p>
4						
4						
4						
4						
4						
4						
4						
4						
68.0						
68.0						
-7	R-7	$\frac{119}{119}$	$\frac{99}{99}$	SL		<p>LOCKPORT DOLOMITE</p> <p>(NOTE: No water return in R-7 to bottom of hole.)</p>

ESS	WEATHERING		BEDDING/JOINT SPACING			RQD	
Scratch sily	Fresh V. slight Slight Moderate	Mod. Severe Severe V. Severe Complete	V. thin Thin Medium Thick V. thick	V. Close Close Mod. Close Wide V. wide	< 2" 2" - 12" 12" - 36" 36" - 120" > 120"	> 90% 90-75 75-50 50-25 < 25	Excellent Good Fair Poor ..

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
75	4	78.0			SL	75.2	Light to medium gray, fine-grained, thin to medium-bedded Dolomite, very thinly color-banded. Trace pits, gypsum nodules and fossils. Secondary gypsum seams in closely to moderately closely spaced partings.
	4					PT 4	
	5						
80	4	R-8	121 114	101* 94	SL	82.0	LOCKPORT DOLOMITE
	5					Gypsum nodule, 0.1 ft. wide, at 80.0 ft.	
	5					Moderately weathered shaly partings at 84.6, 84.8 (trace sulphur in parting) and 85.8 ft.	
	6						
	5						
85	6	88.0					Severely weathered shaly partings at 87.2 and 89.6 ft.
	6					LOCKPORT DOLOMITE	
	6						
	5						
90	-	R-9	62 60	100 97	SL		* RQD based on core recovered.
	-					(Contact gradational)	
	4						
	4						
95	5	98.0	55 55	95 95			Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings.
	5					ROCHESTER SHALE	
	5					Moderately weathered shaly parting at 97.6 ft. Severely weathered shaly parting at 103.8 ft. Rough vertical joints from 103.8 to 104.0 and from 105.6 to 105.7 ft. Severely weathered shaly parting at 107.3 ft. Severely weathered vertical joint with trace secondary gypsum seam from 108.2 to 108.5 ft.	
	5						
100	5	R-10	120 118	100 98	SL		ROCHESTER SHALE
	4						
	5						
	6						
105	5.5	108.0					ROCHESTER SHALE
	5						
	4						
110	6						Vertical joint from 109.2 to 109.5 ft.
	5					108.2	

FIELD HARDNESS		WEATHERING		BEDDING/Joint SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
110	5	R-11	119 116	99 97	SL	PT3 115.0	Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace gypsum nodules and fossils. Secondary gypsum nodules in closely to very closely spaced partings. ROCHESTER SHALE
	5						
	5						
	5						
115	5	R-12	120 120	100 100	SL	118.0	Small gypsum nodule at 114.3 ft. ROCHESTER SHALE Gypsum nodules, 0.2 ft. wide at 123.7 and 125.1 ft.
	5						
	5						
	5						
120	5	R-13	120 120	100 100	SL	128.0	ROCHESTER SHALE Light gray, thin to very thin, closely spaced Limestone beds from 131.8 to 170.0 ft. Vertical joint from 133.9 to 134.3 ft. Very short vertical joint at 136.0 ft.
	5						
	5						
	5						
125	5	R-14	120 120	100 100	SL	133.2	ROCHESTER SHALE Moderately weathered shaly parting at 144.0 ft.
	5						
	5						
	5						
130	5	R-14	120 120	100 100	SL	PT2 140.0	
	5						
	5						
	5						
135	5	R-14	120 120	100 100	SL	138.0	
	5						
	5						
	5						
140	4	R-14	120 120	100 100	SL	140.0	
	4						
	4						
	5						
145	5						

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	— carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

FOR FURNISH

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
145	5	148.0			SL	145.2	Light to medium-gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely spaced Limestone beds. ROCHESTER SHALE Gypsum nodule, 0.1 ft. wide at 149.3 ft. Rough vertical joints from 153.0 to 153.2 ft., 154.1 to 154.4 ft. and 155.3 to 155.6 ft.
	5					PT1	
	4					148.3	
	6						
150	5	R-15	119	99	SL	149.5	ROCHESTER SHALE Gypsum nodule, 0.1 ft. wide at 149.3 ft. Rough vertical joints from 153.0 to 153.2 ft., 154.1 to 154.4 ft. and 155.3 to 155.6 ft.
	6		119	99		152.0	
	6						
	5						
	6						
	6						
155	6	158.0					ROCHESTER SHALE
	6						
	6						
	6						
160	5	R-16	119	104*	SL		Smooth, low angle joint with secondary gypsum seam at 165.8 ft. * RQD based on core recovered.
	5		119	100			
	5						
	6						
	6						
	6						
165	6	167.5					
	6						
	5						
	6	R-17	40	133*	SL		ROCHESTER SHALE
	6		40	100			
170	6	170.0					Bottom of Boring at 170.0 ft. Observation well installed in completed borehole.
175							
180							

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- Carves			V. thick	V. wide	> 120"	< 25	V. Poor

M.S.A. FORM 4B

GROUND WATER MONITORING REPORT

OW/PZ NUMBER: OW SM 7 NCD ELEVATION SUBTRAHEND 515.4 ft. FILE NO. 374813
PAGE NO. 2 of 2

DATE	TIME	ELAPSED TIME	DEPTH OF WATER FROM <u>surface</u>	ELEVATION OF WATER	REMARKS	READ BY
10 Mar. 1981	AM		17.6 ft.	497.8 ft.	After Installation	MT
		0	2.0	513.4	Flush Test	
		1	8.5		"	
		2	14.4		"	
		3	14.7		"	
		4 min.	15.2		"	
11 Mar. 1981	PM		16.0	499.4		MT
12 Mar. 1981	AM		16.0	499.4		MT
13 Mar. 1981	PM		16.1	499.3		MT
15 Apr. 1981	PM		16.5	498.9		FS
1 May 1981	PM		17.0	498.4		SP
		0	15.4		Flush Test (Poured in 1 gal.)	
		1	15.4		"	
		2	15.4		"	
		5 min.	15.7	499.7	"	
24 June 1981	PM	106 days	17.0	498.4		MW
20 July 1981	AM	132 days	16.8	498.6		FS
5 Aug. 1981	AM	148 days	10.5	504.9	Roadbox full of water - 1/2 gallon Sent down PVC pipe	ERH
22 Sept. 1981	AM	197 days	12.0	503.4		ERH
21 Oct. 1981	PM	226 days	13.7	501.7		SMV

H&A FOR JAN. 79 39A

COMBUSTIBLE GAS MEASUREMENT

PROJECT CSOAP, Phase II FILE NO. 374813 BORING NO. SM 7

INSPECTOR M. Tierney DRILLER T. Smith

DATE	ELAPSED TIME (MIN.)	BOTTOM OF HOLE (FT)	METER READING (%)	REMARKS
3 Mar. 81	0	18.0	0	
	0	28.0	0	
4 Mar. 81	12 hrs.	28.0	0	Hole capped overnight.
	0	38.0	0	
	0	48.0	0	
	0	68.0	0.25	
	0	88.0	1.0	
5 Mar. 81	12 hrs.	88.0	.75	
	0	98.0	.50	
	0	118.0	0	
	0	128.0	0	
	0	138.0	20.0	
6 Mar. 81	12 hrs.	138.0	10.0	Hole capped overnight.
	0	148.0	8.0	
	0	158.0	0	
	0	167.5	0	

GROUND WATER OBSERVATION WELL REPORT

PROJECT: CSOAP, PHASE II
 LOCATION: Rochester, NY
 CLIENT: L.S.T.
 CONTRACTOR: Drill & Test
 DRILLER: T. Smith INSPECTOR: M. Tierney
 INSTALLATION DATE 10 March 1981

FILE NO. 374813
 WELL NO. OW SM7
 BORING NO. SM7
 LOCATION Main St. & S. Water
 SHEET 1 OF 2

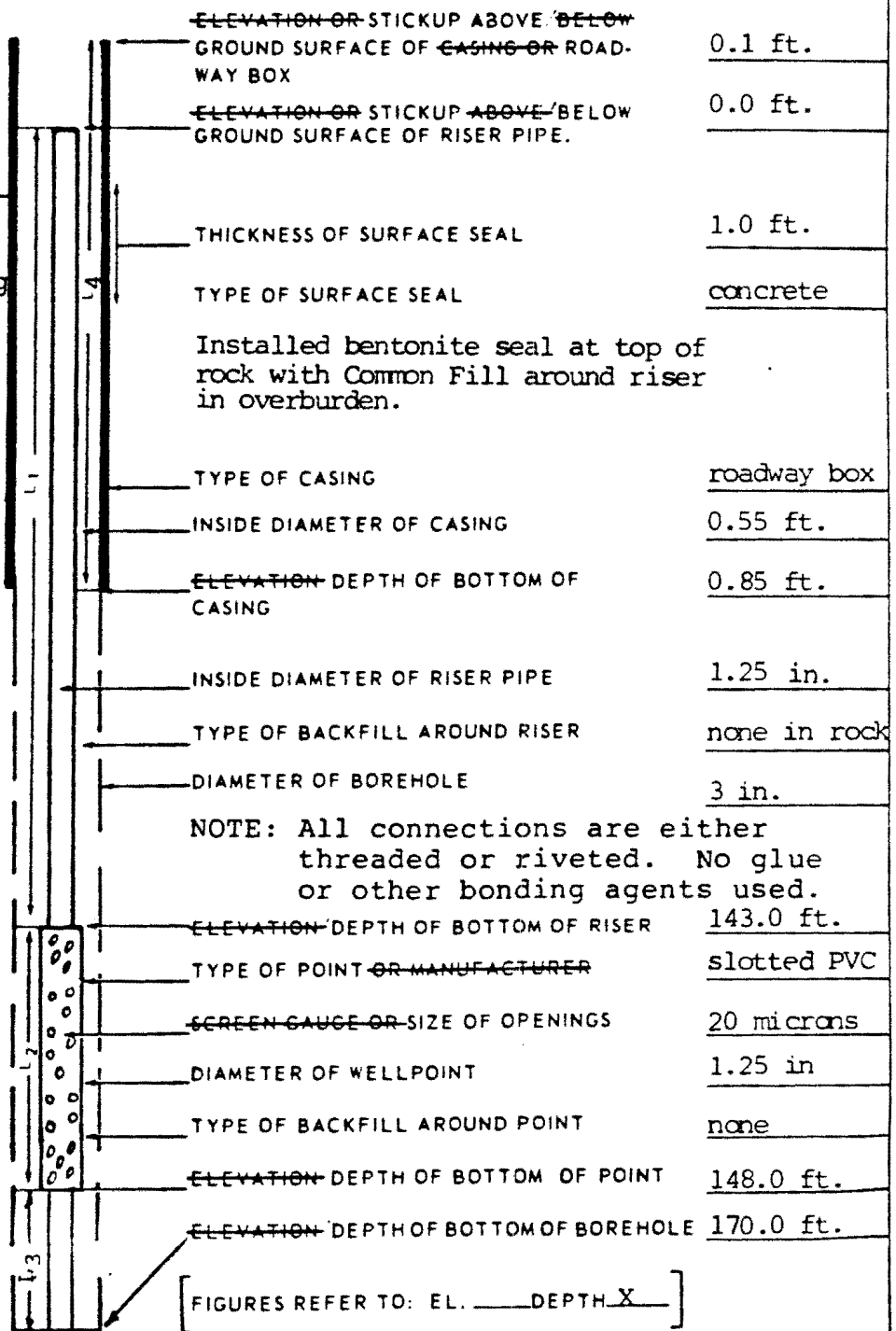
SURVEY DATUM NCD

GROUND ELEVATION 515.4 ft.

Refer to test boring log for description of soil and rock conditions.

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)

OVERBURDEN THICKNESS (ft) 9.0



[FIGURES REFER TO: EL. _____ DEPTH X]

$$\left[\frac{0.85}{\text{LENGTH OF CASING } (L_4)} \right] + \left[\frac{165.0}{\text{LENGTH OF RISER PIPE } (L_1 + L_3)} \right] + \left[\frac{5.0}{\text{LENGTH OF POINT } (L_2)} \right] = \frac{170.0 \text{ ft.}}{\text{PAY LENGTH}}$$

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM7

TEST NO. 1

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill & Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Main St. & S. Water

ELEVATION: 514.3 ft.

DATE START: 9 March 1981

DATE FINISH: 9 March 1981

DRILLER: T. Smith

INSPECTOR: M. Tierney

GEOLOGIST: -

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Ashcroft	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.566 to 1.0) x Z

COMPUTED MAX GAUGE PRESS: (MGP) 110.0 psi

COMPUTED INTERNAL FRICTION: -

ROCK TYPE: Rochester shale HOLE SIZE 3 in.

RECOVERY (%) 99

R O D (%) 99

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 9.0 TO TOP LOWER PACKER 152.0

TO BOTTOM OF BORING 170.0 TO BOTTOM UPPER PACKER (Z) 145.2

TO WATER TABLE 12.6 LENGTH OF TEST SECTION 6.8

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1131	0	150	25	1073.8		Probable leak around packer at 75 and 85 psi.
	1			1073.8		
	2			1073.8		
	3			1073.8	0.0	
1136	0		50	1075.0		
	1			1075.0		
	2			1075.0		
	3			1075.0	0.0	
1142	0		75	1086.0		
	1			1096.2		
	2			1107.1		
	3			1117.5		
	5			1138.0	10.4	
1150	0		85	1173.5		
	1			1187.0		
	2			1200.2		
	5			1240.3		
	10			1306.1		
	15			1372.0	13.2	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM7

TEST NO. 2

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

FILE NO. 374813
SHEET NO. 1 of 1
LOCATION: Main St. & S. Water
ELEVATION: 514.3 ft.
DATE START: 9 March 1981
DATE FINISH: 9 March 1981
DRILLER: T. Smith
INSPECTOR: M. Tierney
GEOLOGIST: -

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Ashcroft	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.566 to 1.0) x \bar{z}
COMPUTED MAX GAUGE PRESS: (MGP) 100 psi
COMPUTED INTERNAL FRICTION: -

ROCK TYPE: Rochester Shale HOLE SIZE 3 in.
RECOVERY (%) 100
R O D (%) 100

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 18.0 TO TOP LOWER PACKER 140.0
TO BOTTOM OF BORING 170.0 TO BOTTOM UPPER PACKER (±) 133.2
TO WATER TABLE 12.6 LENGTH OF TEST SECTION 6.8
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1217	0	150	20	1377.1		Probable leak around packer at 60 and 85 psi.
	1			1377.1		
	2			1377.2		
	3			1377.3	0.1	
1225	0		40	1378.8		
	1			1379.0		
	2			1379.2		
	3			1379.4	0.2	
1229	0		60	1380.1		
	1			1382.7		
	2			1384.9		
	5			1392.5		
	10			1416.0	3.6	
1241	0		85	1430.0		
	1			1443.1		
	2			1456.3		
	5			1494.5		
	10			1550.4		
	20			1659.0	11.5	

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. <u>SM7</u>	TEST NO. <u>3</u>
PROJECT: <u>CSOAP, Phase II</u>					FILE NO. <u>374813</u>	
CLIENT: <u>L.S.T.</u>					SHEET NO. <u>1 of 1</u>	
CONTRACTOR: <u>Drill & Test</u>					LOCATION: <u>Main St. & S. Water</u>	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: <u>514.3 ft.</u>	
TYPE	<u>Pneumatic</u>	<u>Digital</u>	<u>Dial</u>	<u>None</u>	DATE START: <u>9 March 1981</u>	
MFG.	<u>Dia. Drill</u>	<u>Neptune</u>	<u>Ashcroft</u>	<u>-</u>	DATE FINISH: <u>9 March 1981</u>	
MODEL NO.	<u>-</u>	<u>Trident</u>	<u>-</u>	<u>-</u>	DRILLER: <u>T. Smith</u>	
					INSPECTOR: <u>M. Tierney</u>	
					GEOLOGIST: <u>-</u>	

M.G.P. = (0.566 to 1.0) x \bar{z}	ROCK TYPE: <u>Rochester Shale</u>	HOLE SIZE <u>3 in.</u>
COMPUTED MAX GAUGE PRESS: (MGP) <u>81 psi</u>	RECOVERY (%) <u>99</u>	
COMPUTED INTERNAL FRICTION: <u>-</u>	R Q D (%) <u>97</u>	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK <u>9.0</u>	TO TOP LOWER PACKER <u>115.0</u>
TO BOTTOM OF BORING <u>170.0</u>	TO BOTTOM UPPER PACKER (\bar{z}) <u>108.2</u>
TO WATER TABLE <u>12.6</u>	LENGTH OF TEST SECTION <u>6.8</u>
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE <u>1.5</u>	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1307	0	150	20	1689.9		Probable leak around packer at 60 and 80 psi.
	1			1689.9		
	2			1689.9		
	3			1689.9	0.0	
1316	0		40	1689.0		
	1			1689.0		
	2			1689.9		
	3			1689.9	0.0	
1320	0		60	1689.9		
	1			1690.0		
	2			1690.1		
	5			1695.7		
	10			1702.0	1.2	
1331	0		80	1710.0		
	1			1720.8		
	2			1731.8		
	5			1765.0		
	10			1819.0		
	15			1874.0	10.9	

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. <u>SM7</u>	TEST NO. <u>4</u>
PROJECT: <u>CSOAP, Phase II</u>					FILE NO. <u>374813</u>	
CLIENT: <u>L.S.T.</u>					SHEET NO. <u>1 of 1</u>	
CONTRACTOR: <u>Drill & Test</u>					LOCATION: <u>Main St. & S. Water</u>	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: <u>514.3 ft.</u>	
TYPE	<u>Pneumatic</u>	<u>Digital</u>	<u>Dial</u>	<u>None</u>	DATE START: <u>9 March 1981</u>	
MFG.	<u>Dia. Drill</u>	<u>Neptune</u>	<u>Ashcroft</u>	<u>-</u>	DATE FINISH: <u>9 March 1981</u>	
MODEL NO.	<u>-</u>	<u>Trident</u>	<u>-</u>	<u>-</u>	DRILLER: <u>T. Smith</u>	
					INSPECTOR: <u>M. Tierney</u>	
					GEOLOGIST: _____	

M.G.P. = (0.566 to 1.0) x Z	ROCK TYPE: <u>Lockport Dolomite</u>	HOLE SIZE <u>3 in.</u>
COMPUTED MAX GAUGE PRESS: (MGP) <u>64 psi</u>	RECOVERY (%) <u>99 to 101</u>	
COMPUTED INTERNAL FRICTION: <u>-</u>	R O D (%) <u>94 to 99</u>	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK <u>9.0</u>	TO TOP LOWER PACKER <u>92.0</u>
TO BOTTOM OF BORING <u>170.0</u>	TO BOTTOM UPPER PACKER (Z) <u>85.2</u>
TO WATER TABLE <u>12.6</u>	LENGTH OF TEST SECTION <u>6.8</u>
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE <u>1.5</u>	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1355	0	150	15	1881.8		
	1			1881.9		
	2			1882.2		
	3			1882.5	0.2	
1359	0		30	1883.9		
	1			1884.5		
	2			1885.1		
	3			1885.7	0.6	
1403	0		45	1886.9		
	1			1888.0		
	2			1889.0		
	3			1890.1		
	5			1892.2	1.1	
1409	0		60	1893.3		
	1			1894.8		
	2			1896.0		
	5			1900.0		
	10			1906.9		
	15			1914.0	1.4	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM7

TEST NO. 5

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill & Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Main St. & S. Water

ELEVATION: 514.3 ft.

DATE START: 9 March 1981

DATE FINISH: 9 March 1981

DRILLER: T. Smith

INSPECTOR: M. Tierney

GEOLOGIST:

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Ashcroft	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.666 to 1.0) x Z
COMPUTED MAX GAUGE PRESS: (MGP) 40 psi

ROCK TYPE: Lockport Dolomite HOLE SIZE 3 in.

COMPUTED INTERNAL FRICTION: -

RECOVERY (%) 100

COMPUTED INTERNAL FRICTION: -

R Q D (%) 99

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK	18.0	TO TOP LOWER PACKER	61.0
TO BOTTOM OF BORING	170.0	TO BOTTOM UPPER PACKER (Z)	54.2
TO WATER TABLE	12.6	LENGTH OF TEST SECTION	6.8
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE	2.0		

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1450	0	150	10	1915.1		
	1			1915.2		
	2			1915.2		
	3			1915.2	0.0	
1454	0		20	1915.3		
	1			1915.3		
	2			1915.3		
	3			1915.3	0.0	
1458	0		30	1915.5		
	1			1915.7		
	2			1915.7		
	3			1915.7		
	5			1915.7	0.0	
1504	0		40	1915.7		
	1			1915.7		
	2			1915.7		
	5			1915.7		
	10			1915.7	0.0	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM7

TEST NO. 6

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill & Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Main St. & S. Water

ELEVATION: 514.3 ft.

DATE START: 9 March 1981

DATE FINISH: 9 March 1981

DRILLER: T. Smith

INSPECTOR: M. Tierney

GEOLOGIST: S. Vinci

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Ashcroft	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.566 to 1.0) x Z

COMPUTED MAX GAUGE PRESS: (MGP) 31 psi

COMPUTED INTERNAL FRICTION: -

ROCK TYPE: Lockport Dolomite HOLE SIZE 3 in.

RECOVERY (%) 100

ROD (%) 99

DEPTHS: (All Distances Measured From Ground Surface in Feet)

TO TOP OF ROCK 9.0 TO TOP LOWER PACKER 48.0

TO BOTTOM OF BORING 170.0 TO BOTTOM UPPER PACKER (Z) 41.2

TO WATER TABLE 12.6 LENGTH OF TEST SECTION 6.8

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1521	0	150	10	1917.9		
	1			1919.8		
	2			1921.5		
	3			1923.2	1.8	
1525	0		20	1925.0		
	1			1927.8		
	2			1930.8		
	3			1933.7		
	5			1939.5	2.9	
1531	0		30	1942.3		
	1			1945.7		
	2			1948.9		
	5			1958.0		
	10			1973.8		
	15			1989.9	3.2	

HBA 1 J 63

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. SM 12

PROJECT: SOAP, Phase II

FILE NO. 374813

CLIENT: L.S.T.

SHEET NO. 1 of 6

CONTRACTOR: Drill & Test

LOCATION: Mill St. & Platt

ELEVATION: 487.3 ft. 488.1

GROUNDWATER		DEPTH TO		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	
					SIZE ID in.	S/S NX
					HAMMER WT lb.	1-3/8 2-1/8
					HAMMER FALL in	140 -
						30 -

DATE START: 12 Mar. 1981
DATE FINISH: 13 Mar. 1981
DRILLER: J. Genovese
INSPECTOR: M. Tierney

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 2 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
	0.3					Blacktop 0.0 - 0.3
	AUGERED		3		1.0	Medium compact brown coarse to fine SAND, some silt, trace fine gravel, trace brick fragments and cinders.
			5	S-1	3.0	
			5			
	4.5				4.0	Very compact brown medium to fine SAND, some fine gravel, trace silt. -FILL-
5		100	S-2	4.5		
		50/0				TOP OF ROCK AT 4.5 ft.

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 4.5
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 2
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. SM 12
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
							Begin coring at 4.5 ft.
5	3.5	4.5					Light gray, fine to medium-grained, thin to medium-bedded Dolomite. Trace pits and vugs. LOCKPORT DOLOMITE
	3.5	R-1	<u>32</u>	<u>89</u>	SL-		
	3.5	7.5	<u>26</u>	<u>72</u>	MOD		Six smooth, moderately weathered, low angle to moderately dipping joints from 4.8 to 6.5 ft. Two smooth, high angle intersecting joints from 6.7 to 7.5 ft.
10	3.5				SL-		
	3.5				MOD		Smooth, low angle, iron-stained joint to 10.3 ft. LOCKPORT DOLOMITE
	3.5	R-2	<u>102</u>	<u>100</u>			
	3.5		<u>102</u>	<u>100</u>	SL		Light to medium gray, fine-grained, thin to medium-bedded Dolomite, thinly color-banded and mottled, from 10.5 to 35.1 ft. Secondary gypsum seams in closely spaced partings from 10.5 to 35.1 ft.
15	3.5	16.0					
	3.5						Severely weathered shaly partings at 15.1, 17.1 and 19.6 ft. LOCKPORT DOLOMITE
20	3.5						
	3.5	R-3	<u>122</u>	<u>102</u>	SL	21.0	Rough, high angle joint from 20.0 to 20.2 ft.
	3.5		<u>117</u>	<u>96*</u>		22.0	
	3.5					22.6	Severely weathered shaly partings at 23.5, 25.1, 26.6, 28.0 and 29.6 ft. *RQD based on core recovery.
25	3.5					22.7	
	3.5	26.0					Vertical crack from 28.6 to 29.0 ft. LOCKPORT DOLOMITE
	3.5						
30	3.5	R-4	<u>119</u>	<u>99</u>	SL		Severely weathered clayey shale parting at 33.5 ft. Very thin severely weathered clay bed at 34.3 ft.
	3.5		<u>119</u>	<u>99</u>		30.3	
	3.5						PT5
35	3.5						

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

SEE FORMER

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
35	3.5	36.0				X	Light to medium gray, fine-grained, thin to medium-bedded Dolomite. Very thinly color-banded.
	4					37.0	37.1 LOCKPORT DOLOMITE
	4						(Contact gradational)
	4						Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings.
40	4	R-5	119	99	SL		ROCHESTER SHALE
	4		119	99			Severely weathered shaly partings at 38.9, 39.2, 39.6 and 40.2 ft.
	4						
	4						
45	4	46.0					
	3.5						
	3.5						
	3.5						
50	3.5	R-6	119	99	SL		Gypsum nodule, 0.1 ft. thick, at 50.2 ft.
	3.5		119	99			ROCHESTER SHALE
	3.5						Smooth, moderately dipping joint at 51.4 ft.
	3.5						
	3.5						
55	3.5	56.0					
	3.5						
	3.5						
	3.5						
60	3.5	R-7	122	101	SL		ROCHESTER SHALE
	3.5		122	100*			*RQD based on core recovered.
	3.5						
	3.5						
65	3.5	66.0					Small gypsum nodule at 66.3 ft.
	3.5						
	3.5						ROCHESTER SHALE
	3.5						Light gray, thin to very thin, closely spaced Limestone beds from 66.7 to 133.7 ft.
70	3.5						

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. Thin	V. Close	< 2"	> 90%
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	— carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

HSA FORM 48-1

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
70	3.5	R-8	121 121	101 100*	SL		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray thin to very thin, closely spaced Limestone beds. ROCHESTER SHALE
	3.5						
	3.5						
	3.5						
75	3.5	76.0					Severely weathered shaly partings at 70.4, and 71.0 ft.
	3.5						
	3.5						
	3.5						
80	3.5	R-9	119 119	99 99	SL		ROCHESTER SHALE
	3.5						
	3.5						
	3.5						
85	3.5	86.0				85.3	Gypsum nodule, 0.1 ft. wide, at 85.6 ft.
	3.5						
	3.5				SL		
	3.5						
90	3.5	R-10	124 120	103 97*	SL	PT4 SEV 92.0	ROCHESTER SHALE Severely weathered clay bed from 88.9 to 89.2 ft. Severely weathered shaly parting at 92.6 ft.
	3.5						
	3.5						
	3.5						
95	3.5	96.0					
	3.5						
	3.5						
	3.5						
100	3.5	R-11	119 119	99 99	SL		ROCHESTER SHALE
	3.5						
	3.5						
	3.5						
105	3.5						

*RQD based on core recovered.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	- carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

H & A FORM 48 - 7

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
105	3.5	106.0					Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely spaced Limestone beds.
	3.5					107.3	
110	3.5	R-12	118	98	SL	PT3	ROCHESTER SHALE
	3.5		118	98			
	3.5					114.0	
115	3.5						
	3.5					116.5	
	3.5					117.7	ROCHESTER SHALE
120	3.5	R-13	118	98	SL	PT2	Severely weathered shaly partings at 120.5 and 121.0 ft.
	3.5		117	98			
	3.5					124.0	
125	3.5						
	3.5						Increasingly fossiliferous Mudstone from 125.9 to 133.7 ft.
	3.5						ROCHESTER SHALE
130	3.5	R-14	121	101	SL		Smooth, low angle partings with gypsum seams at 130.0 and 132.9 ft. Severely weathered shaly parting at 131.8 ft.
	3.5		117	97*			*RQD based on core recovered.
	3.5					133.7	
135	3.5						Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone, inter-bedded with dark gray, very thin, dolomitic Shale. Secondary gypsum seams in closely spaced partings.
	3.5					136.3	IRONDEQUOIT LIMESTONE
	3.5						Severely weathered shaly partings at 134.7 and 135.7 ft.
	3.5					139.5	Severely weathered vertical joint from 136.4 to 137.5 ft. Thin, severely weathered Shale bed at 137.5 ft.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Med. Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Soft	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
	— curves			V. thick	V. wide	> 120"	< 25	V. Poor

GROUND WATER MONITORING REPORT

OW/PZ NUMBER: <u>OW SM 12</u>		NCD ELEVATION SUBTRAHEND <u>488.4 ft.</u>		FILE NO. <u>374813</u>	PAGE NO. <u>2 of 2</u>	
DATE	TIME	ELAPSED TIME	DEPTH OF WATER FROM <u>surface</u>	ELEVATION OF WATER	REMARKS	READ BY
17 Mar. 1981	PM		64.3 ft.	424.1 ft.	Installation Complete	SP
18 Mar. 1981	PM		70.2	418.2		SP
15 Apr. 1981	PM		71.1	417.3		FS
1 May 1981	PM		50.3	438.1		SP
		0	48.4		Flush Test (Poured in 1 gal.)	
		1	48.7		"	
		2	49.0		"	
		5 min.	49.6	438.8	"	
26 June 1981	AM	101 days	52.0	436.4		MW
20 July 1981	AM	125 days	51.7	436.7		FS
5 Aug. 1981	AM	141 days	52.1	436.3	0% gas reading	ERH
21 Sept. 1981	AM	188 days	52.0	436.4	0% gas reading	ERH
21 Oct. 1981	PM	218 days	52.4	436.0		SMV
4 Nov. 1981	PM	232 days	51.0	437.4		ERH
		0 min.	48.0	440.4	Flush Test (Poured in 5 gal.)	ERH
6 Nov. 1981	PM	234 days	52.1	436.3		SMV
			$\gamma = 51.9$			

COMBUSTIBLE GAS MEASUREMENT

PROJECT CSOAP, Phase II FILE NO. 374813 BORING NO. SM 12

INSPECTOR M. Tierney DRILLER J. Genovese

DATE	ELAPSED TIME (MIN)	BOTTOM OF HOLE (FT)	METER READING (%)	REMARKS
12 Mar. 81	0	7.5	0	
	0	16.5	0	
	0	36.0	0	
	0	56.0	0	
	0	66.0	0	
13 Mar. 81	12 hrs	66.0	0	Hole capped overnight
	0	96.0	0	
	0	136.0	0	
16 Mar. 81	60 hrs	136.0	0	Hole capped over weekend
	0	146.0	0	
	10	146.0	0	End of Boring

GROUND WATER OBSERVATION WELL REPORT

PROJECT: CSOAP, PHASE II
 LOCATION: Rochester, NY
 CLIENT: L.S.T.
 CONTRACTOR: Drill and Test
 DRILLER: J. Genovese INSPECTOR: S. Putney
 INSTALLATION DATE 17 March 1981

FILE NO. 374813
 WELL NO. OW SM 12
 BORING NO. SM 12
 LOCATION Mill & Platt
 SHEET 1 OF 2

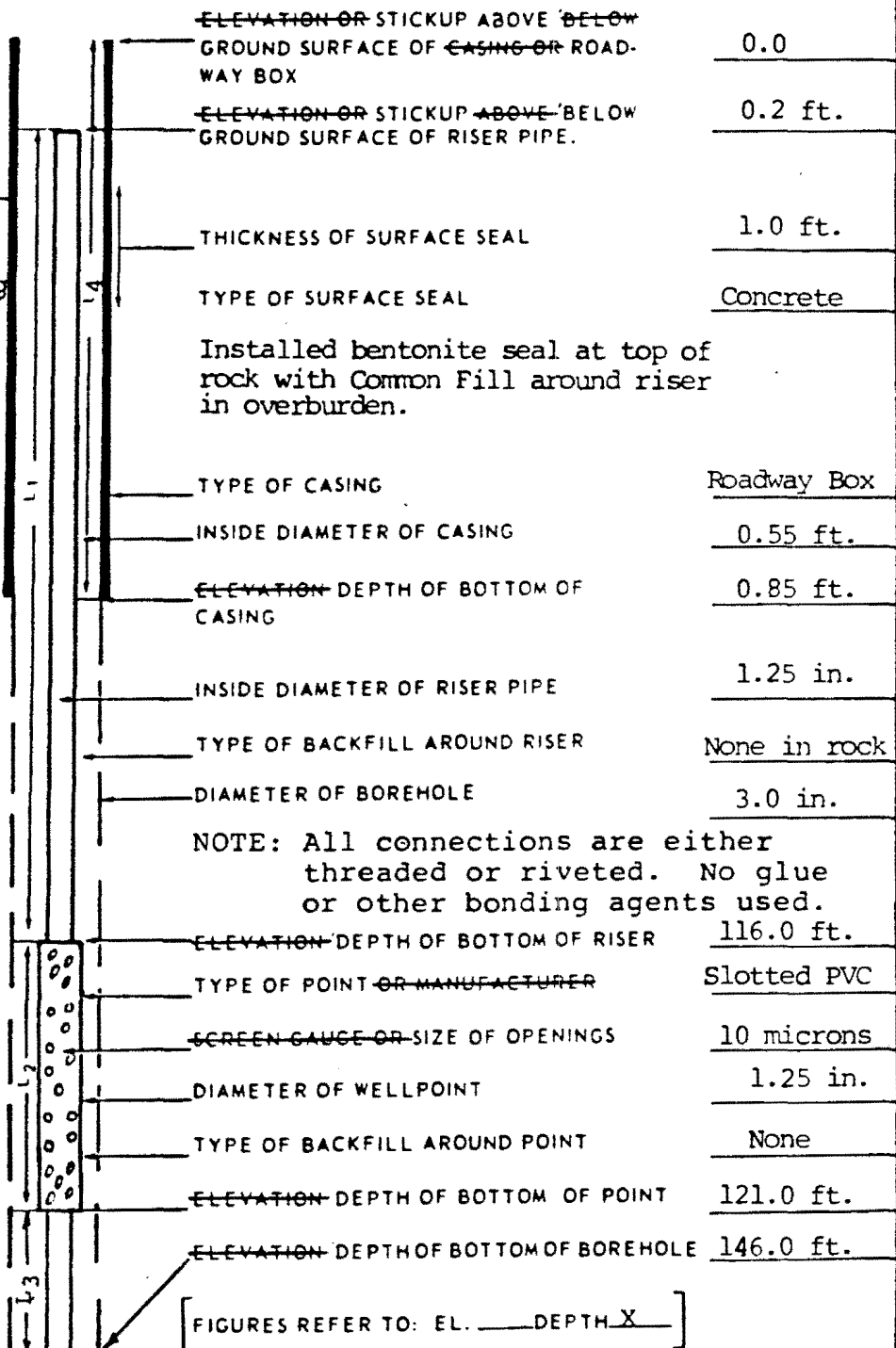
SURVEY DATUM NCD

GROUND ELEVATION 488.4 ft.

Refer to test boring log for description of soil and rock conditions.

OVERBURDEN THICKNESS (ft) 4.5

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)



$$\left[\frac{0.85 \text{ ft.}}{\text{LENGTH OF CASING } L_4} \right] + \left[\frac{140.8 \text{ ft.}}{\text{LENGTH OF RISER PIPE } (L_1 + L_3)} \right] + \left[\frac{5.0 \text{ ft.}}{\text{LENGTH OF POINT } (L_2)} \right] = \frac{145.8 \text{ ft.}}{\text{PAY LENGTH}}$$

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM 12 TEST NO. 1

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill & Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Platt & Mill

ELEVATION: 487.3 ft.

DATE START: 16 Mar. 1981

DATE FINISH: 16 Mar. 1981

DRILLER: J. Genovese

INSPECTOR: S. Putney

GEOLOGIST: -

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	<u>Pneumatic</u>	<u>Digital</u>	<u>Dial</u>	<u>None</u>
MFG.	<u>Dia. Drill</u>	<u>Neptune</u>	<u>Harvard</u>	<u>-</u>
MODEL NO.	<u>-</u>	<u>Trident</u>	<u>-</u>	<u>-</u>

M.G.P. = (0.568 to 1.0) x \bar{z}

COMPUTED MAX GAUGE PRESS: (MGP) 100 psi

COMPUTED INTERNAL FRICTION: -

ROCK TYPE: IRONDEQUOIT LMS. HOLE SIZE 3 in.

RECOVERY (%) 100

R Q D (%) 77

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 4.5 TO TOP LOWER PACKER 143.0

TO BOTTOM OF BORING 146.0 TO BOTTOM UPPER PACKER (\bar{z}) 136.3

TO WATER TABLE 29.9 LENGTH OF TEST SECTION 6.7

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 0.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1300	0	150	25	2421.5		
	1			2423.5		
	2			2425.0		
	3			2426.5	1.7	
1305	0		50	2430.8		
	1			2434.0		
	2			2437.5		
	3			2442.5		
	4			2447.0		
	5			2453.8		
	10			2485.5	5.5	
1318	0		75	2536.5		
	1			2547.5		
	2			2558.7		
	3			2570.0		
	4			2582.2		
	5			2593.5		
	10			2664.5	12.8	

Water came up in casing at 75 psi. Apparent leak around packer.

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM 12 TEST NO. 2

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

FILE NO. 374813
SHEET NO. 1 of 1
LOCATION: Platt & Mill
ELEVATION: 487.3 ft.
DATE START: 16 Mar. 1981
DATE FINISH: 16 Mar. 1981
DRILLER: J. Genovese
INSPECTOR: S. Putney
GEOLOGIST: -

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Harvard	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.566 to 1.0) x \bar{z}
 COMPUTED MAX GAUGE PRESS: (MGP) 85 psi
 COMPUTED INTERNAL FRICTION: -
 ROCK TYPE: ROCHESTER SHALE HOLE SIZE 3 in.
 RECOVERY (%) 98
 R O D (%) 98

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 4.5 TO TOP LOWER PACKER 124.0
 TO BOTTOM OF BORING 146.0 TO BOTTOM UPPER PACKER (±) 117.3
 TO WATER TABLE 29.9 LENGTH OF TEST SECTION 6.7
 HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE _____

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1345	0	150	20	2674.0		Probable leak around packer at 60 psi. Water came up in casing at 75 psi. Apparent leak around packer.
	1			4.2		
	2			4.3		
	3			4.3	0.1	
1350	0		40	2674.5		
	1			4.6		
	2			4.7		
	3			4.8	0.1	
1356	0		60	2676.0		
	1			9.0		
	2			2682.8		
	3			2687.1		
	4			2692.2		
	5			2697.5	4.3	
1405	0		75	2702.0		
	1			2710.0		
	2			2717.8		
	5			2741.8		
	10			2777.5	7.6	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM 12

TEST NO. 3

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill & Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Platt & Mill

ELEVATION: 487.3 ft.

DATE START: 16 March 1981

DATE FINISH: 16 Mar. 1981

DRILLER: J. Genovese

INSPECTOR: S. Putney

GEOLOGIST: -

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Harvard	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.566 to 1.0) x \bar{z}

COMPUTED MAX GAUGE PRESS: (MGP) 75 psi

COMPUTED INTERNAL FRICTION: -

ROCK TYPE: ROCHESTER SHALE HOLE SIZE 3 in.

RECOVERY (%) 98

R O D (%) 98

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 4.5 TO TOP LOWER PACKER 114.0

TO BOTTOM OF BORING 146.0 TO BOTTOM UPPER PACKER (±) 107.3

TO WATER TABLE 29.9 LENGTH OF TEST SECTION 6.7

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 3.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1430	0	150	20	2783.0		
	1			2783.2		
	2			2783.2		
	3			2783.2	0.1	
1434	0		40	2783.5		
	1			2783.8		
	2			2783.9		
	3			2784.0	0.2	
1439	0		60	2784.8		
	1			2784.8		
	2			2785.0		
	3			2785.4		
	5			2787.5		
	10			2797.0	2.4	
1450	0		75	2802.0		Probable leak around packer at 60 psi.
	1			2812.5		
	2			2822.8		
	5			2849.0		
	10			2895.5	9.4	

Probable leak around packer at 60 psi.

Water came up in casing at 75 psi. Apparent leak around packer.

TEST BORING REPORT

HOLE NO. SM 13

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

FILE NO. 374813
SHEET NO. 1 of 2
LOCATION: State St.
ELEVATION: 492.8 ft. NCD ok
DATE START: 12 March 1981
DATE FINISH: 12 March 1981
DRILLER: J. Jensen
INSPECTOR: S. Putney

GROUNDWATER		DEPTH TO			CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE		
12 Mar	12:30	7.5 ft	7.6ft	26.6ft		SS	NX
					SIZE ID in	1-3/8	2-1/8
					HAMMER WT lb	140	-
					HAMMER FALL in	30	-

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
0.5		↑				ASPHALT.
						FILL Subbase Material
			28		2.0-	Compact brown silty SAND, some clay, trace gravel, trace brick. -FILL-
			23	S-1	4.0	
			13			Medium compact brown silty fine SAND, trace fine gravel and brick.
5			11			
	5.5		8	S-2	4.0-	
			7			
			15		6.0	
			94/5			
			100/3	S-3	6.3	Very compact brown SILT, weathered bedrock.
	7.6					TOP OF ROCK AT 7.6 FT.
10						
15						
20						
25						

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 7.6
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 3
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. SM 13
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
5							Begin coring at 7.6 ft.
	3	7.6					Light gray, fine-grained, thin to medium-bedded siliceous Dolomite. Trace pits, closely to moderately spaced argillaceous partings.
10	4 3						
	4	R-1	108 84	100 78	SL		LOCKPORT DOLOMITE
	4						Partings moderately to severely weathered from 8.0 to 14.2 ft. (NOTE: Incomplete water return throughout boring.)
15	3						Smooth, horizontal iron-stained joint at 7.7 ft.
	3	16.6					Smooth, low angle joint at 11.7 ft. Moderately weathered, iron-stained, vertical joint from 12.3 to 13.1 ft.
	3						LOCKPORT DOLOMITE
20	3						Very thin, closely spaced, wavy argillaceous bands, some of which are partings, from 14.9 to 20.4 ft.
	4	R-2	121 116	101 96*	SL		Severely weathered shaly partings at 15.2, 15.6, 19.3 and 20.4 ft. Secondary gypsum seams in closely to moderately closely spaced partings from 14.2 to 26.6 ft.
	3						Light to medium gray Dolomite, very thinly color-banded, trace gypsum nodules, from 20.4 to 26.6 ft.
25	3	26.6					
	4						Bottom of Boring at 26.6 ft.
30							*RQD based on core recovered. Borehole grouted to surface.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close < 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close 2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close 12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide 36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide > 120"	< 25	V. Poor

T B A F U N E S B

COMBUSTIBLE GAS MEASUREMENT

PROJECT CSOAP, Phase II FILE NO. 374813 BORING NO. SM 13

INSPECTOR S. Putney DRILLER J. Jensen

DATE	ELAPSED TIME (min)	BOTTOM OF HOLE (FT)	METER READING (%)	REMARKS
12 Mar. 1981	0	16.6	0.0	
	0	26.6	0.0	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. SM 14
FILE NO. 374813
SHEET NO. 1 of 2
LOCATION Plymouth Ave.
ELEVATION 499.7 ft. NCD
DATE START 12 March 1981
DATE FINISH 13 March 1981
DRILLER J. Jensen
INSPECTOR S. Putney

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

GROUNDWATER		DEPTH TO:			CASING SAMPLER CORE			
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	Augers	SS	NX
3/13/81		14.3	15.0	25.0	SIZE 1/2 in	-	1-3/8	2-1/8
					HAMMER WT lb	-	140	-
					HAMMER FALL in	-	30	-

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 2 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS	
5			6	S-1	0.0	Medium compact brown medium to fine SAND, little silt and fine gravel, trace brick. -FILL-	
			11		1.8		
			16				
			100/3				
			48	S-2	2.0	Very compact brown coarse to fine SAND, little silt and coarse to fine gravel, asphalt. -FILL-	
			32		4.0		
			27				
			32	S-3	4.0	Very compact brown silty medium to fine SAND, little fine gravel.	
			20		4.0		
			17				
			10	S-3	6.0	Medium compact brown silty fine SAND, trace fine gravel and cinders. -FILL-	
			27				
		22					
		28	N.R.	6.0	No sample recovered.		
		10		8.0			
		8					
		12	S-4	8.0	Medium compact brown (mottled) medium to fine SAND, little fine gravel, silt, trace brick. -FILL-		
		9		10.0			
		8					
10		14	S-5	10.0	Medium compact brown (mottled) silty medium to fine SAND, little silt, fine gravel and brick, trace cinders. -FILL-		
		24		12.0			
		5		12.0			
		8					
		4	S-6	12.0	Compact gray-brown coarse to fine SAND and coarse to fine GRAVEL (angular rock fragments).		
		58		13.8			
		70					
		100/3					
15	15.0					TOP OF ROCK AT 15.0 FT.	
						NOTE: Augered from 13.8 to 15.0 ft.	
20							
25							

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 15.0 ft.
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-10	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 6
30-30	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. SM 14
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
10							Begin coring at 15.0 ft.
15	4	15.0					
	5						Light gray, fine-grained, thin to medium-bedded siliceous Dolomite. Trace pits. Very closely to moderately closely spaced argillaceous partings. LOCKPORT DOLOMITE Partings moderately to severely weathered from 15.1 to 22.8 ft. High angle crack from 15.0 to 15.2 ft. Smooth, moderately dipping joint at 16.7 ft. Vertical joint from 16.9 to 17.1 ft. Smooth, low angle joints at 18.8, 19.4, 20.2, 21.1, 21.8, 21.9 and 23.3 ft. Secondary gypsum seams in partings from 22.8 to 25.0 ft. Severely weathered clayey parting at 22.6 ft. *RQD based on core recovered.
	6						
	3						
20	3	R-1	121	101	SL-		
	4		101	83*	MOD		
	4						
	2						
	3						
25	3	25.0					
30							

FIELD HARDNESS

WEATHERING

BEDDING/JOINT SPACING

RQD

V. Hard	— Knife can't scratch
Hard	— scratches diff.
Med. Hard	— scratches easily
Soft	— grooves
V. Soft	— carves

Fresh	Mod. Severe
V. slight	Severe
Slight	V. Severe
Moderate	Complete

V. thin	V. Close	< 2"	> 90%
Thin	Close	2" - 12"	90-75
Medium	Mod. Close	12" - 36"	75-50
Thick	Wide	36" - 120"	50-25
V. thick	V. wide	> 120"	< 25

Excellent
Good
Fair
Poor
V. Poor

COMBUSTIBLE GAS MEASUREMENT

PROJECT CSOAP, Phase II FILE NO. 374813 BORING NO. SM 14

INSPECTOR S. Putney DRILLER J. Jensen

DATE	ELAPSED TIME (min)	BOTTOM OF HOLE (FT)	METER READING (%)	REMARKS
13 Mar. 1981	0	25.0	0.0	

TEST BORING REPORT

MOLE NO. SM 15

OBJECT: CSOAP, Phase II

FILE NO. 374813

CLIENT: L.S.T.

SHEET NO. 1 of 6

CONTRACTOR: Drill & Test,

LOCATION: N. Water & Inner Loop

GROUNDWATER DEPTH TO

ELEVATION: 497.5 ft. NCD

DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF MOLE

CASING	SAMPLER	CORE BARREL
Augers	S/S	NX
SIZE ID in	1-3/8	2-1/8
HAMMER WT lb	140	
HAMMER FALL in	30	

DATE START 13 March 1981

DATE FINISH 18 March 1981

DRILLER B. Skura

INSPECTOR M. Tierney

DEPTH IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER FEET (INCHES)	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
0.3			13	S-1	.5	BLACKTOP Compact brown, coarse to fine SAND, little coarse gravel, trace silt. -FILL-
			25		2.0	
			20			
5		AUGERED	6	S-2	5.0	Loose brown silty fine SAND, trace fine gravel and medium sand.
			4			
			4		6.5	
10			11	S-3	10.0	Medium compact brown medium to fine SAND, little coarse to fine gravel. -FILL- TOP OF ROCK AT 11.5 FT.
			13			
			12		11.5	
11.5			100/0			

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 11.5 ft.
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 3
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	MOLE NO. SM 15
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
10		11.5					(NOTE: Drill rates were not recorded in this boring.) Begin coring at 11.5 ft.
15		R-1	$\frac{29}{18}$	$\frac{76}{47}$	SL-MOD		Light gray, fine-grained, thin to medium-bedded Dolomite. Trace pits. Closely to very closely spaced argillaceous partings. LOCKPORT DOLOMITE Low angle, moderately weathered joints at 11.7, 12.2, 13.0, 13.4, 14.0, 14.7 and 15.0 ft.
20		21.5	$\frac{79}{78}$	$\frac{96}{95}$	SL		LOCKPORT DOLOMITE Secondary gypsum seams in partings from 13.5 to 26.5 ft. Light to dark gray, fine-grained Dolomite, very thinly color-banded, with trace pits, gypsum nodules, secondary gypsum seams in closely spaced partings, from 26.5 to 55.3 ft.
25		R-2	$\frac{118}{118}$	$\frac{109}{100^*}$	SL	28.2	LOCKPORT DOLOMITE
30		30.5				29.3	*RQD based on core recovered
35		R-3	$\frac{83}{83}$	$\frac{99}{99}$	SL		LOCKPORT DOLOMITE Gypsum nodule, 0.1 ft. wide, at 35.2 ft.
40		37.5					Severely weathered shaley partings at 38.6 ft. and 41.1 ft. Low angle joint at 39.0 ft. LOCKPORT DOLOMITE Low angle joints at 41.4 and 41.7 ft. Gypsum nodule, 0.1 ft. wide, at 44.2 ft.
45		R-4	$\frac{115}{106}$	$\frac{101}{92^*}$	SL		

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25
V. Soft	— carves			V. thick	V. wide	> 120"	< 25
							Excellent
							Good
							Fair
							Poor
							V. Poor

H & A FORM 4B

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
80		R-8	<u>120</u>	<u>100</u>	SL		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely spaced Limestone beds.
			<u>120</u>	<u>100</u>			
85							
		87.0					ROCHESTER SHALE
90		R-9	<u>112</u>	<u>93</u>	SL		Light gray, thin to very thin, closely spaced Limestone beds from 88.0 to 150.1 ft.
			<u>110</u>	<u>92</u>			
95							
		97.0				95.3	
100		R-10	<u>118</u>	<u>109</u>	SL	PT3	ROCHESTER SHALE
			<u>118</u>	<u>100*</u>			
105							Gypsum nodule 0.1 ft. wide at 101.0 ft. Severely weathered shaley partings at 101.3 and 102.3 ft.
		106.0					*RQD based on core recovered.
110		R-11	<u>90</u>	<u>75</u>	SL		ROCHESTER SHALE
			<u>90</u>	<u>100*</u>			
115							Smooth vertical joint from 109.0 to 109.5 ft.
							High angle joint from 112.0 to 112.5 ft.
						113.3	

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
v. Hard	— Knife can't scratch	Fresh	Mod. Severe	v. thin	v. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	v. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	v. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
v. Soft	— carves			v. thick	v. wide	> 120"	< 25	v. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
115		116.0				X	Light to dark gray, fine-grained, dolomitic Mudstone, very thinly color-banded. Trace gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely spaced Limestone beds.
120		R-12 120 120	120 120	143 100*	SL	PT2 119.0	
		123.0					ROCHESTER SHALE Smooth, low angle joint with secondary gypsum seam at 116.1 ft. *RQD based on core recovered; rock cored in R-11 was recovered in R-12.
125		R-13 121 116	121 116	101 96*	SL	124.3 125.0-125.2 125.5 126.5 PT1 130.0	Severely weathered clayey parting at 121.6 ft. Rough vertical joint from 126.1 to 126.3 ft. ROCHESTER SHALE
130		133.0					
135		R-14 122 120	122 120	102 98*	SL		ROCHESTER SHALE Increasingly fossiliferous from 141.0 to 150.1 ft.
140		143.0					
145		R-15 120 120	120 120	100 100	SL		ROCHESTER SHALE Moderately dipping joint with gypsum seam at 149.8 ft. Low angle joint with secondary gypsum seam at 149.9 ft.
150							

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
150		R-15 153.0			SL	150.1	Light to medium-gray, fine to medium-grained, thin-bedded Limestone IRONDEQUOIT LIMESTONE Low angle slickensided shears with secondary gypsum seams at 152.2 and 152.5 ft.
155							Bottom of Boring at 153.0 ft. Observation well installed in completed borehole.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

GROUND WATER MONITORING REPORT

OW/PZ NUMBER: OW SM 15

NCD
ELEVATION SUBTRAHEND 497.5 ft.

FILE NO. 374813
PAGE NO. 2 of 2

DATE	TIME	ELAPSED TIME	DEPTH OF WATER FROM <u>surface</u>	ELEVATION OF WATER	REMARKS	READ BY
20 Mar. 1981	AM		48.0 ft.	449.5 ft.	Installation Complete	ERH
					Flushed—water never reached surface	ERH
24 Mar. 1981	AM		41.5	456.0		ERH
1 May 1981	PM		29.5	468.0		SP
		0	26.6	470.9	Flush Test (Poured in 1 gal.)	
		1	27.1		" "	
		2	27.6		" "	
		5	28.3		" "	
		7 min.	28.5	469.0	" "	
24 June 1981	PM	96 days	39.9	457.6		MW
20 July 1981	AM	122 days	40.0	457.5		FS
5 Aug. 1981	AM	138 days	39.5	458.0	0% gas	ERH
22 Sep. 1981	AM	186 days	38.3	459.2	trace gas read < 0.15%	ERH
21 Oct. 1981	PM	215 days	38.8	458.7		SMV
4 Nov. 1981	PM	229 days	38.0	459.5		ERH
		0 min.	35.0	462.5	Flush Test (Poured in 5 gal.)	ERH
6 Nov. 1981	PM	231 days	38.2	459.3		SMV

COMBUSTIBLE GAS MEASUREMENT

PROJECT CSOAP, Phase II FILE NO. 374813 BORING NO. SM 15
INSPECTOR M. Tierney DRILLER B. Skura

DATE	ELAPSED TIME (min)	BOTTOM OF HOLE (FT)	METER READING (%)	REMARKS
13 Mar. 1981	0	21.0	0	
16 Mar. 1981	62 hr.	21.0	0	Hole capped over weekend
	0	30.5	0	
	0	37.5	0	
	0	47.0	0	
17 Mar. 1981	12 hr.	47.0	0	
	0	77.0	0	
	0	97.0	0	
18 Mar. 1981	12 hr.	97.0	0	
	0	123.0	0	
	0	143.0	0	
	0	153.0	0	
	10	153.0	0	End Boring

GROUND WATER OBSERVATION WELL REPORT

PROJECT: CSOAP, PHASE II
 LOCATION: Rochester, NY
 CLIENT: L.S.T.
 CONTRACTOR: Drill & Test
 DRILLER: B. Skura INSPECTOR: E. Hanna
 INSTALLATION DATE 19 March 1981

FILE NO. 374813
 WELL NO. OW SM 15
 BORING NO. SM 15
 LOCATION N. Water St.
at Inner Loop
 SHEET 1 OF 2

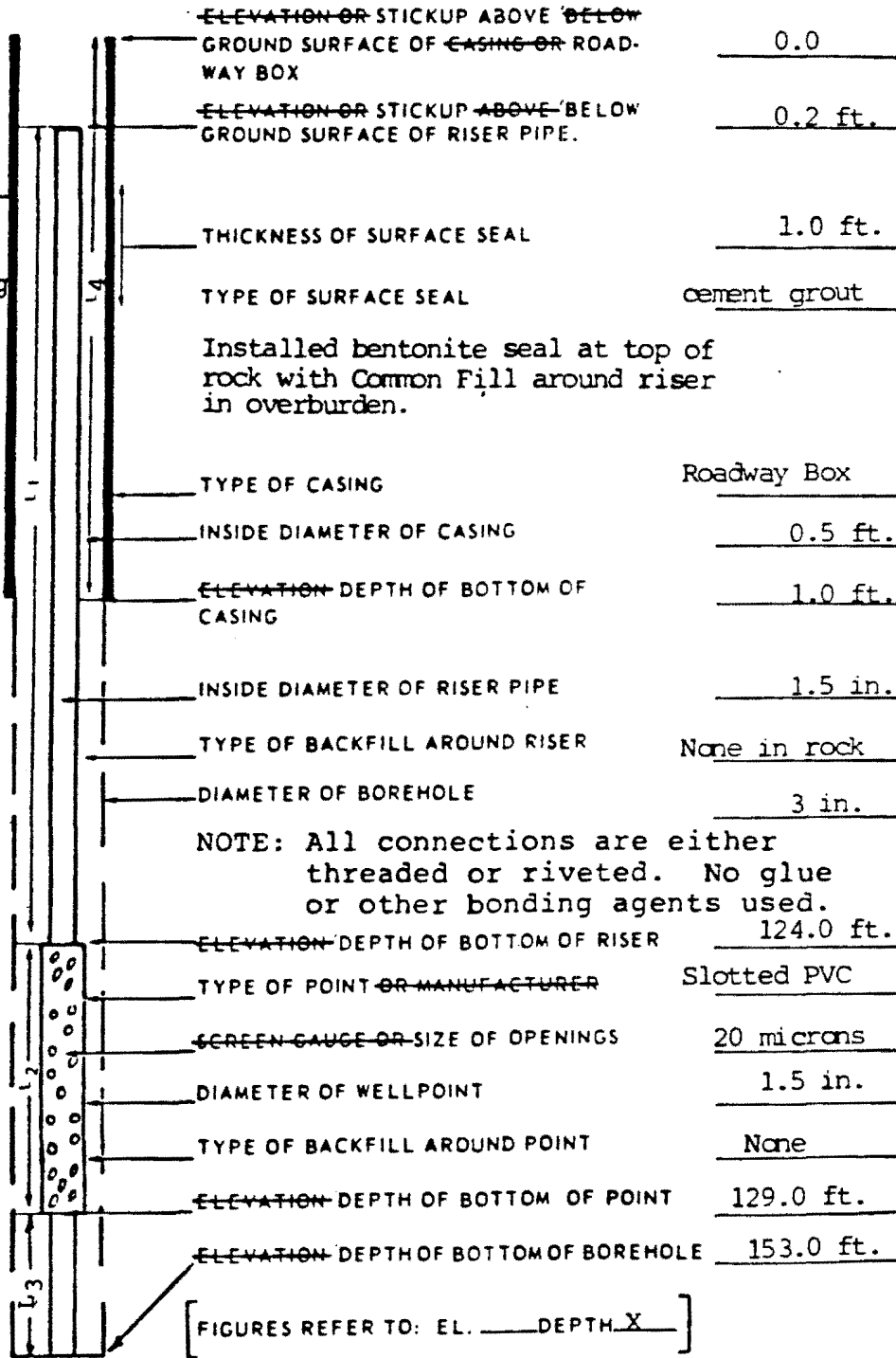
SURVEY DATUM NCD

GROUND ELEVATION 497.5 ft.

Refer to test boring log for description of soil and rock conditions.

OVERBURDEN THICKNESS (ft) 11.5

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)



[FIGURES REFER TO: EL. _____ DEPTH X]

$$\left[\frac{1.0 \text{ ft.}}{\text{LENGTH OF CASING } (L_4)} \right] \left[\frac{147.8}{\text{LENGTH OF RISER PIPE } (L_1 + L_3)} + \frac{5.0}{\text{LENGTH OF POINT } (L_2)} \right] = \frac{152.8 \text{ ft.}}{\text{PAY LENGTH}}$$

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM 15 TEST NO. 1

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
TRACTOR: Drill & Test

FILE NO. 374813
SHEET NO. 1 of 1
LOCATION: N. Water St. at Inner Loop
ELEVATION: 497.5 ft. R
DATE START: 19 Mar. 1981
DATE FINISH: 19 Mar. 1981
DRILLER: B. Skura
INSPECTOR: R. Hilimire
GEOLOGIST: -

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Dial	Dial	None
MFG.	Dia. Drill	Neptune	Harvard	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.566 to 1.0) x \bar{z}
 COMPUTED MAX GAUGE PRESS: (MGP) 100 psi
 COMPUTED INTERNAL FRICTION: -
 ROCK TYPE: Rochester Shale HOLE SIZE 3 in.
 RECOVERY (%) 101
 R O D (%) 96

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 11.5 TO TOP LOWER PACKER 130.0
 TO BOTTOM OF BORING 153.0 TO BOTTOM UPPER PACKER (±) 124.3
 TO WATER TABLE 22.2 LENGTH OF TEST SECTION 5.7
 HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1317	0	145	25	553.8	0.0	Probable leak around packer at 75 and 100 psi.
	1			553.8		
	2			553.8		
	5			553.8		
1323	0	50	50	554.0	0.0	
	1			554.0		
	2			554.0		
	5			554.0		
1329	0	75	75	554.1	1.7	
	1			554.1		
	2			554.2		
	5			556.2		
	10			571.2		
1341	0	100	100	579.8	9.0	
	1			587.6		
	2			596.5		
	5			623.5		
	10			676.0		

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. SM 15	TEST NO. 2
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill & Test					LOCATION: N. Water St. at Inner Loop	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 497.5 ft. R	
TYPE	Pneumatic	Dial	Dial	None	DATE START: 19 Mar. 1981	
MFG.	Dia. Drill	Neptune	Harvard	-	DATE FINISH: 19 Mar. 1981	
MODEL NO.	-	Trident	-	-	DRILLER: B. Skura	
					INSPECTOR: R. Hilimire	
					GEOLOGIST: -	

M.G.P. = (0.566 to 1.0) x \bar{z}	ROCK TYPE: Rochester Shale	HOLE SIZE: 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 80 psi	RECOVERY (%) 75 to 143	
COMPUTED INTERNAL FRICTION: -	R O D (%) 100	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 11.5	TO TOP LOWER PACKER 119.0
TO BOTTOM OF BORING 153.0	TO BOTTOM UPPER PACKER (±) 113.3
TO WATER TABLE 22.2	LENGTH OF TEST SECTION 5.7
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1402	0	145	20	684.3		Probable leak around packer at 80 psi.
	1			684.3		
	2			684.3		
	5			684.3	0.0	
1408	0		40	684.4		
	1			684.4		
	2			684.4		
	5			684.4	0.0	
1414	0		60	684.4		
	1			684.4		
	2			684.4		
	5			684.4	0.0	
1420	0		80	686.6		
	1			688.8		
	2			692.0		
	5			706.7		
	10			743.0	5.6	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM 15

TEST NO. 3

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Drill & Test

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: N. Water St. at Inner Loop

ELEVATION: 497.5 ft. R

DATE START: 19 Mar. 1981

DATE FINISH: 19 Mar. 1981

DRILLER: B. Skura

INSPECTOR: R. Hilimire

GEOLOGIST: -

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Dial	Dial	None
MFG.	Dia. Drill	Neptune	Harvard	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.566 to 1.0) x Z

COMPUTED MAX GAUGE PRESS: (MGP) 75 psi

COMPUTED INTERNAL FRICTION: -

ROCK TYPE: Rochester Shale

HOLE SIZE 3 in.

RECOVERY (%) 93 to 109

R O D (%) 92 to 100

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 11.5

TO TOP LOWER PACKER 101.0

TO BOTTOM OF BORING 153.0

TO BOTTOM UPPER PACKER (Z) 95.3

TO WATER TABLE 22.2

LENGTH OF TEST SECTION 5.7

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1441	0	145	15	744.3		
	1			744.3		
	2			744.3		
	5			744.3	0.0	
1447	0		35	744.4		
	1			744.4		
	2			744.4		
	5			744.4	0.0	
1453	0		50	745.2		
	1			745.2		
	2			745.2		
	5			745.2	0.0	
1459	0		75	745.2		
	1			745.2		
	2			745.2		
	5			745.2	0.0	

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. SM 15	TEST NO. 4
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill & Test					LOCATION: N. Water St. at Inner Loop	
		PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 497.5 ft. R
TYPE	Pneumatic	Dial	Dial	None		DATE START: 19 Mar. 1981
MFG.	Dia. Drill	Neptune	Harvard	-		DATE FINISH: 19 Mar. 1981
MODEL NO.	-	Trident	-	-		DRILLER: B. Skura
					INSPECTOR: R. HiLimire	
					GEOLOGIST: -	
M.G.P. = (0.566 to 1.0) x \bar{z}				ROCK TYPE: Rochester Shale		
COMPUTED MAX GAUGE PRESS: (MGP) 60 psi				MOLE SIZE 3 in.		
COMPUTED INTERNAL FRICTION: -				RECOVERY (%) 102		
				ROD (%) 100		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 11.5 TO TOP LOWER PACKER 77.0

TO BOTTOM OF BORING 153.0 TO BOTTOM UPPER PACKER (±) 71.3

TO WATER TABLE 22.2 LENGTH OF TEST SECTION 5.7

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1514	0	145	15	745.5		
	1			745.5		
	2			745.5		
	5			745.5	0.0	
1520	0		30	745.8		
	1			745.8		
	2			745.8		
	5			745.8	0.0	
1526	0		45	745.9		
	1			745.9		
	2			745.9		
	5			745.9	0.0	
1532	0		60	745.9		
	1			745.9		
	2			745.9		
	5			745.9	0.0	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM 15 TEST NO. 5

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

FILE NO. 374813
SHEET NO. 1 of 1
LOCATION: N. Water St. at Inner Loop
ELEVATION: 497.5 ft. R
DATE START: 19 Mar. 1981
DATE FINISH: 19 Mar. 1981
DRILLER: B. Skura
INSPECTOR: R. Hilimire
GEOLOGIST: -

TYPE	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
	Pneumatic	Dial	Dial	None
MFG.	Dia. Drill	Neptune	Harvard	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.566 to 1.0) x \bar{z}
 COMPUTED MAX GAUGE PRESS: (MGP) 40 psi
 COMPUTED INTERNAL FRICTION: -
 ROCK TYPE: Lockport Dolomite HOLE SIZE 3 in.
 RECOVERY (%) 99
 R O D (%) 98

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 11.5 TO TOP LOWER PACKER 55.0
 TO BOTTOM OF BORING 153.0 TO BOTTOM UPPER PACKER (±) 49.3
 TO WATER TABLE 22.2 LENGTH OF TEST SECTION 5.8
 HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.5

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1544	0	145	10	748.1		
	1			748.9		
	5			759.2		
	10			777.2	2.9	
1555	0		20	781.9		
	1			787.3		
	2			792.3		
	5			808.6		
	10			834.3	5.2	
1606	0		30	839.4		
	1			845.8		
	2			852.0		
	5			870.5		
	10			901.5	6.2	
1617	0		40	908.3		
	1			915.7		
	2			923.0		
	5			947.0		
	10			983.0	7.5	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. SM 16

PROJECT: CSOAP, Phase II

FILE NO 384813

CLIENT: L.S.T.

SHEET NO. 1 of 2

CONTRACTOR: Drill & Test

LOCATION: N. Fitzhugh & Allen

GROUNDWATER

DEPTH TO:

CASING SAMPLER CORE BARREL

ELEVATION 497.0 ft. NCD

DATE START 13 March 1981

DATE FINISH 13 March 1981

DRILLER J. Jensen

INSPECTOR S. Putney

DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	Augers	SS	NX
3/13/81		15.7	12.5	26.5	SIZE ID	in	1-3/8	2-1/8
					HAMMER WT	lb	140	
					HAMMER FALL	in	30	

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
1.5						CONCRETE & ASPHALT
			10	S-1	2.0	Compact brown medium to fine SAND, little coarse to fine gravel and silt.
			18		-	
			18		4.0	-FILL-
			12			
5			15	S-2	4.0	Medium compact brown silty medium to fine SAND, trace fine gravel, cinders and clay. -FILL-
			6		6.0	
			8			
			4			
			8			
			7	S-3	6.0	Medium compact brown medium to fine SAND, little silt and fine gravel, trace brick and cinders. -FILL-
			6		-	
			9		8.0	
			7			
			12	S-4	6.0	Very compact brown medium to fine SAND, little coarse to fine gravel, (angular rock fragments), trace silt. -FILL-
			73		-	
10			25		10.0	
			45	S-5	10.0	2 rock fragments (poor recovery)
			53		-	
			100/5		11.5	
12.5						TOP OF ROCK AT 12.5 FT. -FILL-
			100/0			
						NOTE: Augered from 11.5 - 12.5 ft.
15						
20						
25						

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 12.5 ft.
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 5
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO SM 16
50	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
10							Begin coring at 12.5 ft.
15	4 3 3 3	12.5					Light gray, fine-grained, thin to medium-bedded, siliceous Dolomite. Trace pits and stylolites. Very closely to moderately closely spaced argillaceous partings. LOCKPORT DOLOMITE
20	2 3 2 3	R-1 21.5	$\frac{109}{72}$	$\frac{101}{66^*}$	SL		Smooth, moderately dipping joint at 12.6 ft. Low angle joints at 12.8, 13.2, 13.9 and 15.3 ft. Short vertical joint at 13.0 ft. Secondary gypsum seams in some joints and partings from 14.6 to 26.5 ft. Low angle joints at 15.7 and 17.7 ft. *RQD based on core recovered. LOCKPORT DOLOMITE
25	3 3 3	R-2 26.5	$\frac{59}{58}$	$\frac{98}{97}$	SL		Partings moderately to severely weathered from 12.8 to 19.7 ft. Short, vertical joint at 16.6 ft. Smooth, low angle joints at 18.7, 19.5, 20.4 21.3 and 22.5 ft.
30							Bottom of Boring at 26.5 ft. Borehole grouted to 11.5 ft. then backfilled to surface.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

COMBUSTIBLE GAS MEASUREMENT

PROJECT CSOAP, Phase II FILE NO. 374813 BORING NO. SM 16

INSPECTOR S. Putney DRILLER J. Jensen

DATE	ELAPSED TIME (min)	BOTTOM OF HOLE (FT)	METER READING (%)	REMARKS
13 Mar. 1981	0	21.5	0.25	
13 Mar. 1981	0	26.5	0.25	

HALEY & ALDRICH, INC
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. SM 17

PROJECT: CSOAP, Phase II

FILE NO 374813

CLIENT: L.S.T.

SHEET NO 1 of 2

CONTRACTOR: Drill & Test

LOCATION State St.

GROUNDWATER		DEPTH TO			CASING SAMPLER CORE BARREL			
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	Augers	SS	NX
4/16/81		6.0	6.0	26.0	SIZE ID in	-	1-3/8	2-1/8
					HAMMER WT lb	-	140	-
					HAMMER FALL in	-	30	-

ELEVATION 493.8 ft. NCD

DATE START 16 March 1981

DATE FINISH 16 March 1981

DRILLER J. Jensen

INSPECTOR S. Putney

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
	0.5					ASPHALT
			3		2.0	Loose brown medium to fine SAND, trace silt and fine gravel, trace brick, trace cinders. -FILL-
			4	S-1	-	
			3		4.0	
5			3		4.0	
			3			Loose gray silty medium to fine SAND, trace clay and brick. -FILL -
			4	S-2	-	
	6.0		100		6.0	TOP OF ROCK AT 6.0 FT.
10						
15						
20						
25						

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 6.0
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 2
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO SM 17
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

COMBUSTIBLE GAS MEASUREMENT

PROJECT CSOAP, Phase II FILE NO. 374813 BORING NO. SM 17

INSPECTOR S. Putney DRILLER J. Jensen

DATE	ELAPSED TIME (min)	BOTTOM OF HOLE (FT)	METER READING (%)	REMARKS
16 Mar. 1981	0	16.0	0.0	
	0	26.0	0.0	

TEST BORING REPORT

MOLE NO. SM 20
FILE NO. 374813
SHEET NO. 1 of 6
LOCATION N. Water
ELEVATION 495.0 ft. NCD cc
DATE START 20 March 1981
DATE FINISH 25 March 1981
DRILLER B. Skura
INSPECTOR E. Hanna

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

GROUNDWATER		DEPTH TO		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF MOLE	TYPE	
					SIZE 1 D in	3
					HAMMER WT lb	300
					HAMMER FALL in	24
						SS
						1-3/8
						2-1/8
						NX
						-
						-

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 4 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
	0.3		20			BLACKTOP
			12	S-1	0.5	Medium compact black coarse to fine SAND, little coarse to fine gravel and concrete fragments. -FILL-
			12		2.0	
			12			
5			12	S-2	5.0	Compact brown medium to fine SAND and cinders, trace silt. -FILL-
			17		6.5	
			15			
10	10.0		6	S-3*	10.0	Medium compact gray silty fine SAND, trace decomposed root fibers. TOP OF ROCK AT 12.3 FT.
			12		11.5	
			14			
	12.3					
15						*Laboratory grain size analysis.
20						
25						

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>12.3 ft.</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u>-</u>
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>3</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	MOLE NO. <u>SM 20</u>
50+	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
10							Begin coring at 12.3 ft.
15	4	12.3			SL-MOD		Light gray, fine to medium-grained, thin to medium-bedded, cross-bedded siliceous Dolomite. Trace pits. Very thin, closely to very closely spaced, wavy argillaceous bands, most of which are partings.
	4	R-1	120	100	SL		LOCKPORT DOLOMITE
	4		117	98			Moderately weathered partings from 12.3 to 18.5 ft. Smooth, low angle, parallel joints at 12.6 and 13.3 ft.
	3						Smooth, moderately dipping joint intersecting parting at 14.0 ft.
	3						Short, vertical, moderately weathered joint at 14.9 ft.
20	4	22.3			SL		Vertical, severely weathered joint from 18.4 to 18.5 ft.
	3						LOCKPORT DOLOMITE
	4						Secondary gypsum seams in some partings from 20.3 to 24.7 ft.
	3						Moderately dipping, parallel argillaceous partings from 22.8 to 22.9 ft. and 23.0 to 23.1 ft. Severely weathered shaly partings at 23.5 and 24.7 ft.
25	3	R-2	120	100	SL		
	3		120	100			
	4						
	4						
30	3	32.3					
	4						
	4						
	3						
35	4	R-3	120	100	SL		Light to medium gray, fine-grained Dolomite, very thinly color-banded with trace gypsum nodules and fossils, and secondary gypsum seams in closely to moderately closely spaced partings from 24.7 to 53.1 ft.
	4		116	97			** Sample from 34.2 to 34.4 ft.
	3						LOCKPORT DOLOMITE
	4						Severely weathered shaly parting at 27.4 ft.
40	3	42.3					Gypsum nodules, 0.1 ft. wide, at 32.3 and 34.6 ft.
	4						
	4						
	3						
45	3						Very thin, severely weathered clayey shale bed at 36.7 ft. Severely weathered shaly partings at 37.2 and 39.2 ft.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Foot	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS	
			in.	%				
45	4	R-4	120	100	SL	46.2	Light to medium gray, fine-grained, thin to medium-bedded Dolomite, very thinly color-banded. Trace pits, gypsum nodules and fossils. Secondary gypsum seams in closely to moderately closely spaced partings. LOCKPORT DOLOMITE	
	3		113	94				
	3							
	3							
50	4	52.3				PT5	Severely weathered shaly partings at 45.6, 47.3, 47.5 and 50.3 ft. Very thin, severely weathered clayey shale bed at 51.5 ft. Severely weathered shaly partings at 51.9, 52.3 and 52.8 ft. (Contact gradational)	
	3							
	3							
	4							
55	4	R-5			SL	53.1	Light to dark gray, fine-grained dolomitic Mudstone, very thinly color banded. Trace pits, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. ROCHESTER SHALE Severely weathered shaly partings at 53.1, 53.3, 57.3, 57.4 and 60.4 ft. (NOTE: Incomplete water return in R-4 through R-12.)	
	3		121	101				
	3		109	90*				
	4							
60	4	62.3						
	4							
	4							
	4							
65	3	R-6			SL	70.2	ROCHESTER SHALE Severely weathered shaly partings at 66.8 and 68.8 ft. Small gypsum nodule at 70.2 ft. Severely weathered shaly parting at 70.8 ft.	
	3		120	100				
	4		113	94				
	3							
70	3	72.3				PT4	Gypsum nodule 0.2 ft. wide at 72.1 ft. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds from 72.4 to 147.7 ft. Moderately weathered shaly parting at 75.1 ft.	
	5							
	5							
	5							
75	4	R-7	23	99	SL	76.0	ROCHESTER SHALE *RQD based on core recovered.	
	5		74.3	23				99
	4							
	5							
80	5	R-8	122	102	SL			
	5		114	93*				
	4							
	5							

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— indoves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
150	4					150.2	Light to medium gray, fine to medium-grained, thin to medium-bedded fossiliferous Limestone, interbedded with dark gray, very thin dolomitic Shale. Secondary gypsum seams in closely to moderately closely spaced, low angle partings.
	5						
	4						
	4	154.3				PT1	
155	4					156.0	IRONDEQUOIT LIMESTONE Low angle, slickensided shear at 149.2 ft. Moderately dipping slickensided shear at 151.8 ft. Low angle slickensided shear at 152.9 ft. Short, high angle joint at 155.8 ft.
	3	R-16					
	4		58	97	SL		
	3		56	93			
	4	159.3					
160	4						Bottom of Boring at 159.3 ft.
							Observation well installed in completed boring.
165							

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

COMBUSTIBLE GAS MEASUREMENT

PROJECT CSOAP, Phase II FILE NO. 374813 BORING NO. SM 20

INSPECTOR E. Hanna DRILLER B. Skura

DATE	ELAPSED TIME (min)	BOTTOM OF HOLE (FT)	METER READING (%)	REMARKS
23 Mar. 1981	0	32.3	0	
	0	42.3	0	
24 Mar. 1981	0	72.3	0.7	
	0	84.3	0	
	0	104.3	0	
25 Mar. 1981	0	134.3	0	
	0	144.3	0	
	0	154.3	0	

GROUND WATER OBSERVATION WELL REPORT

PROJECT: <u>CSOAP, PHASE II</u>	FILE NO. <u>374813</u>
LOCATION: <u>Rochester, NY</u>	WELL NO. <u>OW SM 20</u>
CLIENT: <u>L.S.T.</u>	BORING NO. <u>SM 20</u>
CONTRACTOR: <u>Drill & Test</u>	LOCATION <u>N. Water St.</u>
DRILLER: <u>E. Ward</u> INSPECTOR: <u>S. Putney</u>	<u>at Inner Loop</u>
INSTALLATION DATE <u>27 March 1981</u>	SHEET <u>1</u> OF <u>2</u>

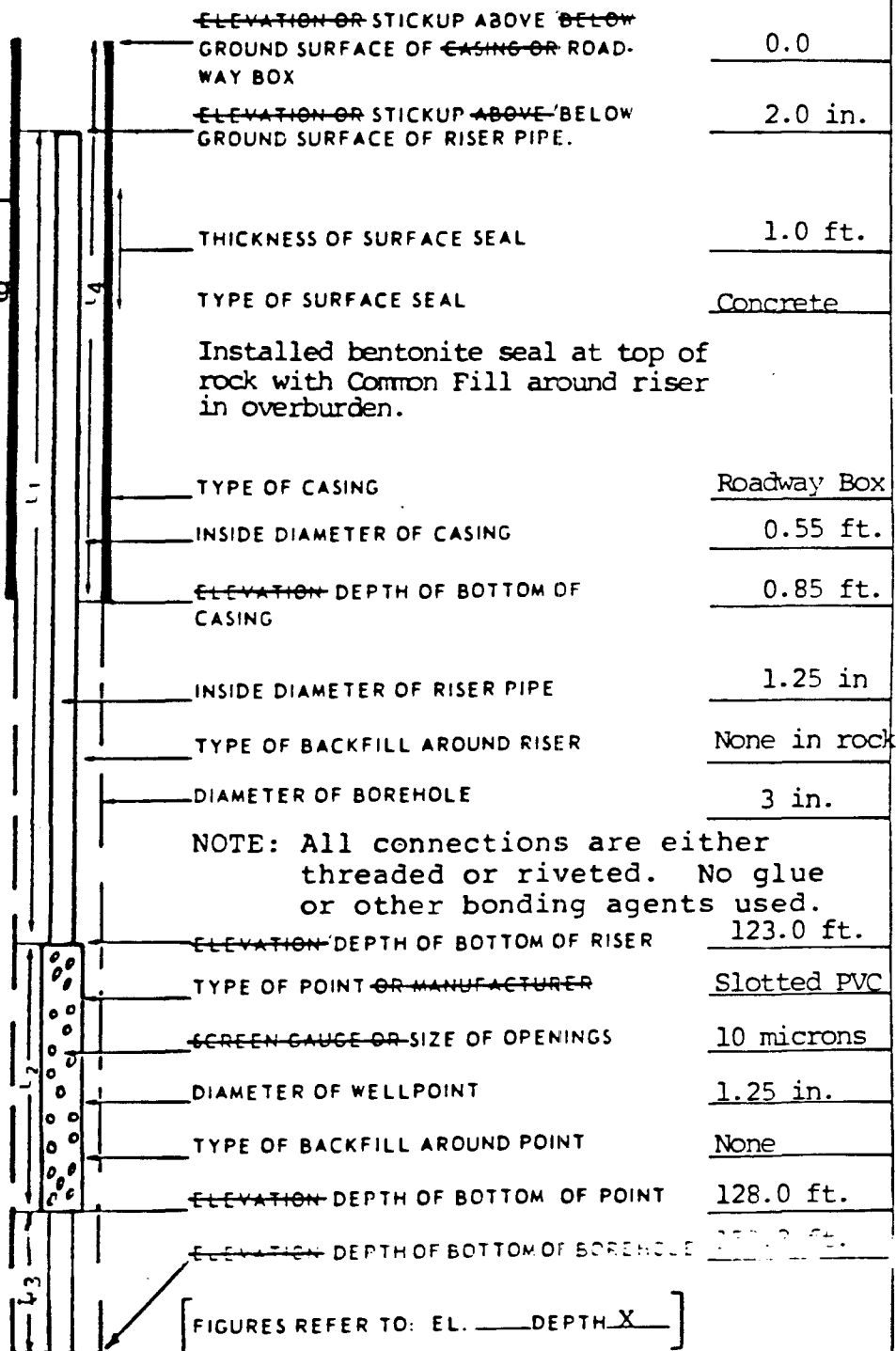
SURVEY DATUM NCD

GROUND ELEVATION 495.0 ft.

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)

Refer to test boring log for description of soil and rock conditions.

OVERBURDEN THICKNESS (ft) 12.3



$$\left[\frac{0.85 \text{ ft.}}{\text{LENGTH OF CASING } (L_4)} \right] + \left[\frac{154.1}{\text{LENGTH OF RISER PIPE } (L_1 + L_3)} \right] + \left[\frac{5.0}{\text{LENGTH OF POINT } (L_2)} \right] = 159.1 \text{ ft.} \quad \text{PAY LENGTH}$$

MALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM 20 TEST NO. 1

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

FILE NO. 374813
SHEET NO. 1 of 1
LOCATION: N. Water at Inner Loop
ELEVATION: 495.0 ft. NCD
DATE START: 27 March 1981
DATE FINISH: 27 March 1981
DRILLER: E. Ward
INSPECTOR: S. Putney
GEOLOGIST: -

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Harvard	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.586 to 1.0) x \bar{z}
COMPUTED MAX GAUGE PRESS: (MGP) 110 psi
COMPUTED INTERNAL FRICTION: -
ROCK TYPE: Irondequoit Lms. HOLE SIZE 3 in.
RECOVERY (%) 98 to 100
R Q D (%) 97 to 100

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 12.3 TO TOP LOWER PACKER 156.0
TO BOTTOM OF BORING 159.3 TO BOTTOM UPPER PACKER (2) 150.2
TO WATER TABLE 16.9 LENGTH OF TEST SECTION 5.8
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 0.1

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
0915	0	150	25	6206.0		Possible leak around packer at 50, 75 and 100 psi.
	1			6206.0		
	2			6206.0		
	3			6206.0	0.0	
0919	0		50	6209.5		
	1			6213.0		
	2			6217.5		
	5			6232.0	4.5	
1925	0		75	6242.0		
	1			6251.5		
	2			6261.0		
	5			6292.2		
	10			6345.0	10.3	
1937	0		100	6365.0		
	1			6379.0		
	2			6395.0		
	5			6432.5		
	10			6501.0	13.6	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM 20 TEST NO. 2

PROJECT: CSOAP, Phase II

FILE NO. 374813

CLIENT: L.S.T.

SHEET NO. 1 of 1

CONTRACTOR: Drill & Test

LOCATION: N. Water at Inner Loop

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Harvard	-
MODEL NO.	-	Trident	-	-

ELEVATION: 495.0 ft. NCD

DATE START: 27 March 1981

DATE FINISH: 27 March 1981

DRILLER: E. Ward

INSPECTOR: S. Putney

GEOLOGIST: -

M.G.P. = (0.566 to 1.0) x \bar{z}

COMPUTED MAX GAUGE PRESS: (MGP) 95 psi

ROCK TYPE: Rochester Shale HOLE SIZE 3 in.

RECOVERY (%) 100

COMPUTED INTERNAL FRICTION: -

R Q D (%) 100

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 12.3 TO TOP LOWER PACKER 133.0

TO BOTTOM OF BORING 159.3 TO BOTTOM UPPER PACKER (±) 127.2

TO WATER TABLE 16.9 LENGTH OF TEST SECTION 5.8

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 0.1

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1000	0	150	30	6542.8		Probable leak around packer at 75 and 95 psi.
	1			6542.8		
	2			6542.8		
	3			6542.8	0.0	
1004	0		50	6543.0		
	1			6543.5		
	2			6544.3		
	3			6545.0	0.7	
1009	0		75	6549.3		
	1			6550.0		
	2			6551.0		
	5			6558.0		
	10			6590.5	4.1	
1020	0		95	6606.3		
	1			6614.0		
	2			6621.8		
	5			6661.0		
	10			6701.0	9.5	

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. SM 20	TEST NO. 3
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Drill & Test					LOCATION: N. Water at Inner Loop	
PACKER SYSTEM		WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 495.0 ft. NCD	
TYPE		Digital	Dial	None	DATE START: 27 March 1981	
MFG.		Neptune	Harvard	-	DATE FINISH: 27 March 1981	
MODEL NO.		Trident	-	-	DRILLER: E. Ward	
					INSPECTOR: S. Putney	
					GEOLOGIST: -	
M.G.P. = (0.888 to 1.0) x \bar{z}				ROCK TYPE: Rochester Shale		HOLE SIZE 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 85 psi				RECOVERY (%) 100		
COMPUTED INTERNAL FRICTION: -				R O D (%) 100		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 12.3 TO TOP LOWER PACKER 122.0

TO BOTTOM OF BORING 159.3 TO BOTTOM UPPER PACKER (Z) 116.2

TO WATER TABLE 16.9 LENGTH OF TEST SECTION 5.8

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 0.1

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1045	0	150	25	6710.0		
	1			6714.2		
	2			6719.0		
	3			6723.0		
	5			6730.5	4.1	
1051	0		45	6737.0		
	1			6743.0		
	2			6748.5		
	3			6753.8		
	5			6765.0	5.6	
1057	0		65	6772.5		
	1			6779.8		
	2			6787.3		
	5			6808.0		
	10			6843.0	7.1	
108	0		85	6851.0		
	1			6860.0		
	5			6898.5		
	10			6944.8	9.4	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SM 20 TEST NO. 5

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill & Test

FILE NO. 374813
SHEET NO. 1 of 1
LOCATION: N. Water at Inner Loop.
ELEVATION: 495.0 ft. NCD
DATE START: 27 March 1981
DATE FINISH: 27 March 1981
DRILLER: E. Ward
INSPECTOR: S. Putney
GEOLOGIST: -

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Digital	Dial	None
MFG.	Dia. Drill	Neptune	Harvard	-
MODEL NO.	-	Trident	-	-

M.G.P. = (0.566 to 1.0) x \bar{z}
COMPUTED MAX GAUGE PRESS: (MGP) 30 psi
COMPUTED INTERNAL FRICTION: -

ROCK TYPE: Rochester Shale HOLE SIZE 3 in.
RECOVERY (%) 100
R O D (%) 94

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 12.3 TO TOP LOWER PACKER 52.0
TO BOTTOM OF BORING 159.3 TO BOTTOM UPPER PACKER (Z) 46.2
TO WATER TABLE 16.9 LENGTH OF TEST SECTION 5.8
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 0.1

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1215	0	150	15	6958.0		
	1			6959.2		
	2			6960.4		
	3			6962.0		
	5			6965.0		
	10			6973.8	1.6	
1227	0		30	6976.8		
	1			6979.9		
	2			6982.7		
	5			6992.2		
	10			7009.0	3.2	

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. **SM 22**

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Drill and Test

FILE NO. 374813
SHEET NO. 1 of 6
LOCATION: RGE lot on lake
ELEVATION: 480.8 ft. NCD
DATE START: 25 Aug. 1991
DATE FINISH: 28 Aug. 1991
DRILLER: J. Jensen
INSPECTOR: E. Hanna

GROUNDWATER		DEPTH TO:			CASING			SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	Auger	SS	NO	
8-27-81	9:00	74.5	43.0	88.0	SIZE ID in.	4	1-7/8	1-7/8	
					HAMMER WT lb	---	140	---	
					HAMMER FALL in	---	30	---	

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5			5	S-1	0.0	Medium compact brown coarse to fine SAND, little coal and cinder, trace silt, trace tile fragments. - FILL -
			4		1.5	
			18			
10			8	S-2	4.5	Loose brown medium to fine SAND, little coal and cinder, trace fine gravel, trace silt, trace tile fragments. - FILL -
			6		6.0	
			5			
15			3	S-3	9.5	Very loose brown medium to fine SAND, trace silt, coal, cinders and tile fragments. - FILL -
			3		11.0	
			3			
20			8	S-4	14.5	Medium compact gray medium to fine SAND, little cinders and ash, trace fine gravel, trace silt. - FILL -
			16		16.0	
			4			
25			3	S-5	19.5	Medium compact brown coarse to fine SAND, little silt, trace cinders and tile fragments. - FILL -
			3		21.0	
			10			
30			4	S-6	24.5	Medium compact gray clayey SILT, trace fine sand, cinders and concrete fragments. - FILL -
			6		26.0	
			10			
	27.0					
			20		29.5	Compact brown SILT, little clay

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>43.0 ft.</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u>---</u>
10-20	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>9</u>
20-30	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO <u>SM 22</u>
30-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

TEST BORING REPORT

HOLE NO. SM 22

PAGE 2 OF 6

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
30			28 40	S-7	31.0	Compact brown SILT, little clay.
35			15 25 25	S-8	34.5 36.0	Compact brown SILT, little clay.
40			38 50 100/4	S-9	39.5 40.9	Very compact brown SILT, little clay.
43.0			100/6			TOP OF ROCK AT 43.0 ft.
45						

ADMITTED

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION		SUMMARY
0-4	Very Loose	0-2	Very Soft	S	Split Spoon	Overburden: <u>43.0 ft.</u>
4-10	Loose	2-4	Soft	T	Thin Wall Tube	Rock: _____
10-30	Medium Compact	4-8	Medium Stiff	U	Undisturbed Piston	Samples: <u>9</u>
30-50	Compact	8-15	Stiff	O	Open End Rod	
50+	Very Compact	15-30	Very Stiff	W	Wash Sample	
						HOLE NO. <u>SM 22</u>

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
75	4						Light to dark gray, fine-grained, dolomitic, fossiliferous Mudstone. Trace pits and vugs. Secondary gypsum seams in closely to very closely spaced partings.
	5						
	5				SL		
	4	78.0					Light gray, thin to very thin, closely to moderately closely spaced Limestone beds. ROCHESTER SHALE
80	5				SL		
	4						Severely weathered clayey Shale parting at 81.9 ft.
	5		121	101			
	4		117	97*	SEV		
	5	R-5			SL		* RQD based on core recovered.
	4					83.6	Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Pits and vugs. Closely to moderately closely spaced argillaceous partings.
85	5				SL		
	4				MOD		
	5				SL		IRONDEQUOIT LIMESTONE
	4	88.0					
	4				MOD		Moderately weathered shaly partings at 84.8 and 85.1 ft. Moderately weathered heavily pitted and vuggy vertical joint from 86.4 to 86.9 ft. Heavily pitted vuggy parting at 86.8 ft. Heavily pitted vuggy zones from 86.8 to 87.2 ft., 88.2 to 88.8 ft., and 89.1 to 89.8 ft. Short, severely weathered zone at 88.5 ft. High angle crack from 98.1 to 98.5 ft.
90	4	R-6	45	94			
	4		43	90	SL		
	4	92.0					IRONDEQUOIT LIMESTONE
	4						
	4						Rough high angle joint from 92.5 to 92.7 ft. Rough, iron-stained vertical joint from 93.2 to 94.2 ft. Rough high angle joints from 94.0 to 94.2, 94.2 to 94.4, 95.9 to 96.2, and 101.2 to 101.6 ft.
95	4						
	4						
	4	R-7	117	102	SL		Severely weathered clayey parting at 100.4 ft. Smooth vertical joint with calcite seam from 100.4 to 100.7 ft.
	4		115	98*			
	4						** FRACTURE FREQUENCY (Fract./ft.)
100	4						
	4						
	4					101.6	Dark greenish gray Shale. Trace fossils.
	5	102.0			MOD		
	4				MOD		WILLIAMSON SHALE
	5				SEV		
	5		68	98			Intersecting vertical and moderately dipping joints from 101.6 to 101.8 ft. Smooth, iron-stained vertical joint from 102.0 to 102.6 ft. Smooth high angle joints from 103.1 to 103.3, and 104.2 to 104.7 ft. Rough branched high angle crack from 103.7 to 104.0 ft. Severely weathered parting and moderately dipping joint at 104.1 ft.
105	4	R-8	55	79	SL		
	5						
	4						Dark greenish gray Shale. Trace fossils.
	5						
	4		50	99	SL	107.8	LOWER SODUS SHALE
	5		50	99			
110	4						Smooth, high angle joint with calcite seam from 107.4 to 108.7 ft.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	Scratches diff.	V. Slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	Scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	Urooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	Carves			V. thick	V. wide	> 120"	< 25	V. Poor

R 77

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS	
			in.	%				
110	4				SL		0	Dark greenish gray to grayish brown Shale. Trace fossils.
	5						1	LOWER SODUS SHALE
	5	112.0					0	Seven light gray, very thin shell Limestone beds from 107.8 to 114.2 ft., most of which are vertically cracked or jointed. Low angle joints at 108.7, 114.0, 115.6 and 117.6 ft.
	6						2	Grayish brown Shale from 114.2 to 119.8 ft. Severely weathered clayey partings at 119.8 and 120.7 ft.
115	5						1	
	6						1	
	5	R-9	118	98	SL		0	
	5		115	96			1	
	5						0	LOWER SODUS SHALE
120	5						2	*RQD based on core recovered.
	5				SL	120.7	0	
	5	122.0						Light to medium gray, fine to medium-grained, crystalline, thin-bedded fossiliferous Limestone, interbedded with dark gray, very thin Shale beds. Trace pits, vugs, stylolites and gypsum nodules, closely to very closely spaced argillaceous partings.
	5							
125	5				SL			REYNALES LIMESTONE
	4							
	5	R-10	121	101				Short vertical joint at 121.9 ft. Gypsum nodule, 0.2 ft. wide, in parting at 124.5 ft. Moderately weathered shaly parting at 127.4 ft. Rough, pitted vertical crack from 129.1 to 130.6 ft. Severely weathered clayey parting and short vertical joint at 131.5 ft. Very thin, hard siliceous zones at 127.2, 128.3, 130.2, 131.0 and 136.2 ft. Hard siliceous zone from 132.1 to 132.3 ft. Chert from 133.1 to 133.3 ft. Severely weathered shaly partings at 133.7, 134.3, 135.0 and 139.5 ft.
	4		105	87*				
130	5				MOD			
	4							
	5	132.0						
	5							
135	5							
	5							
	5	R-11	96	101	SL			136.7 Red, medium-grained, oolitic, fossiliferous 137.1 FURNACEVILLE MEMBER hematitic Limestone REYNALES LIMESTONE
	5		92	96*				Moderately dipping crack at 137.9 ft. Low angle joint with trace slickensides at 138.7 ft.
	5							** ** FRACTURE FREQUENCY (Fract./ft.)
140	5				SL	139.9	1	Light greenish gray argillaceous Shale. MAPLEWOOD SHALE
	5		27	107			1	Severely weathered clayey parting at 139.9 ft.
	5		23	85*			0	Smooth vertical joint, with secondary pyrite and gypsum seam, from 141.5 to 147.0 ft., intersected by rough, high angle joint with gypsum seam, from 144.3 to 144.5 ft.
	5	142.0					0	
	4	R-12	57	95	SL		0	
145	5		57	95			0	

FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
d	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
ft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

TEST BORING REPORT

HOLE NO. SM 23

PROJECT: CSOAP, Phase II

FILE NO. 374815

CLIENT: L-S-T

SHEET NO. 1 of 5

CONTRACTOR: Drill and Test

LOCATION: Ambrose & Cliff

ELEVATION: 480.7 ft. NCD

DATE START: 8 April 1982

DATE FINISH: 13 April 1982

DRILLER: J. Jensen

INSPECTOR: E. Hanna

GROUNDWATER		DEPTH TO (ft.)			CASING	SAMPLER	CORE BARREL	
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	NW	SS	NXO
4-13-82	11:00	25.0	51.9	132.9	SIZE ID in	3	--	1-778
					HAMMER WT lb	---	140	---
					HAMMER FALL in	---	30	---

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 16 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
0						BLACKTOP
				S-1	1.5 3.0	Loose, black CINDERS, trace sand and silt.
						-FILL-
5				S-2	4.5 6.0	Loose, brown, medium to fine SAND, little cinders, coal, trace silt and tile.
						-FILL-
10				S-3	9.5 11.0	Very loose, black, medium-fine SAND, little cinders and ash, trace silt and tile.
						-FILL-
15				S-4	14.5 16.0	Very loose, black ASH and CINDERS, little sand, trace silt and tile.
						-FILL-
20				S-5	19.5 21.0	Medium compact, brown, coarse to fine SAND, little silt, trace tile and cinders.
						-FILL-
25				S-6	24.5 26.0	Loose, brown, coarse to fine SAND, little silt, trace tile and cinders.
						-FILL-
30					29.5	-FILL-

PRELIMINARY

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 51.5 ft.
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK 81.4 ft.
10-20	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 11
20-30	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. SM 23
30-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

H.B.A. CORP. 4

TEST BORING REPORT

Scale in Feet	Strata Change	Casing Blows Per Foot	Sampler Blows Per 6 Inches	Sample Number	Sample Depth Range	FIELD CLASSIFICATION AND REMARKS
30			6 7	S-7	31.0	Loose, brown, coarse to fine SAND, trace silt, tile and cinders. -FILL-
35			7 7 7	S-8	34.5 36.0	Loose, brown, coarse to fine SAND, little silt, trace gravel, cinders and tile. -FILL-
40			8 8 8	S-9	39.5 41.0	Loose, black CINDERS, TILE and ASH, little sand, trace silt and gravel. -FILL-
45			8 8 8	S-10	44.5 46.0	Loose, brown SILT, trace tile, gravel, sand and cinders. -FILL-
50			6 25	S-11	50.0 51.5	Very compact, brown SILT. TOP OF ROCK AT 51.5 ft.
51.5			100/5			
55						
60						

Summary

H&A FORM 4 SEP. 78 4

BLOWS/FT.	DENSITY	BLOWS/FT.	CONSISTENCY	SAMPLE IDENTIFICATION		SUMMARY (ft.)
0-4	Very Loose	0-2	Very Soft	S	Split Spoon	Overburden: 51.5 ft.
4-10	Loose	2-4	Soft	T	Thin Wall Tube	Rock: 81.4 ft.
10-30	Medium Compact	4-8	Medium Stiff	U	Undisturbed Piston	Samples: 11
30-50	Compact	8-15	Stiff	O	Open End Rod	
50+	Very Compact	15-30	Very Stiff	W	Wash Sample	
						HOLE NO. SM 23

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
45							
50							Begin coring at 51.9 ft.
55	3	R-1	122 105	98 84	SEV	SL	Light to dark gray, fine-grained, dolomitic Mudstone, very thinly color-banded. Trace pits, gypsum nodules and fossils. Closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds, most of which are vertically cracked. ROCHESTER SHALE Partings moderately to severely weathered from 52.1 to 56.0 ft. Severely weathered, moderately dipping joint at 52.0 ft. Severely weathered, clayey Shale from 53.5 to 53.8, and 54.7 to 54.8 ft. Secondary gypsum seams in partings from 56.1 to 92.3 ft. Severely weathered, shaly parting at 61.1 ft.
	3						
	3						
	3						
	3						
	3						
	3						
	3						
	3						
	3						
60	3	R-2	119 117	100 98	SL	SL	Gypsum nodule, 0.1 ft. wide, at 66.5 ft. ROCHESTER SHALE Small gypsum nodule at 70.6 ft.
	3						
	3						
	3						
	3						
	3						
	3						
	3						
	3						
	3						
65	3	R-3	80 80	106 100*	SL	SL	(NOTE: Core barrel blocked at 78.5 ft.) Moderately weathered partings at 76.5, 77.7 and 79.0 ft.
	3						
	3						
	3						
	3						
	3						
	3						
	3						
	3						
	3						
70	3	R-3	80 80	106 100*	SL	SL	ROCHESTER SHALE *RQD based on core recovered.
	3						
	3						
	3						
	3						
	3						
	3						
	3						
	3						
	3						
75	3	R-3	80 80	106 100*	SL	SL	ROCHESTER SHALE *RQD based on core recovered.
	3						
	3						
	3						
	3						
	3						
	3						
	3						
	3						
	3						
80	3	R-3	80 80	106 100*	SL	SL	ROCHESTER SHALE *RQD based on core recovered.
	3						
	3						
	3						
	3						
	3						
	3						
	3						
	3						
	3						

MBA FORM 4B - MA.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD		
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS		
			in.	%					
80	3	R-4 83.0	56	104	SL	92.3	Light to dark gray, fine-grained, dolomitic Mudstone, very thinly color-banded. Trace pits, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds, most of which are vertically cracked. ROCHESTER SHALE *RQD based on core recovered Increasingly fossiliferous Mudstone from 84.0 to 92.3 ft. (NOTE: Drill rod broke off at 83.0 ft.) Moderately weathered partings at 90.5 and 90.6 ft.		
	3		56	100*					
	3								
85	3	R-5 93.0	119	99	SL	92.3	Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone, interbedded with dark gray, very thin, dolomitic Shale. Secondary gypsum seams in closely to moderately closely spaced partings. IRONDEQUOIT LIMESTONE Severely weathered partings at 94.6, 95.3, 96.2, and 102.8 ft.		
	3							119	99
	3							119	99
	3								
	3								
	3								
90	3	R-6 103.0	119	99	SL	92.3	Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone, interbedded with dark gray, very thin, dolomitic Shale. Secondary gypsum seams in closely to moderately closely spaced partings. IRONDEQUOIT LIMESTONE Severely weathered partings at 94.6, 95.3, 96.2, and 102.8 ft.		
	3							116	97
	5								
	5								
	5								
95	5	R-7 110.2	83	96	SL	92.3	Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone, interbedded with dark gray, very thin, dolomitic Shale. Secondary gypsum seams in closely to moderately closely spaced partings. IRONDEQUOIT LIMESTONE Severely weathered partings at 94.6, 95.3, 96.2, and 102.8 ft.		
	5							72	83
	5								
	5								
100	4	R-8 113.0	30	89	SL	92.3	Dark, greenish gray Shale, trace fossils. WILLIAMSON SHALE *RQD based on core recovered. Severely weathered partings at 110.4, 110.8, 111.0, 111.9, and 112.1 ft. Smooth, low angle joint at 110.5 ft. Smooth, moderately dipping joint at 110.9 ft.		
	5							18	54
	5								
105	5	R-8 113.0	45	110	SL	92.3	Dark, greenish gray Shale, trace fossils. WILLIAMSON SHALE *RQD based on core recovered. Severely weathered partings at 110.4, 110.8, 111.0, 111.9, and 112.1 ft. Smooth, low angle joint at 110.5 ft. Smooth, moderately dipping joint at 110.9 ft.		
	5							32	71*

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. SS 1

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Warren George

FILE NO 374813
SHEET NO 1 of 6
LOCATION Campbell & Saxton
ELEVATION 507.8 ft. 50° 42'
DATE START 17 Feb. 1981
DATE FINISH 20 Feb. 1981
DRILLER K. Reid
INSPECTOR E. Hanna

GROUNDWATER		DEPTH TO:		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	
					SS	NO
					SIZE ID in	1-7/8 1-13/16
					HAMMER WT lb	140
					HAMMER FALL in	30

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
			25		0.0	Compact brown coarse, fine SAND, trace silt.
			55	S-1	1.5	
			22			
5			18		5.0	Wood fragments, little concrete fragments.
			18	S-2	6.5	
			30			
	8.5					- FILL - TOP OF ROCK AT 8.5 ft.
10						
15						
20						
25						

PRELIMINARY

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 8.5
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 2
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	
50+	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	HOLE NO. SS 1

H&A 1000014

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
5							Begin coring at 8.5 ft.
		8.5					
10	3 3 2 2 3 3	R-1	82/65	91/72	SL		Light to medium gray, fine to medium-grained, thin to medium-bedded Dolomite. Trace pits, small vugs and stylolites. LOCKPORT DOLOMITE (Note: No water return during R-1, casing driven deeper. Water return regained in R-2.) Very thin, closely spaced shaly partings from 8.5 to 37.5 ft. Several very thin, closely spaced low angle partings from 8.5 to 12.8 ft.
15	3 3	16.0					
20	3 3 2 2 3 3	R-2	115/108	96/90	SL		Moderately weathered stained vertical joints from 9.6 to 9.7 ft. and 11.3 to 11.6 ft. Stained vertical crack from 10.4 to 10.9 ft. LOCKPORT DOLOMITE
25	2 2	26.0				23.9	
30	3 3 2 2 3 3	R-3	63/60	102/95*	SL		Cross-bedding and very thin, closely to moderately closely spaced, wavy argillaceous partings from 12.5 to 35.4 ft. LOCKPORT DOLOMITE Secondary gypsum seams in partings from 13.1 to 62.7 ft. (Note: Core barrel blocked at 31.2 ft.)
35	2 2 3 3	31.2				30.0	
	2 2 3 3	R-4	60/57	100/95	SL		*RQD based on core recovered. Light to medium gray, streaked and mottled Dolomite from 35.4 to 62.7 ft.
35	2 2	36.2				34.2 35.2	
40	2 2	R-5					LOCKPORT DOLOMITE

H & A FORM 4B - V

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
75	3	76.0					ROCHESTER SHALE
	2						Light to dark gray, fine-grained, dolomitic Mudstone, very thinly color-banded. Secondary gypsum seams in closely to very closely spaced partings.
	2						
	2						
	2						
	2						
80	2	R-9	120 110	100 92	SL		ROCHESTER SHALE
	2						
	2						
	2						
	2						
85	2	86.0					Very thin severely weathered clayey Shale bed at 91.1 ft.
	2					86.9	
	2						
	2						
	2						
90	2	R-10	120 113	100 94	SL	PT3	ROCHESTER SHALE
	2						
	2						
	2					93.0	
	2						
95	2	96.0					Light gray, very thin, closely to very closely spaced Limestone beds from 97.1 to 160.2 ft.
	2						
	2						
	2						
	2						
100	2	R-11	121 121	101 100*	SL		ROCHESTER SHALE
	2						
	2						
	2						
	2						
105	2	106.0					Very thin, moderately weathered shaly parting at 106.8 ft.
	2						
	2						
	2	R-12					*RQD based on core recovered. Small gypsum nodule at 105.0 ft.
	2						
110	2						ROCHESTER SHALE

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
V. Hard - Knife can't scratch Hard - scratches diff. Med. Hard - scratches easily Soft - grooves V. Soft - carves	Fresh V. slight Slight Moderate Mod. Severe Severe V. Severe Complete	V. thin Thin Medium Thick V. thick V. Close Close Mod. Close Wide V. wide < 2" 2" - 12" 12" - 36" 36" - 120" > 120"	> 90% 90-75 75-50 50-25 < 25 Excellent Good Fair Poor V. Poor

H&A FORM 48-1

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
110	3	R-12	118 115	98 96	SL		<p>ROCHESTER SHALE</p> <p>Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Secondary gypsum seams in closely to very closely spaced partings. Light gray, very thin closely spaced Limestone beds.</p>
	3						
	2						
	2						
	2						
115	?	116.0					Very thin shaly parting at 111.3 ft.
	2	R-13	122 121	102 99*	SL		<p>ROCHESTER SHALE</p> <p>Gypsum nodule, 0.1 ft., at 121.1 ft.</p>
	2						
	2						
	2						
	2						
120	2	R-14	119 116	99 97	SL		<p>ROCHESTER SHALE</p>
	2						
	2						
	2						
	2						
125	2	126.0					*RQD based on core recovered.
	3	R-15	120 119	100 99	SL		<p>ROCHESTER SHALE</p> <p>Gypsum nodule, 0.1 ft. wide at 140.2 ft.</p>
	3						
	3						
	3						
	3						
130	2	126.6					Very small gypsum nodule at 126.8 ft.
	2	R-15	120 119	100 99	SL		<p>ROCHESTER SHALE</p> <p>Gypsum nodule, 0.1 ft. wide at 140.2 ft.</p>
	2						
	2						
	2						
	2						
135	2	128.1					
	3	R-15	120 119	100 99	SL		<p>ROCHESTER SHALE</p> <p>Gypsum nodule, 0.1 ft. wide at 140.2 ft.</p>
	3						
	3						
	3						
	3						
140	2	130.0					
	2	R-15	120 119	100 99	SL		<p>ROCHESTER SHALE</p> <p>Gypsum nodule, 0.1 ft. wide at 140.2 ft.</p>
	2						
	2						
	2						
	2						
145	3	136.0					Very small gypsum nodules at 140.3 and 141.2 ft.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

H&A FORM 48-N-7

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
145	3	146.0					<p>ROCHESTER SHALE</p> <p>Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded.</p> <p>ROCHESTER SHALE</p> <p>Increasingly fossiliferous from 150.8 to 160.2 ft.</p> <p>(Note: Gas odor and bubbling sounds noted during R-14 through R-17. Gas forced water flow from casing during R-16.)</p>
	3						
	3						
	2						
150	2						
	3	R-16	120 120	100 100	SL		
	3						
	3						
	3						
155	3	156.0					
		R-17	60 60	100 100	SL		
160		161.0				160.2	IRONDEQUOIT LIMESTONE, Light gray Limestone.
							Bottom of Boring 161.0 ft.
165							Observation well installed in complete borehole.

H&A FORM 4B-MF

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING		RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close < 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close 2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close 12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide 36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide > 120"	< 25	V. Poor

COMBUSTIBLE GAS MEASUREMENT

PROJECT CSOAP Phase II FILE NO. 374813 BORING NO. SS 1

INSPECTOR E. Hanna DRILLER K. Reid

DATE	ELAPSED TIME (min.)	BOTTOM OF HOLE (FT)	METER READING (%)	REMARKS
18 Feb. 1981	0	36.2	0	
	0	46.2	0	
	0	76	0	
	0	86	0	
19 Feb. 1981	10	146	30	Heard bubbling. Smelled gas.
	0	156	30	Heard bubbling. Smelled gas.
	5	161	100	Strong odor of gas.
	90	161	90	
	93	161	90	Capped for 3 minutes.
				Installed OW on 20 Feb.
21 Feb. 1981	40 hrs.	161	25	
22 Feb. 1981	60 hrs.	161	5	

GROUND WATER OBSERVATION WELL REPORT

PROJECT: CSOAP, PHASE II
 LOCATION: Rochester, NY
 CLIENT: L.S.T.
 CONTRACTOR: Warren George
 DRILLER: K. Reid INSPECTOR: E. Hanna
 INSTALLATION DATE 20 Feb. 1981

FILE NO. 374813
 WELL NO. OW SS 1
 BORING NO. SS 1
 LOCATION Saxton and
Cambell
 SHEET 1 OF 2

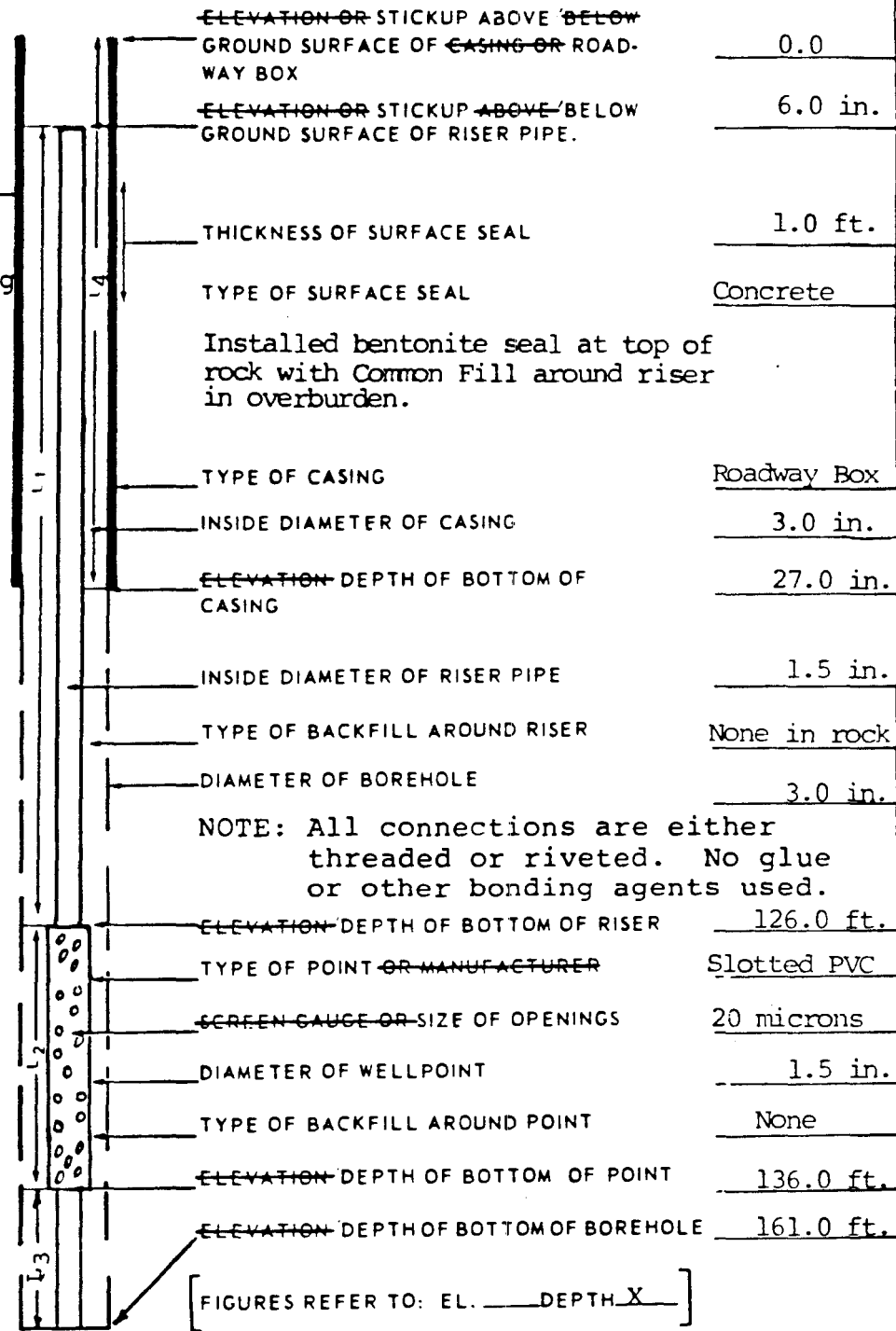
SURVEY DATE: USC & GS

GROUND ELEVATION 507.8 ft.

Refer to test boring log for description of soil and rock conditions.

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)

OVERBURDEN THICKNESS (ft) 8.5



[FIGURES REFER TO: EL. _____ DEPTH X]

$$\left[\frac{2.25 \text{ ft.}}{\text{LENGTH OF CASING } L_4} \right] \left[\frac{150.5 \text{ ft.}}{\text{LENGTH OF RISER PIPE } (L_1 + L_3)} + \frac{10.0 \text{ ft.}}{\text{LENGTH OF POINT } (L_2)} \right] = \frac{160.5 \text{ ft.}}{\text{PAY LENGTH}}$$

GROUND WATER MONITORING REPORT

OW/PZ NUMBER: OW SS 1S NCD ELEVATION SUBTRAHEND 508.5 ft. FILE NO. 374813
PAGE NO. 2 of 2

DATE	TIME	ELAPSED TIME	DEPTH OF WATER FROM surface	ELEVATION OF WATER	REMARKS	READ BY
11 May 1981	PM		Dry	---	Installation complete	ERH
		0	4.0 ft.	504.5 ft.	Flush Test	
		1	4.0	504.5	"	
		2	4.0	504.5	"	
		5 min.	4.0	504.5	"	
12 May 1981	PM	1 day	6.5 ft.	502.0		ERH
13 May 1981	PM	2 days	Dry	---		ERH
1 June 1981	AM	21 days	6.9	501.6		ERH
26 June 1981	AM	46 days	6.8	501.7		MW
17 July 1981	AM	67 days	6.5	502.0		FS
7 Aug. 1981	AM	88 days	Dry			ERH
22 Sept. 1981	AM	134 days	Dry			ERH
22 Oct. 1981	AM	164 days	6.7	501.8		SMV
4 Nov. 1981	PM	177 days	Dry	--		ERH
		0 min.	Dry	--	Flush Test (Poured in 5 gal.)	ERH

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. SS 1	TEST NO. 1
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Warren & George					LOCATION: Saxton & Campbell	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 507.8 ft.	
TYPE	Pneumatic	Dial	Dial	Air	DATE START: 20 Feb. 1981	
MFG.	W.G.	Neptune	Marsh	Am. Fab.	DATE FINISH: 20 Feb. 1981	
MODEL NO.	—	CA2016	—	—	DRILLER: K. Reed	
					INSPECTOR: R. Hilimire	
					GEOLOGIST: —	
M.G.P. = .566 to 1.0) x Z				ROCK TYPE: ROCHESTER SHALE		HOLE SIZE 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 100				RECOVERY (%) 99 to 100		
COMPUTED INTERNAL FRICTION: —				ROD (%) 97 to 99		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 8.5	TO TOP LOWER PACKER 138.0
TO BOTTOM OF BORING 161.0	TO BOTTOM UPPER PACKER (2) 131.9
TO WATER TABLE 21.0	LENGTH OF TEST SECTION 6.1
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.9	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
0900	0	125	25	0.0		
	1			0.0		
	2			0.0		
	3			0.0	0.0	
0904	0		50	0.1		
	1			0.1		
	2			0.1		
	3			0.1	0.0	
0908	0		75	0.6		
	1			0.6		
	2			0.6		
	3			0.6	0.0	
0912	0		100	0.6		
	1			0.6		
	2			0.6		
	3			0.6	0.0	

H&A Nov. 63

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. SS 1	TEST NO. 2
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Warren & George					LOCATION: Saxton & Campbell	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 507.8 ft.	
TYPE	Double	Dial	Dial	Air	DATE START: 20 Feb. 1981	
MFG.	W.G.	Neptune	Marsh	Am.Fab.	DATE FINISH: 20 Feb. 1981	
MODEL NO.	—	CA2016	—	—	DRILLER: K. Reed	
					INSPECTOR: R. Hilimire	
					GEOLOGIST: —	
M.G.P. 0.566 to 1.0) x Z				ROCK TYPE: ROCHESTER SHALE		HOLE SIZE 3 in.
COMPL. D MAX GAUGE PRESS: (MGP) 95				RECOVERY (%) 99 to 102		
COMPUTED INTERNAL FRICTION: —				ROD (%) 97 to 99		

DEPTHS: (All Distances Measured From Ground Surface in Feet)

TO TOP OF ROCK	8.5	TO TOP LOWER PACKER	130.0
TO BOTTOM OF BORING	161	TO BOTTOM UPPER PACKER (Z)	123.9
TO WATER TABLE	21.0	LENGTH OF TEST SECTION	6.1
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE		1.9	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
0930	0	250	25	0.6		
	1			0.6		
	2			0.6		
	3			0.6	0.0	
0934	0		50	0.0		
	1			0.0		
	2			0.0		
	3			0.0	0.0	
0934	0		75	0.0		
	1			0.0		
	2			0.0		
	3			0.0	0.0	
0942	0		95	0.0		
	1			0.0		
	2			0.0		
	3			0.0	0.0	

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. SS 1	TEST NO. 3
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Warren & George					LOCATION: Saxton & Campbell.	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 507.8 ft.	
TYPE	Double	Dial	Dial	Air	DATE START: 20 Feb. 1981	
MFG.	W.G.	Neptune	Marsh	Am.Fab.	DATE FINISH: 20 Feb. 1981	
MODEL NO.	—	CA2016	—	—	DRILLER: K. Reed	
					INSPECTOR: R. Hilimire	
					GEOLOGIST: —	
M.G.P. = (0.566 to 1.0) x \bar{z}				ROCK TYPE: ROCHESTER SHALE HOLE SIZE 3 in.		
COMPUTED MAX GAUGE PRESS: (MGP) 65				RECOVERY (%) 100		
COMPUTED INTERNAL FRICTION: —				R O D (%) 94		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 8.5 TO TOP LOWER PACKER 93.0

TO BOTTOM OF BORING 161 TO BOTTOM UPPER PACKER (Z) 86.9

TO WATER TABLE 21.0 LENGTH OF TEST SECTION 6.1

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 1.9

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
10:00	0	250	15	0.5		
	1			0.5		
	2			0.5		
	3			0.5	0.0	
10:04	0		30	0.6		
	1			0.6		
	2			0.6		
	3			0.6	0.0	
10:08	0		45	0.7		
	1			0.7		
	2			0.7		
	3			0.7	0.0	
10:12	0		65	0.8		
	1			0.8		
	2			0.8		
	3			0.8	0.0	

For H&A Nov. 83

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. SS 1	TEST NO. 4
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Warren & George					LOCATION: Saxton & Campbell	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 507.8 ft.	
TYPE	Double	Dial	Dial	Air	DATE START: 20 Feb. 1981	
MFG.	W.G.	Neptune	Marsh	Am.Fab.	DATE FINISH: 20 Feb. 1981	
MODEL NO.	_____	CA2016	_____	_____	DRILLER: K. Reed	
					INSPECTOR: R. Hilimire	
					GEOLOGIST: _____	
M.G.P. = (0.566 to 1.0) x \bar{z}			25	ROCK TYPE: LOCKPORT DOLOMITE		HOLE SIZE 3 in.
COMPUTED MAX GAUGE PRESS: (MGP)			_____	RECOVERY (%)		96 to 102
COMPUTED INTERNAL FRICTION:			_____	R O D (%)		90 to 95

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK	8.5	TO TOP LOWER PACKER	30.0
TO BOTTOM OF BORING	161	TO BOTTOM UPPER PACKER (\bar{z})	23.9
TO WATER TABLE	21.0	LENGTH OF TEST SECTION	6.1
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE		1.9	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
10:30	0	250	5	0.7		
	1			1.2		
	2			1.8		
	3			2.3		
	4			2.9	0.6	
10:35	0		15	3.9		
	1			6.9		
	2			10.0		
	3			13.3		
	4			16.5	3.2	
10:40	0		25	17.4		
	1			23.0		
	2			28.2		
	3			34.5		
	4			40.5		
	5			46.2	5.8	

H&A Nov. 63

GROUND WATER OBSERVATION WELL REPORT

PROJECT: CSOAP, PHASE II
 LOCATION: Rochester, NY
 CLIENT: L.S.T.
 CONTRACTOR: Warren George
 DRILLER: K. Reid INSPECTOR: E. Hanna
 INSTALLATION DATE 20 Feb. 1981

FILE NO. 374813
 WELL NO. OW SS 1
 BORING NO. SS 1
 LOCATION Saxton and
Cambell
 SHEET 1 OF 2

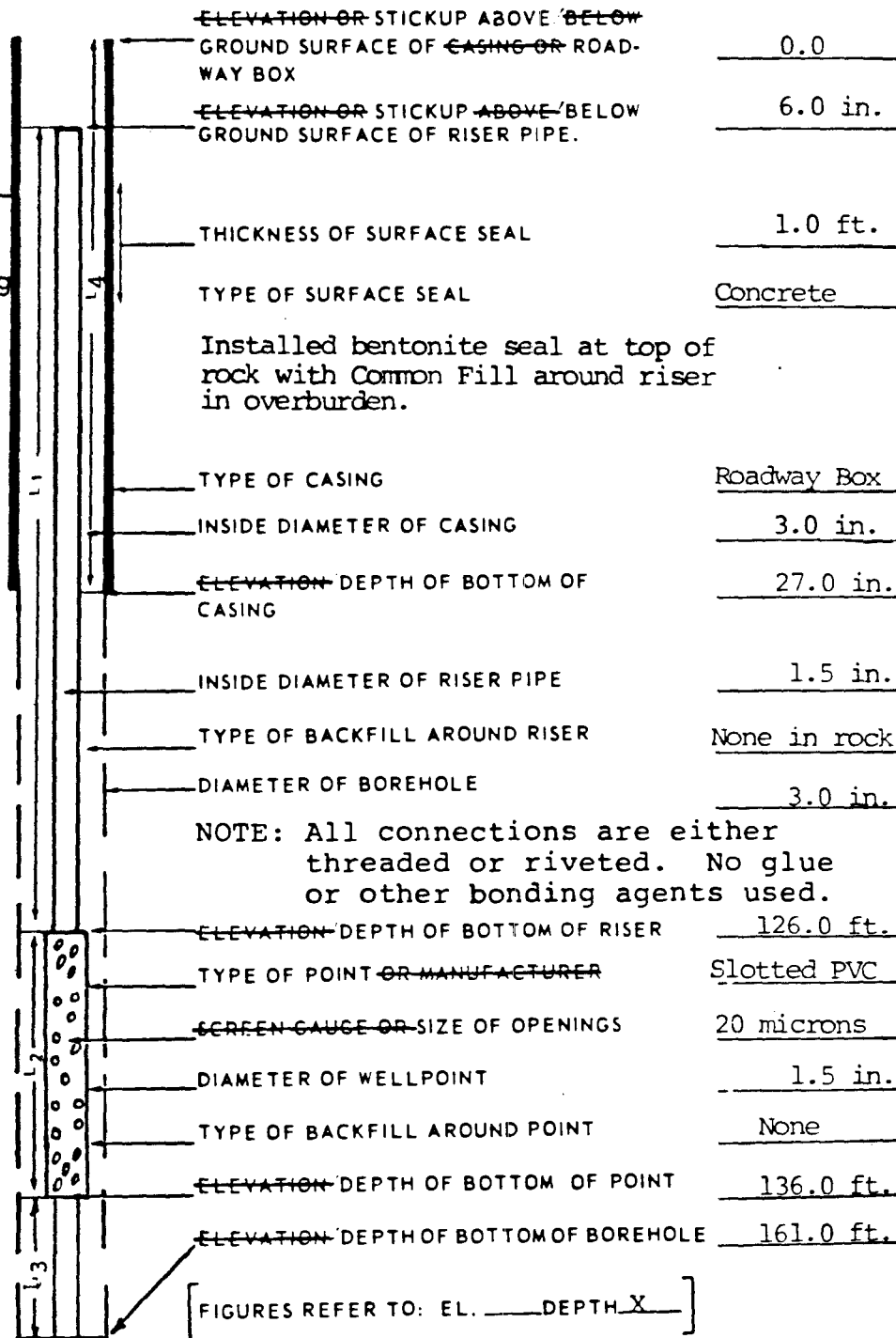
SURVEY DATUM NCD

GROUND ELEVATION 508.9 ft.

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)

Refer to test boring log for description of soil and rock conditions.

OVERBURDEN THICKNESS (ft) 8.5



ELEVATION OR STICKUP ABOVE/BELOW GROUND SURFACE OF CASING OR ROADWAY BOX	0.0
ELEVATION OR STICKUP ABOVE/BELOW GROUND SURFACE OF RISER PIPE.	6.0 in.
THICKNESS OF SURFACE SEAL	1.0 ft.
TYPE OF SURFACE SEAL	Concrete
Installed bentonite seal at top of rock with Common Fill around riser in overburden.	
TYPE OF CASING	Roadway Box
INSIDE DIAMETER OF CASING	3.0 in.
ELEVATION DEPTH OF BOTTOM OF CASING	27.0 in.
INSIDE DIAMETER OF RISER PIPE	1.5 in.
TYPE OF BACKFILL AROUND RISER	None in rock
DIAMETER OF BOREHOLE	3.0 in.
NOTE: All connections are either threaded or riveted. No glue or other bonding agents used.	
ELEVATION DEPTH OF BOTTOM OF RISER	126.0 ft.
TYPE OF POINT OR MANUFACTURER	Slotted PVC
SCREEN GAUGE OR SIZE OF OPENINGS	20 microns
DIAMETER OF WELLPOINT	1.5 in.
TYPE OF BACKFILL AROUND POINT	None
ELEVATION DEPTH OF BOTTOM OF POINT	136.0 ft.
ELEVATION DEPTH OF BOTTOM OF BOREHOLE	161.0 ft.

[FIGURES REFER TO: EL. _____ DEPTH X]

$$\left[\frac{2.25 \text{ ft.}}{\text{LENGTH OF CASING } L_4} \right] + \left[\frac{150.5 \text{ ft.}}{\text{LENGTH OF RISER PIPE } (L_1 + L_3)} \right] + \left[\frac{10.0 \text{ ft.}}{\text{LENGTH OF POINT } (L_2)} \right] = \frac{160.5 \text{ ft.}}{\text{PAY LENGTH}}$$

GROUND WATER MONITORING REPORT

OW/PZ NUMBER: OW SS 1 NCD ELEVATION SUBTRAHEND 508.9 ft. FILE NO. 374813
PAGE NO. 2 of 2

DATE	TIME	ELAPSED TIME	DEPTH OF WATER FROM <u>surface</u>	ELEVATION OF WATER	REMARKS	READ BY
20 Feb. 1981	PM	0	0.0 ft.	508.9 ft.	Flush Test	EH
		1	6.5		"	
		2	8.7		"	
		5	10.6		"	
		13	12.7		"	
		23	14.0		"	
		190 min.	24.0	484.9	"	
21 Feb. 1981	AM		22.2	486.7	25% Gas reading	EH
23 Feb. 1981	AM		20.5	488.4	5% Gas reading	EH
16 Apr. 1981	PM		21.1	487.8		FS

H & A FORM 59A JAN. 79

GROUND WATER MONITORING REPORT

OW/PZ NUMBER: OW SS 1 NCD ELEVATION SUBTRAHEND 508.9 ft. FILE NO. 374813
PAGE NO. 2 of 2

DATE	TIME	ELAPSED TIME	DEPTH OF WATER FROM <u>surface</u>	ELEVATION OF WATER	REMARKS	READ BY
20 Feb. 1981	PM	0	0.0 ft.	508.9 ft.	Flush Test	EH
		1	6.5		"	
		2	8.7		"	
		5	10.6		"	
		13	12.7		"	
		23	14.0		"	
		190 min.	24.0	484.9	"	
21 Feb. 1981	AM		22.2	486.7	25% Gas reading	EH
23 Feb. 1981	AM		20.5	488.4	5% Gas reading	EH
16 Apr. 1981	PM		21.1	487.8		FS
1 May 1981	PM		16.3	492.6		SP
		0	14.3	494.6	Flush Test (Poured in 1 gal.)	
		1	14.7		"	
		2	15.0		"	
		5 min.	15.0	493.9	"	
12 May 1981	1100	81 days	15.0	493.9		ERH
1 June 1981	AM	101 days	15.0	493.9		ERH
26 June 1981	AM	126 days	15.3	493.6		MW
17 July 1981	AM	147 days	15.0	493.9		FS
7 Aug. 1981	AM	168 days	16.0	492.9	0% gas reading	ERH
22 Sept. 1981	AM	214 days	16.3	492.6	0% gas reading	ERH
22 Oct. 1981	AM	244 days	16.0	492.9		SMV

TEST BORING REPORT

HOLE NO. SS 2

PROJECT: CSOAP, Phase II

FILE NO. 374813

CLIENT: L.S.T.

SHEET NO. 1 of 6

CONTRACTOR: Warren George

LOCATION: Broad & Saxton

ELEVATION: 504.6 ft. 505.902

GROUNDWATER		DEPTH TO			CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	S/S	NQ
19 Feb	15:00	11.0ft	9.5ft	155.5	SIZE ID in	3	1-3/8 1-13/16
20 Feb	10:00	12.0ft	--	155.5	HAMMER WT lb	--	140
					HAMMER FALL in	--	30

DATE START: 18 Feb. 1981

DATE FINISH: 19 Feb. 1981

DRILLER: D. Holley

INSPECTOR: J. Ehrets

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
			2	S-1	0.0
			1		1.5
	4.0		50/1	S-2	3.0
					3.1
5			12	S-3*	5.0
			14		
	7.0		18		6.5

FIELD CLASSIFICATION AND REMARKS

Very loose dark brown silty medium to fine SAND, trace fine gravel, slightly organic. -TOPSOIL & FILL -

Very compact brown medium to fine SAND, little silt, trace fine gravel. - FILL -

Compact brown sandy SILT, little gravel, trace clay.

TOP OF ROCK AT 7.0 ft.

NOTE: Cored boulder from 3.1 ft. to 4.0 ft.

* Laboratory grain size test performed.

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 7.0
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 3
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO SS 2
50+	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

H&A 1000-14

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
5							Begin coring at 7.0 ft.
		R-1 7.0 9.8	$\frac{34}{19}$	$\frac{100}{56}$	MOD		Light gray, fine-grained, thin to medium-bedded Dolomite. Trace vugs, stylolites and fossils. (NOTE: NX core from 7.0 to 9.8 ft. NW casing set; NQ core from 9.8 to 155.5 ft.) LOCKPORT DOLOMITE
10	2 /	R-2 15.5	$\frac{67}{59}$	$\frac{99}{87}$	SL		Closely spaced, low to high angle, moderately weathered, stained joints from 7.0 to 9.8 ft. and 11.4 to 13.9 ft., some containing secondary gypsum seams. Medium gray mottling and horizontal streaks from 15.5 to 30.8 ft. LOCKPORT DOLOMITE
15	/	R-3 23.8	$\frac{116}{97}$	$\frac{97}{81}$	SL		Very thin, moderately weathered shaley partings at 14.4, 15.5, 16.7, 17.4, 19.0 and 20.1 ft.
20	2 /	R-4 25.5	$\frac{124}{104}$	$\frac{103}{84^*}$	SL	23.8	High angle joint from 26.6 to 26.8 ft. Several very close severely weathered shaly and clayey partings from 29.0 to 29.3 ft. LOCKPORT DOLOMITE
25	/					25.0	Several moderately to severely weathered shaly partings from 29.0 to 29.3 ft. Light to dark gray, fine-grained dolomitic Mudstone, very thinly color banded. Secondary gypsum seams in closely spaced partings. ROCHESTER SHALE
30	/					30.8	
35	/						

* RQD based upon core recovered.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	Scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	Scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	Scratches	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	Carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS				
			in.	%							
70	1	R-9			SL	PT4	ROCHESTER SHALE				
	1						75.3				Light to dark gray, fine-grained dolomitic mudstone, very thinly color banded. Secondary gypsum seams in closely to very closely spaced partings. Very thin, light gray, closely spaced Limestone beds.
	1										(NOTE: Sulfurous odor at end of R-9; gas bubbling in water down in hole.)
	1										
75	1	76.0			ROCHESTER SHALE						
	1				Very thin shaly parting at 84.9 ft.						
	2					(NOTE: Sulfurous odor at end of R-10.)					
	2										
80	3	R-10	$\frac{120}{120}$	$\frac{100}{100}$			SL	ROCHESTER SHALE			
	1				85.3						Very thin shaly parting at 90.2 ft.
	1					(NOTE: Gas forced water up casing after R-11.)					
	1										
85	1	R-11	$\frac{119}{119}$	$\frac{98}{98}$			SL				ROCHESTER SHALE
	1				95.5						Very thin shaly parting at 95.5 ft.
	1					(NOTE: Gas forced water up casing after R-11.)					
	1										
90	1	R-12	$\frac{122}{122}$	$\frac{102}{100^*}$			SL				ROCHESTER SHALE
	2				100						* RQD based on core recovered.
	2										
	2										
95	2	R-12	$\frac{122}{122}$	$\frac{102}{100^*}$		SL	ROCHESTER SHALE				
	2				100					* RQD based on core recovered.	
	2										
	2										
100	2	R-12	$\frac{122}{122}$	$\frac{102}{100^*}$		SL				ROCHESTER SHALE	
	2				100					* RQD based on core recovered.	
	2										
	2										
05	2	R-12	$\frac{122}{122}$	$\frac{102}{100^*}$		SL				ROCHESTER SHALE	
	2				100					* RQD based on core recovered.	
	2										
	2										

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

MSA FORM 48-

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
105	2	105.5					ROCHESTER SHALE
	2						Light to dark gray, fine-grained dolomitic Mudstone, very thinly color banded.
	2						Secondary gypsum seams in closely to very closely spaced partings.
110	2	R-13	119	99	SL	109.7	Very thin shaly partings at 107.4 and 112.1 ft.
	2		119	99			(NOTE: Strong water flow from casing after R-12.)
	2					PT3	Very thin shaly partings at 117.1 and 121.0 ft.
115	2	115.5					ROCHESTER SHALE
	2					116.0	
120	2	R-14	121	101	SL		* RQD based on core recovered.
	2		121	100*			Very thin shaly parting at 124.1 ft.
	2					121.7	
125	2	125.5					ROCHESTER SHALE
	2					PT2	
	2					126.5	
	2					127.8	ROCHESTER SHALE
130	2	R-15	118	98	SL		Very thin, light gray fossiliferous Limestone bed at 131.7 ft, Mudstone increasingly fossiliferous from 131.7 to 137.5 ft.
	2		118	98			Very thin, moderately weathered Shale parting at 135.5 ft.
	2					PT1	
135	2	135.5					ROCHESTER SHALE
	2					136.0	
	2	R-16	56	100	SL		Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone. Interbedded with very thin, dark gray dolomitic Shale
	2		48	86			IRONDEQUOIT LIMESTONE.
140	3					137.5	

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

77
M&A FORM 4B-1

CORE BORING REPORT

GEOLOGIST Fred Amos

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
140	4	R-17 140.2	10	100	SL		IRONDEQUOIT LIMESTONE
	7	141.0	10	100		142.0	Light to medium gray, fine to medium-grained, thin to medium-bedded fossiliferous Limestone. Interbedded with very thin, dark gray dolomitic Shale.
	3		53	98			
	3	R-18	52	96	SL	143.4	
145	4	145.5					Very thin, moderately weathered Shale partings at 138.7, 138.8 and 142.0 ft. Low angle slickensided joint at 141.0 ft.
	4						
	5						
	4	R-19	60	100	SL		IRONDEQUOIT LIMESTONE
	3		60	100			
150	3	150.5					Very thin shaly partings at 145.2, 146.8, 148.2 and 152.2 ft.
	4						IRONDEQUOIT LIMESTONE
	4						
	3	R-20	61	102	SL		* RQD based on core recovered. Moderately weathered clayey Shale from 154.4 to 154.8 ft.
155	4	155.5	57	93*			
							Bottom of boring at 155.5 ft. Installed observation well in completed borehole.

MSA FORM 48-1 77

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			MOLE NO. SS 2	TEST NO. 1
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Warren George					LOCATION: Broad and Saxton	
TYPE	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 504.6 ft.	
	Pneumatic	Dial	Dial	Air	DATE START: 19 Feb. 1981	
MFG.	W.G.	Gam.-Cal	Ashcroft	W.G.	DATE FINISH: 19 Feb. 1981	
MODEL NO.	---	7607432	---	---	DRILLER: D. Holley	
					INSPECTOR: R. Hilimire	
					GEOLOGIST: _____	

M.G.P. = (0.566 to 1.0) x \bar{z}	ROCK TYPE: Rochester Shale	HOLE SIZE 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 95	RECOVERY (%) 98	
COMPUTED INTERNAL FRICTION: -----	R O D (%) 98	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 7.0	TO TOP LOWER PACKER 136.0
TO BOTTOM OF BORING 155.5	TO BOTTOM UPPER PACKER (Z) 129.7
TO WATER TABLE 11.0	LENGTH OF TEST SECTION 6.3
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.0	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1447	0	240	25	244.4		
	1			244.4		
	2			244.4		
	3			244.4	0.0	
1451	0		50	244.4		
	1			244.4		
	2			244.4		
	3			244.4	0.0	
1455	0		75	244.4		
	1			245.6		
	2			246.7		
	3			247.0		
	6			247.1	0.5	
1502	0		95	247.4		
	1			249.7		
	2			252.3		
	3			254.5		
	5			260.4		
	7			267.0		
	10			276.4		
	12			282.3	2.9	

33
H&A Nov.

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SS 2 TEST NO. 2

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Warren George

FILE NO. 374813
SHEET NO. 1 of 1
LOCATION: Broad & Saxton
ELEVATION: 504.6 ft.
DATE START: 19 Feb. 1981
DATE FINISH: 19 Feb. 1981
DRILLER: D. Holley
INSPECTOR: R. Hilimire
GEOLOGIST: --

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Dial	Dial	Air
MFG.	W.G.	Gam.-Cal.	Ashcroft	W.G.
MODEL NO.	---	7607432	---	---

M.G.P. = (0.566 to 1.0) x \bar{z}
COMPUTED MAX GAUGE PRESS: (MGP) 90
COMPUTED INTERNAL FRICTION: --

ROCK TYPE: Rochester Shale HOLE SIZE 3 in.
RECOVERY (%) 98 to 101
ROD (%) 98 to 100

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 7.0 TO TOP LOWER PACKER 128.0
TO BOTTOM OF BORING 155.5 TO BOTTOM UPPER PACKER (z) 121.7
TO WATER TABLE 11.0 LENGTH OF TEST SECTION 6.3
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1524	0	250	25	285.8		
	1			285.8		
	2			285.8		
	3			285.8	0.0	
1528	0		50	286.0		
	1			286.1		
	2			286.2		
	3			286.2	0.1	
1532	0		75	286.4		
	1			286.5		
	2			286.6		
	3			286.7		
	4			286.8	0.1	
1537	0		100	287.0		
	1			287.5		
	2			287.7		
	3			287.9		
	4			288.3		
	5			288.7	0.3	

63 H&A N.S.

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. <u>SS 2</u>	TEST NO. <u>3</u>
PROJECT: <u>CSOAP, Phase II</u>					FILE NO. <u>374813</u>	
CLIENT: <u>L.S.T.</u>					SHEET NO. <u>1 of 1</u>	
CONTRACTOR: <u>Warren George</u>					LOCATION: <u>Broad & Saxton</u>	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: <u>504.6 ft.</u>	
TYPE	<u>Pneumatic</u>	<u>Dial</u>	<u>Dial</u>	<u>Air</u>	DATE START: <u>19 Feb. 1981</u>	
MFG.	<u>W.G.</u>	<u>Gam.-Cal.</u>	<u>Ashcroft</u>	<u>W.G.</u>	DATE FINISH: <u>19 Feb. 1981</u>	
MODEL NO.	<u>---</u>	<u>7607432</u>	<u>---</u>	<u>---</u>	DRILLER: <u>D. Holley</u>	
					INSPECTOR: <u>R. Hilimire</u>	
					GEOLOGIST: _____	

M.G.P. - (0.566 to 1.0) x \bar{z}	ROCK TYPE: <u>Rochester Shale</u>	ROCK TYPE: <u>Rochester Shale</u>	HOLE SIZE <u>3 in</u>
COMPUTED MAX GAUGE PRESS: (MGP) <u>80</u>	RECOVERY (%) <u>99</u>	RECOVERY (%) <u>99</u>	
COMPUTED INTERNAL FRICTION: <u>--</u>	R O D (%) <u>99</u>	R O D (%) <u>99</u>	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK <u>7.0</u>	TO TOP LOWER PACKER <u>116</u>
TO BOTTOM OF BORING <u>155.5</u>	TO BOTTOM UPPER PACKER (Z) <u>109.7</u>
TO WATER TABLE <u>11.0</u>	LENGTH OF TEST SECTION <u>6.3</u>
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE <u>2.0</u>	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1551	0	250	25	304.3		
	1			305.3		
	2			305.9		
	3			306.5		
	4			307.1	0.7	
1555	0		50	307.4		
	1			308.1		
	2			309.0		
	3			309.9		
	4			310.7		
	5			311.5	0.8	
1601	0		80	313.2		
	1			315.0		
	2			316.4		
	3			317.8		
	4			319.3		
	5			320.9	1.5	

63
H&A No.

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. <u>SS 2</u>	TEST NO. <u>4</u>
PROJECT: <u>CSOAP, Phase II</u>					FILE NO. <u>374813</u>	
CLIENT: <u>L.S.T.</u>					SHEET NO. <u>1 of 1</u>	
CONTRACTOR: <u>Warren George</u>					LOCATION: <u>Broad and Saxton</u>	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: <u>504.6 ft.</u>	
TYPE	<u>Pneumatic</u>	<u>Dial</u>	<u>Dial</u>	<u>Air</u>	DATE START: <u>19 Feb. 1981</u>	
MFG.	<u>W.G.</u>	<u>Gam.-Cal.</u>	<u>Ashcroft</u>	<u>W.G.</u>	DATE FINISH: <u>19 Feb. 1981</u>	
MODEL NO.	<u>---</u>	<u>7607432</u>	<u>---</u>	<u>---</u>	DRILLER: <u>D. Holley</u>	
					INSPECTOR: <u>R. Hilimire</u>	
					GEOLOGIST: <u>---</u>	

M.G.P. = (0.566 to 1.0) x Z	ROCK TYPE: <u>Rochester Shale</u>	HOLE SIZE <u>3 in.</u>
COMPUTED MAX GAUGE PRESS: (MGP) <u>50</u>	RECOVERY (%) <u>100</u>	
COMPUTED INTERNAL FRICTION: <u>---</u>	R O D (%) <u>89</u>	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK <u>7.0</u>	TO TOP LOWER PACKER <u>76.0</u>
TO BOTTOM OF BORING <u>155.5</u>	TO BOTTOM UPPER PACKER (Z) <u>69.7</u>
TO WATER TABLE <u>11.0</u>	LENGTH OF TEST SECTION <u>6.3</u>
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE <u>2.0</u>	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1614	0	250	25	325.0		
	1			325.0		
	2			325.0		
	3			325.0	0.0	
1618	0		50	325.2		
	1			325.2		
	2			325.2		
	3			325.2	0.0	

H&A No. 63

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. SS 2	TEST NO. 5
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Warren George, Inc.					LOCATION: Broad & Saxton	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 504.6 ft.	
TYPE	Pneumatic	Dial	Dial	Air	DATE START: 19 Feb. 1981	
MFG.	W.G.	Gam.-Cal.	Ashcroft	W.G.	DATE FINISH: 19 Feb. 1981	
MODEL NO.	---	7607432	---	---	DRILLER: D. Holley	
					INSPECTOR: R. Hilimire	
					GEOLOGIST: _____	

M.G.P. = (0.566 to 1.0) x Z	ROCK TYPE: Rochester Shale	HOLE SIZE 3 in.
COMPUTED MAX GAUGE PRESS: (MGP) 50	RECOVERY (%) 100	
COMPUTED INTERNAL FRICTION: _____	R O D (%) 77 to 89	

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 7.0	TO TOP LOWER PACKER 66.0
TO BOTTOM OF BORING 155.5	TO BOTTOM UPPER PACKER (±) 59.7
TO WATER TABLE 11.0	LENGTH OF TEST SECTION 6.3
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.0	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1622	0	250	25	328.5		
	1			329.6		
	2			330.7		
	3			331.8		
	4			332.9	1.1	
1627	0		50	333.5		
	1			336.0		
	2			339.4		
	3			341.5		
	4			343.5		
	5			345.5		
	6			347.5		
	7			349.5	2.3	

83
H&A Nov.

GROUND WATER OBSERVATION WELL REPORT

PROJECT: CSOAP, PHASE II
 LOCATION: Rochester, NY
 CLIENT: L.S.T.
 CONTRACTOR: Warren George
 DRILLER: D. Holley INSPECTOR: J. Ehrets
 INSTALLATION DATE: 20 Feb. 1981

FILE NO. 374813
 WELL NO. OW SS 2
 BORING NO. SS 2
 LOCATION W. Broad St.
& Saxton St.
 SHEET 1 OF 2

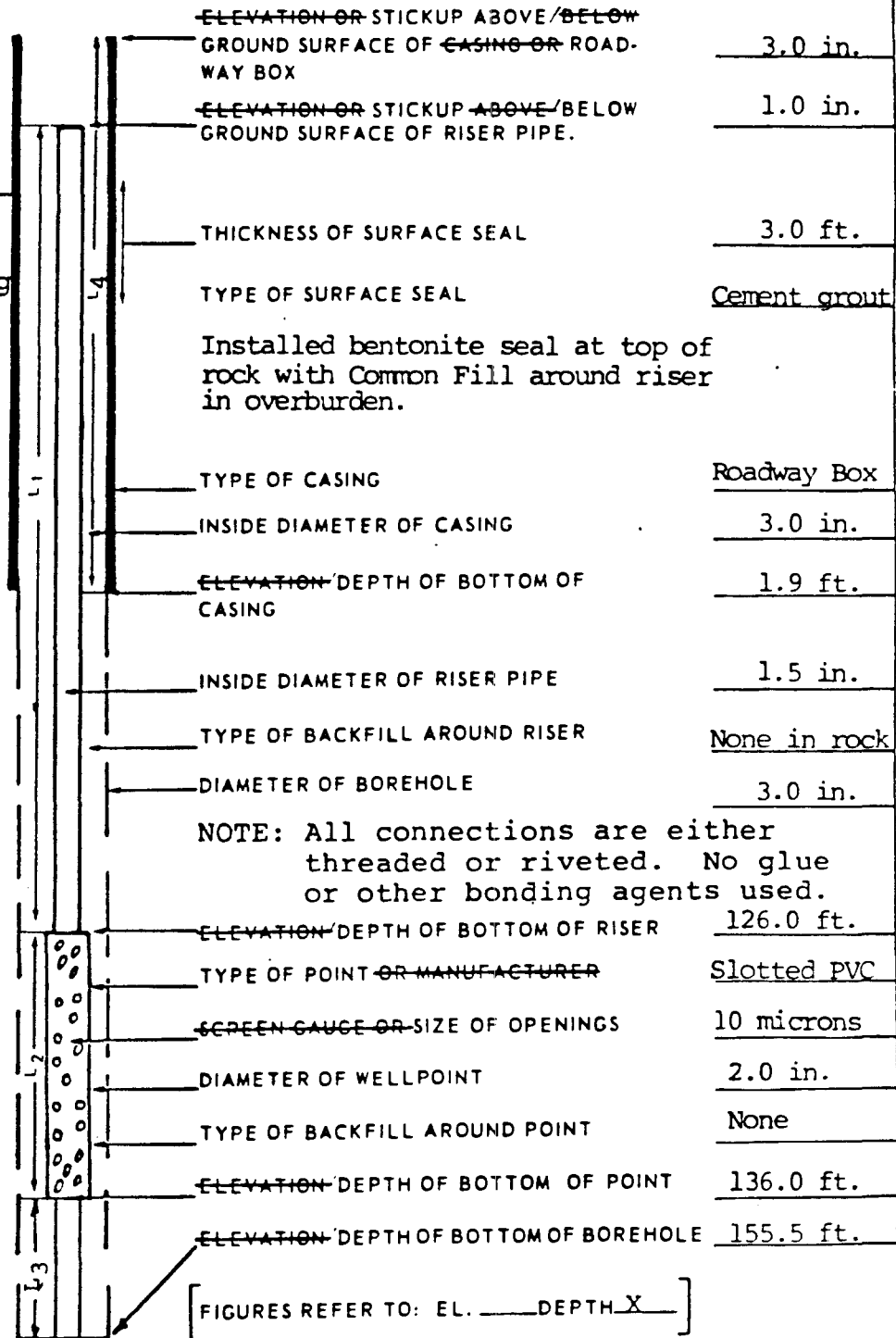
SURVEY DATUM USC & GS

GROUND ELEVATION 504.6 ft.

Refer to test boring log for description of soil and rock conditions.

OVERBURDEN THICKNESS (ft) 7.0

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)



$$\left[\frac{2.2 \text{ ft.}}{\text{LENGTH OF CASING } L_4} \right] \left[\frac{145.5 \text{ ft.}}{\text{LENGTH OF RISER PIPE } (L_1 + L_3)} + \frac{10.0 \text{ ft.}}{\text{LENGTH OF POINT } (L_2)} \right] = 155.5 \text{ ft.} \text{ PAY LENGTH}$$

GROUND WATER MONITORING REPORT

OW/PZ NUMBER: OW SS 2 NCD ELEVATION SUBTRAHEND 505.7 ft. FILE NO. 374813
 PAGE NO. 2 of 2

DATE	TIME	ELAPSED TIME	DEPTH OF WATER FROM <u>surface</u>	ELEVATION OF WATER	REMARKS	READ BY
25 Mar. 1981	AM		14.0 ft.	491.7 ft.	Prior to flushing	ERH
		0	---		Flush test-water did not reach surface	ERH
		1	12.0		"	
		4	12.5		"	
		21 min.	12.5	493.2	"	
16 Apr. 1981	PM		13.0	492.7		FS
1 May 1981	PM		14.0	491.7		SP
		0	13.0	492.7	Flush Test (Poured in 1 gal.)	
		2	14.0		"	
		5 min.	14.0	491.7	"	
1 June 1981	AM	68 days	15.0	490.7	Strong gas odor PVC pipe black	ERH
26 June 1981	AM	93 days	14.0	491.7	2% gas reading	MW
17 July 1981	AM	114 days	14.5	491.2		FS
7 Aug. 1981	AM	135 days	14.5	491.2	0.5% gas reading	ERH
22 Sept. 1981	AM	181 days	14.0	491.7	0% gas reading	ERH
22 Oct. 1981	AM	211 days	14.4	491.3		SMV
4 Nov. 1981	PM	224 days	14.0	491.7		ERH
		0 min.	13.0	492.7	Flush Test (Poured in 5 gal.)	ERH
6 Nov. 1981	PM	226 days	13.5	492.2		SMV
			<i>17</i>			

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. SS 3

PROJECT: CSOAP, Phase II

FILE NO. 374813

CLIENT: L.S.T.

SHEET NO. 1 of 6

CONTRACTOR: Warren George

LOCATION: Jay & Saxton

ELEVATION: 506.7 ft. 507.8 ft.

GROUNDWATER

DEPTH TO

CASING

SAMPLER

CORE BARREL

DATE START: 20 Feb 1981

DATE FINISH: 23 Feb 1981

DRILLER: D. Holley

INSPECTOR: R. Hilimire

DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE

TYPE	SIZE ID	HAMMER WT	HAMMER FALL
	in.	lb.	in
	3	140	30
	1 3/8		
	1-13/16		

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
---------------	---------------	-----------------------	--------------------------	---------------	--------------------

FIELD CLASSIFICATION AND REMARKS

5			50	S-1	0.0	Very compact brown coarse to fine SAND, little gravel, trace clay, brick fragments, glass fragments, cinders.
			28		1.5	
5			7	S-2	5.0-	Medium compact brown silty, coarse to fine SAND, little gravel, brick fragments. Slightly plastic.
			5		6.5	
10	10.2		30	S-3	10.0-	-FILL- Top of Rock at 10.2
			2		10.2	
15						
20						
25						

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 10.2
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 3
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. SS 3
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

H.B.A. 10/81/87/4

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
40	3	R-5	120 120	100 100	SL	PT4 45.0 45.5	Light to dark gray, fine-grained, thin-bedded Dolomite, very thinly color-banded and mottled. LOCKPORT DOLOMITE Moderately weathered shaly partings at 40.3 and 41.7 ft. (NOTE: Strong Hydrogen Sulfide odor during R-5.) LOCKPORT DOLOMITE
3							
3							
3							
3							
45	3	45.5				45.0 45.5	
	3					46.6	
	3						
	3						
50	3	R-6	120 83	100 69	SL		LOCKPORT DOLOMITE
3							
3							
3							
3							
55	3	55.5				55.5	(Contact gradational)
	2						
	2						
	2						
	2						
60	2	R-7	122 117	102 96*	SL		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, vugs and fossils. Secondary gypsum seams in closely to very closely spaced partings. ROCHESTER SHALE
1							
1							
1							
1							
65	1	65.5					* RQD based on core recovered.
	2					65.7	
	2						
	2						
	2						
70	2	R-8	121 121	101 100*	SL	PT3 72.0	ROCHESTER SHALE
2							
2							
2							
2							
75	2						

HSA FORM 4B - MAR. 77

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
75	2	75.5					Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Secondary gypsum seams in closely to very closely spaced partings. ROCHESTER SHALE
	2						
	2						
	2						
	2						
80	2	R-9	118	98	SL		Light gray, thin to very thin, closely spaced Limestone beds from 83.7 to 151.9 ft. Moderately weathered partings at 84.0 ft. and 87.1 ft. ROCHESTER SHALE
	2		118	98			
	2						
	2						
	2						
85	2	85.5					ROCHESTER SHALE
	2						
	2						
	2						
	2						
90	1	R-10	123	103	SL		* RQD based on core recovered. Moderately weathered parting at 95.8 ft. ROCHESTER SHALE
	1		123	100*			
	1						
	1						
	1						
95	1	95.5					ROCHESTER SHALE
	1						
	1						
	1						
	1						
100	2	R-11	119	99	SL		Very dark gray Mudstone from 103.4 to 151.9 ft. Moderately weathered parting at 105.9 ft. ROCHESTER SHALE
	2		115	96			
	2						
	2						
	2						
105	2	105.5					Rough vertical joint from 109.9 to 108.0 ft. ROCHESTER SHALE
	2						
	2						
	2						
	2						
110	2	R-12	123	103			
			123	100*			

H&A FORM 4B - M... 77

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
110	2	R-12					Dark gray, fine-grained Dolomitic Mudstone, very thinly color-banded. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely spaced Limestone beds.
	2						
	2						
	2						
115	2	115.5					ROCHESTER SHALE Moderately weathered parting at 113.4 ft.
	2						
	2						
	2						
120	2	R-13	117	98			ROCHESTER SHALE
	2		117	98			
	2						
	2						
					121.7		
					PT2		
125	2	125.5					ROCHESTER SHALE
	2					126.7	
	2					128.1	
	2						
					130.7		
					PT1		
135	2	R-14	122	102			* RQD based on core recovered.
	2		122	100*			
	2						
	2						
					137.0		
140	2	R-15	121	101			ROCHESTER SHALE Increasingly fossiliferous from 141.4 to 151.9 ft.
	2		121	100*			
	2						
	2						
145	2						

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
V. Hard - Knife can't scratch Hard - scratches diff. Med. Hard - scratches easily Soft - grooves V. Soft - carves	Fresh V. slight Slight Moderate Mod. Severe Severe V. Severe Complete	V. thin Thin Medium Thick V. thick V. Close Close Mod. Close Wide V. wide < 2" 2" - 12" 12" - 36" 36" - 120" > 120"	> 90% 90-75 75-50 50-25 < 25 Excellent Good Fair Poor V. Poor

H&A FORM 4B - MAR 77

CORE BORING REPORT

GEOLOGIST Fred Amos

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
145		145.5					Dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Closely to very closely spaced partings. Light gray, very thin, closely spaced Limestone beds. ROCHESTER SHALE
			77	100			
		R-16	77	100			Severely weathered clay parting at 149.5 ft.
150							Light to medium gray, fine to medium-grained, thin to medium bedded fossiliferous Limestone, interbedded with dark gray, thin to medium-bedded dolomitic Shale. Secondary gypsum seams in closely spaced partings. IRONDEQUOIT LIMESTONE (NOTE: Odor of gas and bubbling in water at end of R-16.) Severely weathered shaly parting at 154.2 ft.
			44	102			
		155.5	44	100*			
155							* RQD base on core recovered.
		R-17	58	97			
		160.5	58	97			
160							Bottom of boring at 160.5 ft.
							Observation well installed in completed borehole.
165							

H&A FORM 48 - 77

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

COMBUSTIBLE GAS MEASUREMENT

PROJECT CSOAP, Phase II FILE NO. 374813 BORING NO. SS 3

INSPECTOR R. Hilimire DRILLER D. Holley

DATE	ELAPSED TIME (MIN.)	BOTTOM OF HOLE (FT)	METER READING (%)	REMARKS
21 Feb. 1981	0	75.5	30	
	0	85.5	10	
	0	90.5	0	
	0	95.5	0	
	0	105.5	0	
	0	145.5	0	
	0	155.5	0	

GROUND WATER OBSERVATION WELL REPORT

PROJECT: CSOAP, PHASE II
 LOCATION: Rochester, NY
 CLIENT: L.S.T.
 CONTRACTOR: Warren George
 DRILLER: D. Holley INSPECTOR: M. Wright
 INSTALLATION DATE 23 Feb. 1981

FILE NO. 374813
 WELL NO. OWSS 3
 BORING NO. SS 3
 LOCATION Jay & Saxton
 SHEET 1 OF 2

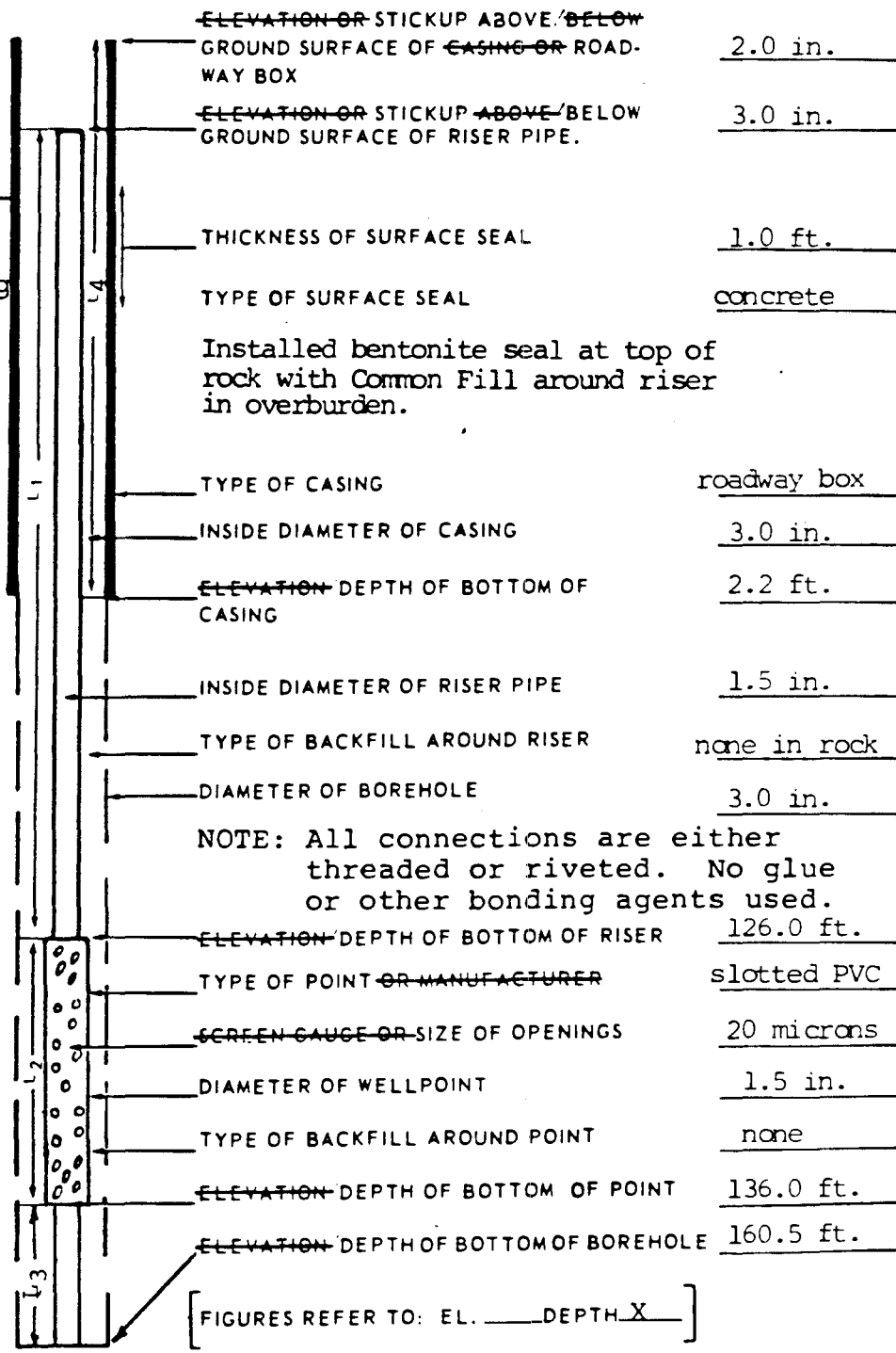
SURVEY DATUM USC & GS

GROUND ELEVATION 506.7 ft.

SUMMARIZE SOIL CONDITIONS (NOT TO SCALE)

Refer to test boring log for description of soil and rock conditions.

OVERBURDEN THICKNESS (ft) 10.2



$$\left[\frac{2.2}{\text{LENGTH OF CASING } L_4} \right] \left[\frac{150.3 \text{ ft.}}{\text{LENGTH OF RISER PIPE } (L_1 + L_3)} + \frac{10.0 \text{ ft.}}{\text{LENGTH OF POINT } (L_2)} \right] = \frac{160.3 \text{ ft.}}{\text{PAY LENGTH}}$$

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

GROUND WATER MONITORING REPORT

OW/PZ NUMBER: <u>OW SS 3</u>		NCD ELEVATION SUBTRAHEND <u>509.0 ft.</u>		FILE NO. <u>374813</u> PAGE NO. <u>2 of 2</u>		
DATE	TIME	ELAPSED TIME	DEPTH OF WATER FROM <u>surface</u>	ELEVATION OF WATER	REMARKS	READ BY
26 Mar. 1981	AM		12.0 ft.	497.0 ft.	Prior to flushing	ERH
		0	0.0	509.0	Flush test	
		1	2.5		"	
		2	3.0		"	
		3	3.5		"	
		5	4.2		"	
		10	4.7		"	
		15 min.	5.0		"	
	PM	3 hrs.	5.7	503.3	"	
16 Apr. 1981	PM		6.0	503.0		FS
12 May 1981	1400		11.0	498.0	Prior to flushing	ERH
		0	5.0		Flush test	
		1	6.0		"	
		2	6.0		"	
		5	6.0		"	
16 June 1981	AM	82 days	11.0	498.0		ERH
17 July 1981	AM	113 days	10.7	498.3		FS
22 Sept. 1981	PM	180 days	14.2	494.8		ERH
			<i>K-12</i>			

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SS 3 TEST NO. 1

PROJECT: CSOAP, Phase II
CLIENT: L.S.T.
CONTRACTOR: Warren George

FILE NO. 374813
SHEET NO. 1 of 1
LOCATION: Jay & Saxton
ELEVATION: 504.6 ft.
DATE START: 23 Feb, 1981
DATE FINISH: 23 Feb, 1981
DRILLER: D. Holley
INSPECTOR: _____
GEOLOGIST: S. Vinci

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	<u>Pneumatic</u>	<u>Dial</u>	<u>Dial</u>	<u>Air</u>
MFG.	<u>W.G.</u>	<u>Gam.-Cal.</u>	<u>Ashcroft</u>	<u>W.G.</u>
MODEL NO.	<u>---</u>	<u>7607432</u>	<u>---</u>	<u>---</u>

M.G.P. = (0.566 to 1.0) x Z
COMPUTED MAX GAUGE PRESS: (MGP) 95 psi
COMPUTED INTERNAL FRICTION: _____

ROCK TYPE: Rochester shale HOLE SIZE 3 in.
RECOVERY (%) 102
R O D (%) 100

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 10.2 TO TOP LOWER PACKER 137.0
TO BOTTOM OF BORING 160.5 TO BOTTOM UPPER PACKER (Z) 130.7
TO WATER TABLE 12.0 LENGTH OF TEST SECTION 6.3
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1040	0	285	25	383.8		
	1			383.8		
	2			383.8	0.0	
1044	0		50	383.8		
	1			383.8		
	2			383.8	0.0	
1047	0		95	383.9		
	1			384.0		
	2			384.0		
	5			384.1		
	10			384.3	0.0	

PIBA NO. 1 83

HALEY & ALDRICH, INC. CAMBRIDGE, MASSACHUSETTS		WATER PRESSURE TEST			HOLE NO. SS 3	TEST NO. 2
PROJECT: CSOAP, Phase II					FILE NO. 374813	
CLIENT: L.S.T.					SHEET NO. 1 of 1	
CONTRACTOR: Warren George					LOCATION: Jay & Saxton	
	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER	ELEVATION: 504.6 ft.	
TYPE	Pneumatic	Dial	Dial	Air	DATE START: 23 Feb. 1981	
MFG.	W.G.	Gam.-Cal.	Ashcroft	W.G.	DATE FINISH: 23 Feb. 1981	
MODEL NO.	---	7607432	---	---	DRILLER: D. Holley	
M.G.P. = (0.566 to 1.0) x Z				ROCK TYPE: Rochester shale HOLE SIZE 3 in.		
COMPUTED MAX GAUGE PRESS: (MGP) 90 psi				RECOVERY (%) 98 to 102		
COMPUTED INTERNAL FRICTION: _____				ROD (%) 98 to 100		

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 10.2 TO TOP LOWER PACKER 128.0

TO BOTTOM OF BORING 160.5 TO BOTTOM UPPER PACKER (±) 121.7

TO WATER TABLE 12.0 LENGTH OF TEST SECTION 6.3

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1103	0	275	25	399.0		
	1			399.1		
	2			399.1		
	3			399.1	0.0	
1107	0		55	399.2		
	1			399.3		
	2			399.3		
	3			399.4	0.1	
1111	0		90	399.5		
	1			399.6		
	2			399.7		
	3			399.7		
	5			399.9		
	8			400.0	0.1	

Fc
M&A Nov. 63

PROJECT: CSOAP, Phase II
 CLIENT: L.S.T.
 CONTRACTOR: Warren George

FILE NO. 374813
 SHEET NO. 1 of 1
 LOCATION: Jay & Saxton
 ELEVATION: 504.6 ft.
 DATE START: 23 Feb, 1981
 DATE FINISH: 23 Feb, 1981
 DRILLER: D. Holley
 INSPECTOR: M. Wright
 GEOLOGIST: _____

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Dial	Dial	Air
MFG.	W.G.	Gam.-Cal.	Ashcroft	W.G.
MODEL NO.	---	7607432	---	---

M.G.P. = (0.566 to 1.0) x \bar{z}
 COMPUTED MAX GAUGE PRESS: (MGP) 45 psi
 COMPUTED INTERNAL FRICTION: _____
 ROCK TYPE: Rochester shale HOLE SIZE 3 in.
 RECOVERY (%) 101
 R O D (%) 100

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 10.2	TO TOP LOWER PACKER 72.0
TO BOTTOM OF BORING 160.5	TO BOTTOM UPPER PACKER (Z) 65.7
TO WATER TABLE 12.0	LENGTH OF TEST SECTION 6.3
HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.0	

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1200	0	200	25	403.7		
	1			403.7		
	2			403.7		
	3			403.7	0.0	
1204	0		30	403.7		
	1			403.8		
	2			403.8		
	4			403.8	0.0	
1208	0		45	403.8		
	1			403.8		
	2			403.9		
	5			404.0		
	7			404.1	0.0	

63 FEB 1981

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

WATER PRESSURE TEST

HOLE NO. SS 3

TEST NO.

4

PROJECT: CSOAP, Phase II

CLIENT: L.S.T.

CONTRACTOR: Warren George

FILE NO. 374813

SHEET NO. 1 of 1

LOCATION: Jay & Saxton

ELEVATION: 504.6 ft.

DATE START: 23 Feb, 1981

DATE FINISH: 23 Feb, 1981

DRILLER: D. Holley

INSPECTOR: M. Wright

GEOLOGIST:

	PACKER SYSTEM	WATER METER	PRESSURE GAUGE	SURGE CHAMBER
TYPE	Pneumatic	Dial	Dial	Air
MFG.	W.G.	Gam.-Cal.	Ashcroft	W.G.
MODEL NO.	---	7607432	---	---

M.G.P. = (0.586 to 1.0) x Z

COMPUTED MAX GAUGE PRESS: (MGP) 25 psi

COMPUTED INTERNAL FRICTION:

ROCK TYPE: Lockport dolomite HOLE SIZE 3 in.

RECOVERY (%) 100

R O D (%) 100

DEPTHS: (All Distances Measured From Ground Surface In Feet)

TO TOP OF ROCK 10.2 TO TOP LOWER PACKER 45.0

TO BOTTOM OF BORING 160.5 TO BOTTOM UPPER PACKER (Z) 38.7

TO WATER TABLE 12.0 LENGTH OF TEST SECTION 6.3

HEIGHT OF WATER PRESSURE GAUGE ABOVE GROUND SURFACE 2.0

TIME	ELAPSED TIME (MIN)	PACKER PRESSURE (PSI)	GAUGE PRESSURE (PSI)	METER READING (GALS)	VOLUME OF FLOW (GALS/MIN)	REMARKS
1234	0	200	10	405.6		
	1			406.0		
	2			406.4		
	4			407.2	0.4	
1240	0		25	407.9		
	1			408.4		
	2			408.9		
	5			410.4		
	9			412.4	0.5	

H&A Nov. 63

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
5							Begin coring at 10.0 ft.
10	/	10.0	26	108	SL	Light gray, fine-grained, thin to medium-bedded, siliceous Dolomite. Trace pits, vugs, gypsum nodules and stylolites. Very closely to moderately closely spaced argillaceous partings. LOCKPORT DOLOMITE Rough, intersecting low angle joints at 10.6 and 11.2 ft. Severely weathered clayey parting at 10.6 and 11.6 ft. Severely weathered zone from 11.2 to 11.6 ft. Severely to moderately weathered partings from 10.0 to 65.3 ft. Small galena crystal at 14.0 ft. Rough, vertical, moderately weathered joint from 12.1 to 13.1 ft. LOCKPORT DOLOMITE Open, vertical, moderately weathered crack from 13.1 to 14.5 ft. Trace secondary gypsum in partings from 14.8 to 66.6 ft. Two low angle, smooth, intersecting joints from 15.2 to 15.3 ft. LOCKPORT DOLOMITE Moderately dipping, moderately weathered joint at 19.8 ft. Low angle joint at 20.1 ft. Moderately dipping joint, not parallel to above joint, from 20.3 to 20.4 ft. Vug, 0.1 ft. wide, lined with crystals, at 27.2 ft. Numerous discontinuous, wavy argillaceous streaks from 28.7 to 43.0 ft. LOCKPORT DOLOMITE Gypsum nodule, 0.1 ft. wide, at 36.1 ft. (NOTE: No water return from 26.0 ft. to bottom of borehole. * RQD based on core recovered.	
	2	R-1	22	85*	SEV		
15	/	R-2	123	103	SL-MOD		
	2						
	/						
	2						
20	/	R-3	116	97	SL		
	2						
	/						
	2						
25	/	R-4	122	102	SL		
	2						
	/						
	2						
30	/	R-1	111	96*	SL		
	2						
	/						
	2						
35	/	R-2	105	88	SL		
	2						
	/						
	2						
40	/	R-3	105	88	SL		
	2						
	/						
	2						
40	/	R-4	105	88	SL		
	2						
	/						
	2						

H&A FORM 4B - MAR 77

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
40	2	42.0					Light gray, fine-grained, thin to medium-bedded, cross-bedded Dolomite. Very closely to moderately closely spaced argillaceous partings. Very thin, closely to moderately closely spaced, wavy argillaceous bands, some of which are partings. Trace stylolites, and secondary gypsum seams in partings.
	2						
45	2	R-5 52.0	117	98	SL		LOCKPORT DOLOMITE Partings severely to moderately weathered to 65.3 ft.
	2		109	91			
	2						
	2						
50	2	R-6 62.0	117	98	SL		LOCKPORT DOLOMITE Low angle joint, trace slickensides, at 51.5 ft. Moderately dipping and low angle slickensided shears from 59.8 to 61.0 ft.
	2		95	79			
	2						
	2						
60	2	R-7 72.0	121	101	SL		LOCKPORT DOLOMITE Moderately dipping joint at 65.3 ft. Rough, low angle joint at 67.1 ft. High angle slickensided shear from 68.3 to 68.5 ft. *RQD based on core recovered. Moderately dipping joint with trace slickensides at 72.6 ft.
	2		121	100*			
	2						
	2						
70	2						
75	2						

HBA FORM 4B - MAR.

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- indoves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
75	2	R-8	120 120	100 100	SL		Light gray, fine-grained, thin to medium-bedded Dolomite. Very closely to moderately closely spaced argillaceous partings. Very thin, closely to moderately closely spaced, wavy argillaceous bands, some of which are partings. Secondary gypsum seams in some partings.
76	2						
77	2						
78	2						
79	2						
80	2						
		82.0					LOCKPORT DOLOMITE
85	2	R-9	120 120	100 100	SL		Four moderately dipping, non-parallel joints from 73.4 to 75.8 ft. Light to medium gray, fine-grained, thin to medium-bedded dolomite, very thinly color banded with secondary gypsum seams in closely to moderately closely spaced partings from 75.9 to 104.3 ft. Trace gypsum nodules and fossils.
86	2						
87	2						
88	2						
89	2						
90	2						
		92.0					LOCKPORT DOLOMITE
95	2	R-10	118 118	98 98	SL		Severely weathered shaly partings at 92.9, 93.4, 95.5, 99.1 and 93.5 ft.
96	2						
97	2						
98	2						
99	2						
100	2						
		102.0					LOCKPORT DOLOMITE
	1		28 28	100 100	SL		Moderately weathered shaly partings at 102.3 and 103.6 ft.
	1						Severely weathered shaly parting at 104.3 ft.
105	2	R-11	90 85	98 92	MOD	104.3	(Contact gradational) Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings.
106	2						
107	1						
108	2						
110	2						ROCHESTER SHALE

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
V. Hard — Knife can't scratch Hard — scratches diff. Med. Hard — scratches easily Soft — grooves V. Soft — carves	Fresh V. slight Slight Moderate Mod. Severe Severe V. Severe Complete	V. thin Thin Medium Thick V. thick V. Close Close Mod. Close Wide V. wide < 2" 2" - 12" 12" - 36" 36" - 120" > 120"	> 90% 90-75 75-50 50-25 < 25 Excellent Good Fair Poor V. Poor

H&A FORM 4B-MAX

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
110	2 1	112.0			MOD		<p>Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings.</p> <p>ROCHESTER SHALE</p> <p>Moderately weathered high angle joints, with secondary gypsum seams, from 109.7 to 109.8 ft.</p>
115	2 2 1				SL		
	2				MOD		
	1	R-12	120 115	100 96	SL		
120	2 1	122.0					
	2				SL		
	2						
125	2 2 2				MOD		
	2	R-13	124 124	103 100*			
130	2 2	132.0			SL		
	2						
135	2 2 2	R-14	121 121	101 100*	MOD		
	2						
140	2 2	142.0			SL		
	2				MOD		
145	1 1						

Moderately weathered shaly parting at 126.7 ft.

Gypsum nodules, 0.1 ft. wide, at 128.2 and 131.2 ft.

ROCHESTER SHALE

Light gray, thin to very thin, closely spaced Limestone beds from 130.8 to 199.9 ft.

Severely weathered shaly partings at 131.8, 132.6 and 135.3 ft.

ROCHESTER SHALE

Moderately weathered shaly parting at 138.0 ft.

*RQD based on core recovered.

ROCHESTER SHALE

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

MSA FORM 4B - MAR. 7

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
145	✓ ✓ /	R-15	118	98	MOD		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely spaced Limestone beds. ROCHESTER SHALE
	/		116	97			
150	✓ ✓ ✓	152.0					Severely weathered shaly parting at 146.6 ft. Smooth, high angle joint from 146.6 to 146.7 ft. ROCHESTER SHALE
	✓				SL		
155	/	R-16	120	100	SL-MOD		Moderately weathered shaly partings at 147.3 and 147.7 ft. Severely weathered shaly parting at 150.8 ft. Smooth, vertical joint from 152.6 to 152.8 ft.
	/		117	98			
160	✓ /	162.0					Severely weathered shaly partings at 158.1, 160.4, 161.9 and 163.1 ft. Moderately weathered shaly parting at 164.3 ft.
	/				SL		
165	✓ ✓ ✓	R-17	106	88	MOD		Closely to very closely spaced moderately to severely weathered shaly partings from 165.0 to 170.2 ft. (NOTE: Drill rate not recorded from 172 to 180 ft.)
	✓		89	84*			
170	✓ ✓	172.0					
	✓				MOD-SEV		
175		R-18	119	110	SL		Rough vertical joint and broken Mudstone from 170.2 to 172.0 ft. ROCHESTER SHALE
			119	100*			
180					MOD		

MSA FORM 48 - MAR

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
180	2	181.0			MOD		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely spaced Limestone beds. ROCHESTER SHALE Severely weathered shaly partings at 181.3, 182.4 and 183.1 ft. Gypsum nodule, 0.1 ft. wide, at 183.1 ft. Severely weathered shaly parting at 183.5 ft.
	2						
	2						
	2						
185	2				SL-MOD		
	2	R-19	121	101			
	2		117	97*			
	2						
	2						
	2						
190	2	191.0					Increasingly fossiliferous Mudstone from 191.2 ft. to 199.9 ft. ROCHESTER SHALE Severely weathered shaly parting at 187.7 ft. Smooth, low angle, moderately weathered joint with trace gypsum seam at 189.1 ft. Smooth, moderately dipping joint at 190.5 ft. Low angle joints with gypsum seams at 192.0 and 194.0 ft. * RQD based on core recovered.
	2						
	2						
	2						
195	2						
	2	R-20	121	101	MOD		
	2		121	100*			
	2						
	2						
	2						
200	2	201.0				199.9	Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone, interbedded with dark gray, very thin dolomitic Shale. Secondary gypsum seams in closely to moderately closely spaced partings. IRONDEQUOIT LIMESTONE Two gypsum nodules, 0.1 ft. wide, at 200.8 ft.
	2						
	2						
	2						
205	2						
	2	R-21	120	100	MOD		
	2		120	100			
	2						
	2						
	2						
210	2	211.0					IRONDEQUOIT LIMESTONE Moderately weathered shaly parting at 213.9 ft.
	2						
	2						
	2						

H & A FORM 48 - MAR 77

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
215	2	R-22	79	100	MOD	217.6	Light to medium gray, fine to medium-grained, thin to medium-bedded Limestone. IRONDEQUOIT LIMESTONE Moderately weathered shaly partings at 216.2 and 216.4 ft.
	2		79	100			
220	2	221.0	41	100	MOD	217.6	Dark greenish gray Shale, trace fossils. WILLIAMSON SHALE Three moderately weathered partings and one low angle joint from 217.6 to 217.8 ft. Moderately weathered partings at 219.2 and 222.4 ft.
	2		39	95			
225	2	R-23	32	100	MOD	223.7	Dark greenish gray to grayish brown Shale, trace fossils. LOWER SODUS SHALE Eight light gray, thin to very thin, closely spaced shell Limestone beds from 223.7 to 230.1 ft.
	2		32	100			
230	2	231.0	71	81	MOD	230.9	Grayish, brown Shale from 230.9 to 236.0 ft. LOWER SODUS SHALE
	2		71	81			
235	2	R-24	76	103	MOD	237.2	* RQD based on core recovered. Severely weathered partings at 234.6, 236.3 and 237.2 ft.
	2		75	99*			
240	2	242.0	58	100	MOD	237.2	Light to medium gray, fine to medium-grained, crystalline, thin-bedded fossiliferous Limestone, interbedded with dark gray, very thin, closely to very closely spaced Shale beds. Trace stylolites. Trace secondary gypsum seams in very closely to moderately closely spaced partings. REYNALES LIMESTONE
	2		57	98			
245	2	R-25	119	99	SL	237.8	Rough, vertical, moderately weathered joint from 237.8 to 238.1 ft. Severely weathered shaly partings at 239.7 ft. Low angle joint with trace slickensides at 242.0 ft.
	2		119	100			

FRACTURE FREQUENCY (Fract./Ft.)

* RQD based on core recovered.

HSA FORM 4B-WA

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

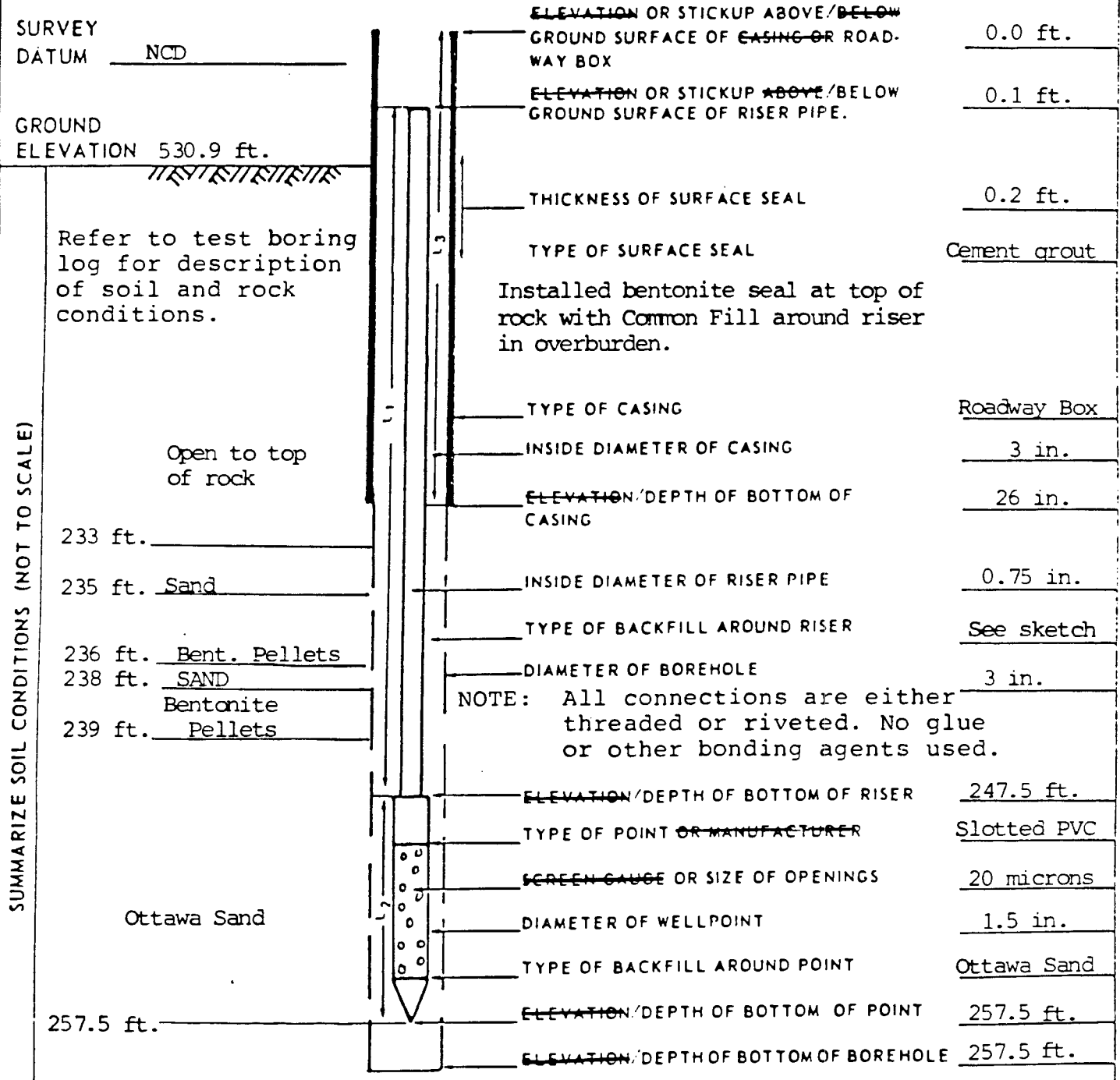
Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
250	2	252.0					Light to medium gray, fine to medium-grained crystalline Limestone, interbedded with gray Shale. 252.5 Red, medium-grained, oolitic, fossiliferous
	2						
255	2	R-26	49	107	SL		Two low angle intersecting slickensided shears at 255.0 ft. Low angle, slickensided shear at 255.8 ft.
	2		49	100*			
	2	257.5	20	100	SL	255.8	** Light greenish gray argillaceous Shale. MAPLEWOOD SHALE Moderately dipping slickensided shear at 256.4 ft.
	2		20	100			
260							Bottom of Boring at 257.5 ft.
							Observation well installed in completed borehole.

* RQD based on core recovered.
** FRACTURE FREQUENCY (Fract./ft.)

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

H & A FORM 4B - MAR.

PROJECT: <u>CSOAP, Phase II</u>	FILE NO. <u>374813</u>
LOCATION: <u>Rochester, N.Y.</u>	WELL NO. <u>OW SS 9</u>
CLIENT: <u>L.S.T.</u>	BORING NO. <u>SS 9</u>
CONTRACTOR: <u>Warren George</u>	LOCATION <u>West Ave. at</u>
DRILLER: <u>J. Harris</u> INSPECTOR: <u>E. R. Hanna</u>	<u>Colvin</u>
INSTALLATION DATE <u>18 March 1981</u>	SHEET <u>1</u> OF <u>2</u>



[FIGURES REFER TO: EL. _____ DEPTH X]

$$\left[\frac{2.2 \text{ ft.}}{\text{LENGTH OF CASING } (L_3)} \right] + \left[\frac{247.4 \text{ ft.}}{\text{LENGTH OF RISER PIPE } (L_1)} \right] + \left[\frac{10.0 \text{ ft.}}{\text{LENGTH OF POINT } (L_2)} \right] = \left[\frac{257.4 \text{ ft.}}{\text{PAY LENGTH}} \right]$$

GROUND WATER MONITORING REPORT

OW/PZ NUMBER: OW SS 9 NCD ELEVATION SUBTRAHEND 530.9 ft. FILE NO. 374813
PAGE NO. 2 of 2

DATE	TIME	ELAPSED TIME	DEPTH OF WATER FROM <u>surface</u>	ELEVATION OF WATER	REMARKS	READ BY
24 Mar. 1981	PM		16.0 ft.	514.9 ft.	Prior to flushing	ERH
		0	0.0	530.9	Flush Test	
		1	2.5		"	
		3	4.5		"	
		5	8.5		"	
		15	14.0		"	
		26 min.	14.5	516.4	"	
25 Mar. 1981	AM		15.5	515.4		ERH
16 Apr. 1981	PM		15.5	515.4		FS
30 Apr. 1981	AM		16.0	514.9		ERH
		0	0	530.9	Flush Test (Poured in 1 gal.)	
		1	9.5		"	
		2	11.0		"	
		5	14.0		"	
		10 min.	14.5	516.4	"	
1 May 1981			14.5	516.4		ERH
12 May 1981	PM	49 days	15.0	515.9		ERH
1 June 1981	AM	69 days	15.5	515.4		ERH
26 June 1981	AM	93 days	16.1	514.9		MW
17 July 1981	AM	114 days	15.8	515.1		FS
7 Aug. 1981	AM	135 days	15.3	515.6	0% gas reading	ERH
22 Sept. 1981	AM	181 days	15.0	515.9		ERH
22 Oct. 1981	AM	211 days	16.8	514.1		SMV

16

TEST BORING REPORT

MOLE NO SS 12
 FILE NO 374813
 SHEET NO 1 of 6
 LOCATION Broad at Saxton
 ELEVATION 507.2 ft. NCD
 DATE START 13 May 1981
 DATE FINISH 22 May 1981
 DRILLER E. Ward
 INSPECTOR E. Hanna

PROJECT: CSOAP, Phase II
 CLIENT: L.S.T.
 CONTRACTOR: Drill and Test

GROUNDWATER		DEPTH TO			CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF MOLE	TYPE	S/S	NX
22 May	PM	12.5					
					SIZE ID in.	1-3/8	2-1/8
					HAMMER WT lb.	300	140
					HAMMER FALL in.	24	30

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
			7		0.0	Loose brown medium to fine sandy SILT, some organics. - TOPSOIL -
			9	S-1		
			8		2.0	
			6			
5			7		4.5	Loose brown silty coarse to fine SAND, trace fine gravel, trace clay. - FILL -
			7	S-2		
			8		6.0	
10						Top of rock at 8.5 ft.
15						
20						
25						

PRELIMINARY

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>8.5 ft.</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK <u>—</u>
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>2</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	
50-	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	MOLE NO. <u>SS 12</u>

H & A FORM 7-4

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
5							(NOTE: Incomplete water return throughout coring)
		8.5					Begin coring at 8.5 ft.
10	5 5 5 3 4	R-1	115 81	96 68	MOD		Light gray, fine-grained, thin to medium-bedded siliceous Dolomite. Trace pits. Closely to moderately closely spaced argillaceous partings. LOCKPORT DOLOMITE Moderately weathered, high angle joints from 8.7 to 9.0 ft., from 9.2 to 9.4 ft. and from 9.6 to 10.0 ft. Partings moderately to severely weathered from 9.1 to 16.8 ft. Secondary gypsum seams in partings from 13.2 to 38.6 ft. Light to medium gray, very thinly color-banded and mottled dolomite from 13.5 to 38.6 ft.
15	6 6 7 6				SL		
20	10 4 3 3 3 4	R-2	121 97	100 81	SL		LOCKPORT DOLOMITE Severely weathered shaly partings at 15.2, 21.7 and 22.5 ft. Rough vertical joint from 18.5 to 18.7 ft.
25	4 3 5 5						
30	3 3 3 3	R-3	70 58	117 83*	SL		Vertical crack from 32.7 to 32.9 ft. LOCKPORT DOLOMITE * RQD based on core recovered.
35	3 3 3 3	R-4	119 119	98 98	SL		Severely weathered shaly parting at 36.6 ft. (Contact gradational)
40	3					38.6	Light to dark gray, fine-grained dolomitic Mudstone. ROCHESTER SHALE

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

H&A FORM 4B-4-77

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
40	3	43.5			SL		Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace pits, vugs, gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings.
	3						
	3						
	3						
45	3	R-5	38	100	SL	ROCHESTER SHALE (NOTE: Core barrel blocked at 46.7 ft.)	
	3		33	87			
	3	46.7					
	3	53.7			SL	Severely weathered shaly parting at 42.8 ft. Vug, 0.1 ft. wide, in parting at 49.5 ft.	
	3						
	3						
	3						
50	3	R-6	84	100	SL		
	3		83	99			
	3						
	3	63.7				ROCHESTER SHALE Rough, high angle joint from 59.3 to 59.4 ft. Rough, intersecting vertical joints from 61.2 to 61.6 ft.	
	3						
	3						
	3						
55	3	R-7	119	99	SL	Vertical joint from 62.2 to 62.4 ft. Gypsum nodule, 0.2 ft. wide, in parting at 63.0 ft.	
	3		114	95			
	3						
60	3	73.7				Gypsum nodule, 0.1 ft. wide, in parting at 66.1 ft. ROCHESTER SHALE Light gray, thin to very thin, closely to moderately closely spaced Limestone beds from 70.9 to 140.2 ft. Small gypsum nodule in parting at 72.2 ft. Gypsum nodule, 0.2 ft. wide, at 72.7 ft.	
	3						
	3						
	3						
65	3	R-8	119	99	SL		
	3		118	98			
	3						
70	3	73.7			SL		
	3						
	3						
	3						
75	3				SL		

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
110	3						Light to dark gray, fine-grained dolomitic Mudstone, very thinly color-banded. Trace gypsum nodules and fossils. Secondary gypsum seams in closely to very closely spaced partings. Light gray, thin to very thin, closely to moderately closely spaced Limestone beds. ROCHESTER SHALE Small gypsum nodules at 110.2 and 118.0 ft.
	3						
	3						
	3						
	3						
115	3	114.9					
	3						
	3						
	3						
	3						
120	3	R-14	$\frac{118}{117}$	$\frac{98}{98}$	SL		
	3						
	3						
	3						
	3						
125	3	124.9					
	3						
	3						
	3						
130	3	R-15	$\frac{118}{114}$	$\frac{98}{95}$	SL		
	3						
	3						
	3						
	3						
135	3	134.9					
	3						
	3						
	3						
	3						
140	3	R-16	$\frac{120}{118}$	$\frac{100}{98}$	SL		
	3						
	3						
	3						
	3						
145	3	144.9					
	3						

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	— Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	— scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	— scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	— grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	— carves			V. thick	V. wide	> 120"	< 25	V. Poor

M&A FORM 48-N-7

CORE BORING REPORT

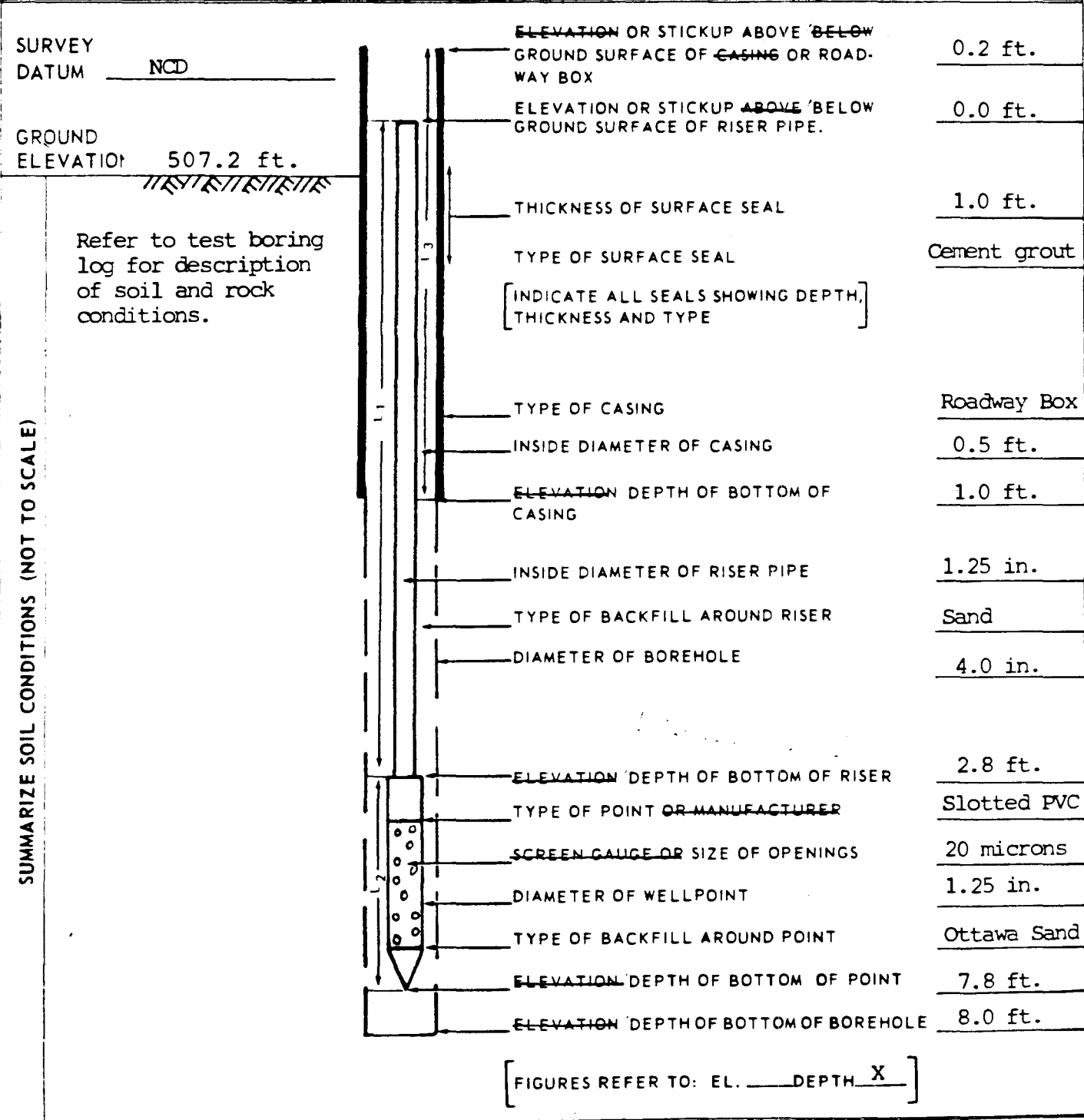
GEOLOGIST Fred Amos

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
145	3	R-17	118 116	98 97	SL		Light to medium gray, fine to medium-grained, thin to medium-bedded, fossiliferous Limestone, interbedded with dark gray, thin to very thin dolomitic Shale. Trace gypsum nodules. Secondary gypsum seams in closely to moderately closely spaced partings. IRONDEQUOIT LIMESTONE Vertical joint from 141.3 to 141.4 ft. Severely weathered shaly partings at 142.5, 143.1 and 144.2 ft. Intersecting vertical joints from 151.2 to 151.4 ft.
3							
3							
3							
3							
3							
3							
3							
3							
3							
150	3	R-18	71 71	99 99	SL	158.0	** Dark greenish gray Shale. Trace fossils. WILLIAMSON SHALE Light gray, very thin Limestone beds at 158.1 and 159.0 ft.
3							
3							
3							
3							
3							
3							
3							
3							
3							
155	3	R-19	154.9				Bottom of Boring at 160.9 ft. Borehole grouted to 13.0 ft., then backfilled to surface. ** FRACTURE FREQUENCY (Fract./ft.)
3							
3							
3							
3							
3							
3							
3							
3							
3							
160	3	R-20	160.9				
3							
3							
3							
3							
3							
3							
3							
3							
3							
165	3	R-21					
3							
3							
3							
3							
3							
3							
3							
3							
3							

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
V. Hard - Knife can't scratch Hard - scratches diff. Med. Hard - scratches easily Soft - grooves V. Soft - carves	Fresh V. slight Slight Moderate Mod. Severe Severe V. Severe Complete	V. thin V. Close < 2" Thin Close 2" - 12" Medium Mod. Close 12" - 36" Thick Wide 36" - 120" V. thick V. wide > 120"	> 90% Excellent 90-75 Good 75-50 Fair 50-25 Poor < 25 V. Poor

GROUND WATER OBSERVATION WELL REPORT

PROJECT: <u>CSOAP, Phase II</u>	FILE NO. <u>374813</u>
LOCATION: <u>Rochester, New York</u>	WELL NO. <u>OW SS 12 S</u>
CLIENT: <u>L.S.T.</u>	BORING NO. <u>---</u>
CONTRACTOR: <u>Drill and Test</u>	LOCATION <u>Saxton at</u>
DRILLER: <u>T. Smith</u> INSPECTOR: <u>E. Hanna</u>	<u>Broad</u>
INSTALLATION DATE <u>26 May 1981</u>	SHEET <u>1</u> OF <u>2</u>



$\frac{1.0}{\text{LENGTH OF CASING } L_3}$	$\frac{2.8}{\text{LENGTH OF RISER PIPE } (L_1)}$	+	$\frac{5.0}{\text{LENGTH OF POINT } (L_2)}$	=	$\frac{7.8}{\text{PAY LENGTH}}$
--	--	---	---	---	---------------------------------

TEST BORING REPORT

HOLE NO. LX 2
 FILE NO. 374813
 SHEET NO. 1 of 6
 LOCATION Lexington & Lark
 ELEVATION 501.3 ft. 501.4
 DATE START 28 Jan. 1981
 DATE FINISH 3 Feb. 1981
 DRILLER J. Hammond
 INSPECTOR J. Ehrets

PROJECT: CSOAP, Phase II
 CLIENT: L.S.T.
 TRACTOR Anderson Drilling Inc.

GROUNDWATER		DEPTH TO:		CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	
-3-81	8:30am	37.0ft	5.0ft	44.0ft	SIZE ID	in 4 1 3/8 2 1/8
-	-	-	-	-	HAMMER WT	lbs 300 140
-	-	-	-	-	HAMMER FALL	in 24 30

CALC IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
		6	1		0.0-	Soft tan silty CLAY, trace sand, organics, roots, cinders - TOPSOIL & FILL -
	2.0	38	2	S-1	2.0	
		140				Very compact gray silty SAND, decomposed shale fragments TOP OF ROCK AT 5.5 ft.
		154				
- 5	5.5	163	96	S-2	5.0-	
			100/0		5.5	
- 10						
- 15						
- 20						
- 25						

PRELIMINARY

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN <u>5.5</u>
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK _____
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES <u>2</u>
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. <u>LX 2</u>
50+	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
5							Begin Coring at 5.5 ft.
	1.5	5.5					Light gray, fine to medium-grained Dolomite with partings and low to high angle joints, about five per foot. Trace mottling. LOCKPORT DOLOMITE (Contact gradational)
	1.5	R-1	60	100	SL-MOD		
	1		18	30			
10	1.5	10.5				10.4	
	1.5	R-2			SL		Light to medium gray, fine-grained dolomitic Mudstone, with very thin color banding. (NOTE: Water return lost during R-2. Except as noted, no water returned below 15.5 ft.) ROCHESTER SHALE. Closely spaced partings.
	3		56	93			
	1		25	42			
15	1.5	15.5					High angle joint at depth of 18.4 to 18.5 ft. Trace vugs. Darker mudstone below depth of 19.8 ft. * RQD based on core recovered. ROCHESTER SHALE Secondary gypsum seams in partings from depth of 23.5 to 104.3 ft.
	2.5	R-3	64	107	SL		
	1.5		34	53*			
20	1.5	20.5					
	1.5	R-4			SL		
	2		59	98			
	1.5		48	80			
25	1	25.5					(NOTE: Core barrel blocked off at 15.5 and 20.5 ft. Problem with bent drill rod during R-4.) ROCHESTER SHALE
	1.5	R-5			SL		
	2.5		120	100			
30	2	115	96				
	1						
	1.5						
35	1.5						
	2.5						

PRELIMINARY

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
35	2.5	35.5					ROCHESTER SHALE Light to dark gray, fine-grained dolomitic Mudstone. Very thin light gray, closely spaced limestone beds.
	3						
	3						
	3.5						
	4.5						
40	3.5	R-6	120 109	100 91	SL		
	3						
	3						
	3.5						
	3.5						
45	4	45.5					ROCHESTER SHALE Very thin, severely weathered dark gray shale bed at depth of 51.3 ft. (NOTE: Water returned briefly at 50 ft.)
	3.5						
	2.5						
	2.5						
50	2.5	R-7	119 90	99 75	SL		
	2.5						
	2.5						
	3.5						
	3.5						
	3.5						
55	3.5	55.4					ROCHESTER SHALE Very dark gray Mudstone to depth of 104.3 ft. Trace fossils
	3.5						
	3.5						
	3.5						
	3.5						
60	3.5	R-8	120 115	100 96	SL		
	4						
	4.5						
	4						
	3.5						
	4						
65	4	65.3					ROCHESTER SHALE
	3.5						
	3.5						
	3.5	R-9					
	3.5						
70	3.5						

PRELIMINARY

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS	
			in.	%				
105	3.5 4 4 4	105.3					Light to dark gray mottled, fine to medium-grained fossiliferous Limestone. IRONDEQUOIT LIMESTONE Thin wavy bedding. (NOTE: Water returned briefly during R-13.) Secondary gypsum seams in closely spaced partings.	
110	2 2 2 3 2.5 2.5	R-13	121 121	101 100*	SL			
115	3 3 3.5 3.5	115.3						
120	3.5 3.5 3.5	R-14	118 112	98 93	SL			
	3.5 4					121.9		Dark greenish gray to dark gray Shale, with very thin closely spaced limestone beds. Trace fossils. WILLIAMSON SHALE
125	4 4 3.5 3.5	125.3						
	3 2.5 2.5 4 4.5	R-15	104 102	87 98*	SL	128.8		Greenish gray to grayish brown fossiliferous Shale. LOWER SODUS SHALE Very thin, severely weathered zone at top. Three very thin light gray limestone beds from depth of 128.7 to 129.9 ft.
135	5 4.5 4.5 4 4.5	135.3						
140	4	R-16						* (NOTE: RQD based upon core recovered) LOWER SODUS SHALE Grayish brown shale from depth of 130.5 to 138.3 ft.

PRELIMINARY

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

977
HSA FORM 4'

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS

TEST BORING REPORT

HOLE NO. LX 3

PROJECT: CSOAP, Phase II

FILE NO. 374813

CLIENT: L.S.T.

SHEET NO. 1 of 5

CONTRACTOR: Anderson Drilling, Inc.

LOCATION: Lexington & Oriole

GROUNDWATER		DEPTH TO:			CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE		
2-6-81	AM	13.0ft	6 ft		SIZE 10 in 4	1-3/8	2-1/8
2-9-81	AM	16.7ft			HAMMER WT 1b 300	140	
2-10-81	AM	16.6ft			HAMMER FALL in 30	30	

ELEVATION 495.9 ft. 497.21

DATE START 5 Feb. 1981

DATE FINISH 5 Feb. 1981

DRILLER G. Miller

INSPECTOR F. Serpe

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
			16		0.0	Medium compact black topsoil. Trace roots.
		15	6	S-1		
		14	8		2.0	
		16				
		82				- FILL -
		92				Very compact brown Silt, some fine gravel and coarse sand. TOP OF ROCK at 5.5 ft.
5	5.5	216	100.5	S-2	5.0 5.5	
						NOTE: Set casing at 6.0 ft. Used roller bit from 6.0 to 10.0 ft.

PRELIMINARY

H & A Form 100-1-81

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S — SPLIT SPOON	OVERBURDEN 5.5 ft.
4-10	LOOSE	2-4	SOFT	T — THIN WALL TUBE	ROCK —
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U — UNDISTURBED PISTON	SAMPLES 2
30-50	COMPACT	8-15	STIFF	O — OPEN END ROD	HOLE NO. LX 3
50	VERY COMPACT	15-30	VERY STIFF	W — WASH SAMPLE	

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
	2	10.0					Begin boring at 10.0 ft.
	2						Light to medium gray, fine-grained dolomitic Mudstone, very thinly color bandad.
	2						ROCHESTER SHALE
15	1.5	R-1	120	100	MOD-SEV		Moderately to severely weathered, closely to very closely spaced partings, some containing secondary gypsum seams.
	1.5		18	15			
	2						
	2						
	2				SL-MOD		
20	2	20.0					Numerous, moderately weathered high angle joints, up to 0.8 ft. long, from 10.0 to 20.6 ft.
	3						
	2.5						
	2						
	2						
25	2.5	R-2	115	96	SL-MOD		Trace vugs
	3		65	54			ROCHESTER SHALE
	3						
	3						
	3						
30	3	30.0					Healed vertical joint in thin Limestone bed at 35.2 ft.
	2.5						
	3						
	3						
	3						
35	3	R-3	112	104	SL-MOD		ROCHESTER SHALE
	3		72	64*			* RQD based on core recovered.
	3						
	3						
	3						
	3						
40	2.5	39.0					ROCHESTER SHALE
	2.5				SL		Severely weathered Shale bed from 42.2 to 42.7 ft.
	2.5	R-4	46	96			
	4	43.0	22	46	SEV		NOTE: No drill water return from 42 to 43 ft. Core barrel blocked off at 43 ft.
	10						
	10				SL		

PRELIMINARY

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
	8	R-5	110 85	102 77*	SL		<p>ROCHESTER SHALE</p> <p>Light to medium gray, fine-grained dolomitic Mudstone, very thinly color banded.</p> <p>Moderately weathered, closely spaced partings, some containing secondary gypsum seams.</p> <p>* RQD based on core recovered.</p>
	8						
	2.5						
	2						
50	2						
	2						
	2						
	3	R-6	120 65	100 54	SL		<p>ROCHESTER SHALE</p> <p>Very thin, moderately to severely weathered Shale beds at 52.7, 54.3 and 58.2 ft.</p>
	3						
	3						
	3						
55	2.5						
	3						
	3						
	3	R-7	120 86	100 72	SL		<p>ROCHESTER SHALE</p> <p>Very thin, moderately to severely weathered Shale beds at 73.1, 74.5, and 77.9 ft.</p>
	3						
	3						
	2						
60	3						
	3						
	3						
	3	R-8	119 86	99 72	SL		<p>ROCHESTER SHALE</p> <p>Trace fossils</p>
	5						
	4						
65	3.5						
	3						
	3						
	2						
	2.5	R-8	119 86	99 72	SL		<p>Dark gray mudstone from 73.4 to 102.7 ft.</p>
	3						
	3						
70	3						
	3						
	2.5						
	3						
	3	R-8	119 86	99 72	SL		<p>ROCHESTER SHALE</p> <p>Trace fossils</p>
	3						
	2.5						
75	3						
	3						
	3						
	4						
	3.5	R-8	119 86	99 72	SL		<p>Trace fossils</p>
	3.5						
	3						

PRELIMINARY

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
V. Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
V. Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

CORE BORING REPORT

GEOLOGIST Fred Amos

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
80	3.5	82.0					Dark gray, fine-grained dolomitic Mudstone. ROCHESTER SHALE
	3.5						
	3						
85	2.5	R-9	64 41	107 64*	SL		* RQD based on core recovered.
	3						
	3						
	2.5						
90	3	R-10	112 105	93 94*	SL		ROCHESTER SHALE
	3						
	3						
	3						
	3						
	3						
95	2.5	R-11	119 114	104 96*	SL	102.5	* RQD based on core recovered. Some rock cored in R-10 was recovered in R-11.
	3						
	3						
	3						
100	3	R-12	120 68	100 57	SL-MOD		IRONDEQUOIT LIMESTONE Thin, severely weathered Shale beds at 106.7, 109.6, 110.5 and 111.4 ft.
	3						
	3						
	2.5						
105	3						Light to medium gray, fine to medium-grained, fossiliferous Limestone, thin to medium-bedded. Interbedded with very thin, dark gray dolomitic Shale.
	3						
	3						
	3						
110	3						
	3						
	3						
	2.5						

PRELIMINARY

FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
1/2 Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. slight	Severe	Thin	Close	2" - 12"	90-75	Good
Med. Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
1/2 Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 1 OF 2 BORING NO. 1

PROJECT PROPOSED TRANSMISSION LINE ALONG B & O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC COMPANY, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER NO RAIN

DATE STARTED 5/6/71 COMPLETED 5/7/71 TECHNICIAN D. BARHITE

GROUND WATER - CASING IN - 18'3" AT COMPLETION 5/7 TIME _____

BELOW SURFACE CASING OUT - 6'0" AT COMPLETION 5/7 TIME _____ -WELLPOINT AT _____

PTH LOW ACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N				
		2	3	6	-	9	1	0'0"-1'6"	LOOSE SILT AND VERY FINE SAND, TRACE OF ORGANIC MATTER AND FINE GRAVEL BROWN, MOIST, NON-PLASTIC	
5'		9	18	24	-	42	2	5'0"-6'6"	BROWN, MOIST, NON-PLASTIC 5'6" COMPACT FINE TO VERY FINE SAND, TRACE OF SILT BROWN, MOIST, NON-PLASTIC	
10'		11	11	13	-	24	3	10'0"-11'6"	BROWN, MOIST, NON-PLASTIC 11'0" LOOSE TO FIRM, FINE TO VERY FINE SAND, TRACE OF SILT AND FINE ROUNDED GRAVEL GREYISH BROWN, WET, NON-PLASTIC 14'0"	
15'		36	100	-	136=12"	4	15'0"-16'0"	15'0"-16'0" RUN # 1 16'0"-20'0"	VERY DENSE, MEDIUM TO FINE SAND, LITTLE FINE ROUNDED GRAVEL, TRACE OF SILT AND SHALE FRAGMENTS GREYISH BROWN, MOIST, NON-PLASTIC 16'0" (2'1") GREY TO DARK GREY, MEDIUM HARD DOLOMITE (18 PIECES)	
20'								RUN # 2 20'0"-21'0"	(0'11") GREY TO DARK GREY DOLOMITE, SOFT MUD SEAM, AT 21'0", (7 + PIECES) 20'0"	
								RUN # 3 21'0"-25'0"	(3'4") GREY TO DARK GREY, MEDIUM HARD DOLOMITE, FEW STYLOLITIC SEAMS THROUGHOUT RUN, UPPER 8" BROKEN. (27 + PIECES) 25'0"	
25'									BORING TERMINATED AT 25'0" NOTE: CORE DRILLED FROM 16'0" TO 25'0" RUN # 1-16'0"-20'0"-2'1" RECOVERY (52%) RUN # 2-20'0"-21'0"-0'11" RECOVERY (92%) RUN # 3-21'0"-25'0"-3'4" RECOVERY (83%)	
30'										

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW.
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW.

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 2 OF 2 BORING NO. 1

PROJECT PROPOSED TRANSMISSION LINE ALONG B & O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER NO RAIN

DATE STARTED 5/6/71 COMPLETED 5/7/71 TECHNICIAN D. BARHITE

GROUND WATER - CASING IN - 18'3" AT COMPLETION 5/7 TIME _____

BELOW SURFACE CASING OUT - 6'0" AT COMPLETION 5/7 TIME _____ -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N			
35'								NOTES: ADVANCED TEST HOLE WITH HOLLOW STEM AUGERS- NO WATER INDUCED INTO TEST HOLE FOR DRILLING PURPOSES EXCEPT FOR CORE DRILLING ROCK. LOST ALL WATER AT 18'0" WHILE CORE DRILLING. AFTER PULLING TOOLS, HOLE CAVED TO 6'8". CORE DRILLED WITH (AX) 1 1/8" I.D. CORE BARREL AND DIAMOND BIT FROM 16'0" TO 25'0".	

NOTES: N = NO. OF BLOWS TO DRIVE _____ SPOON _____ WITH _____ LB. WT. _____ EA. BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852

PAGE 1 OF 2 BORING NO. 2

PROJECT PROPOSED TRANSMISSION LINE ALONG B & O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER NO RAIN

DATE STARTED 5/6/71 COMPLETED 5/7/71 TECHNICIAN R. BATZER

GROUND WATER - CASING IN - 3'3" AT COMPLETION 5/7 TIME _____

BELOW SURFACE CASING OUT - 2'0" AT COMPLETION 5/7 TIME _____ -WELLPOINT AT _____

TH OW CE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N				
5'		5	5	4	-	9	1	1'0"-2'6"	LOOSE RAILROAD FILL CONSISTING OF CINDERS, ASHES, SAND AND GRAVEL, ETC. BLACK, MOIST, NON-PLASTIC 4'6"	
		14	12	58	-	70	2	5'0"-6'6" RUN # 1	FRAGMENTED ROCK, TRACE OF FINE SAND AND SILT BROWN, WET, NON-PLASTIC 6'6"	
10'								6'6"-11'0" RUN # 2	(4'3") GREY, MEDIUM HARD DOLOMITE, UPPER 4 FEET WEATHERED, BROKEN AND SEAMS NOTED AT 43 INCHES. (20 + PIECES) 11'0"	
								11'0"-14'6" RUN # 3	(3'1") GREY TO DARK GREY, INTERBEDDED MEDIUM HARD SHALE AND DOLOMITE (14 PIECES) 14'6"	
15'								14'6"-19'0" RUN # 4	(4'7") GREY TO DARK GREY, INTERBEDDED MEDIUM HARD SHALE AND DOLOMITE, BROKEN AT 6" AND 36", LARGE CAVITY IN LOWER PORTION OF RUN (16 PIECES) 19'0"	
								19'0"-24'0" RUN # 5	(4'10") GREY TO DARK GREY, INTERBEDDED MEDIUM HARD SHALE AND DOLOMITE, FEW STYLOLITIC SEAMS AND VUGS THROUGHOUT RUN (31 PIECES) 24'0"	
20'								24'0"-25'0"	(0'10") GREY TO DARK GREY, INTERBEDDED MEDIUM HARD SHALE AND DOLOMITE, FEW STYLOLITIC SEAMS (4 PIECES) 25'0"	
									BORING TERMINATED AT 25'0" NOTE: CORE DRILLED FROM 6'6" TO 25'0" RUN # 1-6'6"-11'0"-4'3" RECOVERY (94%) RUN # 2-11'0"-14'6"-3'1" RECOVERY (88%) RUN # 3-14'6"-19'0"-4'7" RECOVERY (100%) RUN # 4-19'0"-24'0"-4'10" RECOVERY (97%) RUN # 5-24'0"-25'0"-0'10" RECOVERY (83%)	
30'										

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW.
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW.

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 2 OF 2 BORING NO. 2

PROJECT PROPOSED TRANSMISSION LINE ALONG B & O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER NO RAIN

DATE STARTED 5/6/71 COMPLETED 5/7/71 TECHNICIAN R. BATZER

GROUND WATER - CASING IN - 3'3" AT COMPLETION 5/7 TIME _____

BELOW SURFACE CASING OUT - 2'0" AT COMPLETION 5/7 TIME _____ -WELLPOINT AT _____

DEPTH BELOW FACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N			
3.5'								NOTES: ADVANCED TEST HOLE WITH HOLLOW STEM AUGERS- NO WATER INDUCED INTO TEST HOLE FOR DRILLING PURPOSES EXCEPT FOR CORE DRILLING ROCK. NO WATER LOSS WHILE CORE DRILLING. AFTER PULLING TOOLS, HOLE CAVED TO 2'4". CORE DRILLED WITH (AX) 1 1/8" I.D. CORE BARRI AND DIAMOND BIT FROM 6'6" TO 25'0".	

NOTES: N = NO. OF BLOWS TO DRIVE _____ SPOON _____ WITH _____ LB. WT. _____ EA. BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 1 OF 2 BORING NO. 3

PROJECT PROPOSED TRANSMISSION LINE ALONG B & O RAIL ROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC COMPANY, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER NO RAIN

DATE STARTED 5/13/71 COMPLETED 5/13/71 TECHNICIAN R. BATZER

GROUND WATER - CASING IN - 1'3" AT COMPLETION 5/13 TIME _____

BELOW SURFACE CASING OUT - 0'9" AT COMPLETION 5/13 TIME _____ -WELLPOINT AT _____

PTH LOW ACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N				
		3	5	7	-	12	1	1'0"-2'6"	LOOSE FINE TO VERY FINE SAND, SOME SILT BROWN, REDDISH BROWN, MOIST, NON-PLASTIC	
5'		7	-	-	7	6"	2	5'6"-6'0" RUN # 1 6'0"-11'0"	NOTE A (4'10") GREY MEDIUM HARD DOLOMITE, UPPER PORTION SLIGHTLY WEATHERED AND BROKEN, OFF HORIZONTAL SEAMS NOTED IN LOWER PORTION. (29 + PIECES)	
10'								RUN # 2 11'0"-16'0"	(4'1") GREY TO DARK GREY MEDIUM HARD DOLOMITE, STYLO- LITIC SEAMS NOTED THROUGHOUT RUN, OFF HORIZONTAL SEAMS NOTED IN LOWER PORTION (21 + PIECES)	
15'								RUN # 3 16'0"-20'6"	(3'9") GREY TO DARK GREY MEDIUM HARD DOLOMITE, SOFT MUD SEAM NOTED AT 20'6", OFF HORIZONTAL SEAMS NOTE IN UPPER PORTION OF RUN. (17 + PIECES)	
20'								RUN # 4 20'6"-25'0"	(4'3") GREY TO DARK GREY MEDIUM HARD DOLOMITE, FEW STYLOLITIC SEAMS THROUGHOUT CORE. (35 PIECES)	
25'										
30'									BORING TERMINATED AT 25'0" NOTE: CORE DRILLED FROM 6'0" TO 25'0" RUN # 1-6'0"-11'0"-4'10" RECOVERY (96%) RUN # 2-11'0"-16'0"-4'1" RECOVERY (82%) RUN # 3-16'0"-20'6"-3'9" RECOVERY (85%) RUN # 4-20'6"-25'0"-4'3" RECOVERY (94%)	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW.
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW.

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852

PAGE 1 OF 2 BORING NO. 4

PROJECT PROPOSED TRANSMISSION LINE ALONG B & O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC COMPANY, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER _____

DATE STARTED 5/11/71 COMPLETED 5/11/71 TECHNICIAN A. UTTER

GROUND WATER - CASING IN - 6'0" AT COMPLETION 5/11 TIME _____

BELOW SURFACE CASING OUT - _____ AT COMPLETION / TIME -WELLPOINT AT _____

DEPTH BLOW FACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N				
	11	7	9	11	-	20	1	0'0"-1'6"	MISCELLANEOUS FILL CONSISTING OF MEDIUM TO FINE SAND FINE ANGULAR GRAVEL, ORGANIC MATTER, ETC.	
	14								BLACK, DAMP, NON-PLASTIC 3'0"	
	21								COMPACT SILT AND FINE TO VERY FINE SAND, TRACE OF FINE GRAVEL AND FRAGMENTED ROCK	
5'	34								BROWN, DAMP, NON-PLASTIC 5'6"	
	61	51 = 5"		-	51 = 6"		2	5'0"-5'6" RUN # 1	(3'0") GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, UPPER PORTION SLIGHTLY WEATHERED	
								5'6"-10'6"	(30 PIECES)	
10'										
								RUN # 2	10'6"	
								10'6"-15'6"	(3'6") GREY TO DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE (25 PIECES)	
15'										
								RUN # 3	15'6"	
								15'6"-20'6"	(4'1") GREY TO DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE (31 PIECES)	
20'										
								RUN # 4	20'6"	
								20'6"-25'0"	(4'6") GREY TO DARK GREY, INTERBEDDED MEDIUM HARD SHALE AND DOLOMITE, SLIGHTLY BROKEN IN UPPER PORTION (27 + PIECES)	
25'										
									25'0"	
30'									BORING TERMINATED AT 25'0" NOTE: CORE DRILLED FROM 5'6" TO 25'0" RUN # 1-5'6"-10'6"-3'0" RECOVERY (60%) RUN # 2-10'6"-15'6"-3'6" RECOVERY (70%) RUN # 3-15'6"-20'6"-4'1" RECOVERY (82%) RUN # 4-20'6"-25'0"-4'6" RECOVERY (100%)	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW.
 C = NO. OF BLOWS TO DRIVE 2 1/2" CASING 12" WITH 300 LB. WT. 24" EA. BLOW.

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 2 OF 2 BORING NO. 4

PROJECT PROPOSED TRANSMISSION LINE ALONG B & O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC COMPANY, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER _____

DATE STARTED 5/11/71 COMPLETED 5/11/71 TECHNICIAN A. UTTER

GROUND WATER - CASING IN - 6'0" AT COMPLETION 5/11 TIME _____

BELOW SURFACE CASING OUT - _____ AT COMPLETION / TIME _____ -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N			
35'								NOTES: CORE DRILLED WITH (AX) 1 1/8" I.D. CORE BARREL AND DIAMOND BIT FROM 5'6" TO 25'0". NO WATER LOSS WHILE CORE DRILLING. OFFSET TEST HOLE # 4 - 5 FEET WEST.	

NOTES: N = NO. OF BLOWS TO DRIVE _____ SPOON _____ WITH _____ LB. WT. _____ EA. BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 1 OF 2 BORING NO. 5

PROJECT PROPOSED TRANSMISSION LINE ALONG B & O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER _____

DATE STARTED 5/11/71 COMPLETED 5/12/71 TECHNICIAN A. UTTER

GROUND WATER - CASING IN - AT GROUND SURFACE AT COMPLETION 5/12 TIME _____

BELOW SURFACE CASING OUT - AT COMPLETION / TIME -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N			
0'								WATER	
3'	7	9	13	-	22	1	1'0"-2'6"	1'6" SOFT TO MEDIUM SOFT SILT, LITTLE SOFT FRAGMENTED SHALE, TRACE OF CLAY	
5'	11						RUN #1 3'0"-10'0"	3'0" BROWN, WET, NON-PLASTIC	
10'							RUN #2 10'0"-16'0"	(4'0") GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, UPPER PORTION SLIGHTLY WEATHERED AND BADLY BROKEN (30 + PIECES) 10'0"	
15'							RUN #3 16'0"-25'0"	(5'10") GREY TO DARK GREY, MEDIUM HARD, INTERBEDDED SHALE AND DOLOMITE, FEW STYLOLITIC SEAMS THROUGHOUT RUN (43 PIECES) 16'0"	
20'								(8'10") GREY TO DARK GREY, MEDIUM HARD, INTERBEDDED SHALE AND DOLOMITE, FEW SMALL VUGS IN MIDDLE AND LOWER PORTION (61 PIECES)	
25'								25'0"	
30'								BORING TERMINATED AT 25'0" NOTE: CORE DRILLED FROM 3'0" TO 25'0" RUN # 1-3'0"-10'0"-4'0" RECOVERY (57%) RUN # 2-10'0"-16'0"-5'10" RECOVERY (97%) RUN # 3-16'0"-25'0"-8'10" RECOVERY (98%)	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE 2 1/2" CASING 12" WITH 300 LB. WT. 24" EA. BLOW

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 1 OF 2 BORING NO. 6

PROJECT PROPOSED TRANSMISSION LINE ALONG B & O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER _____

DATE STARTED 5/10/71 COMPLETED 5/10/71 TECHNICIAN A. UTTER

GROUND WATER - CASING IN - 2'8" AT COMPLETION 5/10 TIME _____

BELOW SURFACE CASING OUT - 2'4" AT COMPLETION 5/10 TIME _____ -WELLPOINT AT _____

DEPTH LOW FACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N				
		4	27	37	-	64	1	1'0"-2'6"	LOOSE TO COMPACT SILT AND VERY FINE SAND, SOME FRAGMENTED SHALE BROWN, MOIST, NON-PLASTIC 2'6"	
								RUN # 1	(1'5") GREY, INTERBEDDED, WEATHERED SHALE AND DOLOMITE UPPER 4 INCHES BROKEN (17 PIECES) 5'0"	
5'								RUN # 2	(3'2") GREY TO DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, VUGS NOTED AT 7.0" AND 17.0" (26 + PIECES) 8'6"	
								5'0"-8'6"		
								RUN # 3	(1'2") GREY TO DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE (10 PIECES) 10'0"	
10'								8'6"-10'0"		
								RUN # 4	(5'0") GREY TO DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, BADLY BROKEN FROM 40 TO 46 INCHES, LARGE VUGS AT END OF RUN (32 + PIECES) 15'0"	
								10'0"-15'0"		
15'								RUN # 5	(4'9") GREY TO DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, BROKEN AT 14 INCHES, VUGS AT 21 INCHES (28 + PIECES) 20'0"	
								15'0"-20'0"		
20'								RUN # 6	(4'0") GREY TO DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, BADLY BROKEN FROM 36 TO 43 INCHES (17 + PIECES) 25'0"	
								20'0"-25'0"		
25'									BORING TERMINATED AT 25'0"	
									NOTE: CORE DRILLED FROM 2'6" TO 25'0"	
									RUN # 1-2'6"-5'0"-1'5" RECOVERY (56%)	
									RUN # 2-5'0"-8'6"-3'2" RECOVERY (90%)	
									RUN # 3-8'6"-10'0"-1'2" RECOVERY (78%)	
									RUN # 4-10'0"-15'0"-5'0" RECOVERY (100%)	
									RUN # 5-15'0"-20'0"-2'8" RECOVERY (95%)	
30'									RUN # 6-20'0"-25'0"-4'0" RECOVERY (80%)	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW.
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW.

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 2 OF 2 BORING NO. 6

PROJECT PROPOSED TRANSMISSION LINE ALONG B & O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER _____

DATE STARTED 5/10/71 COMPLETED 5/10/71 TECHNICIAN A. UTTER

GROUND WATER - CASING IN - 2'8" AT COMPLETION 5/10 TIME _____

BELOW SURFACE CASING OUT - 2'4" AT COMPLETION 5/10 TIME _____ -WELLPOINT AT _____

DEPTH BELOW FACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N			
35'								NOTES: CORE DRILLED WITH (AX) 1 1/8" I.D. CORE BARREL AND DIAMOND BIT FROM 2'6" TO 25'0". ADVANCED TEST HOLE WITH HOLLOW STEM AUGER CASING-NO WATER INDUCED INTO THE TEST HOLE FOR DRILLING PURPOSES EXCEPT FOR CORE DRILLIN ROCK. NO WATER LOSS WHILE CORE DRILLING. OFFSET TEST HOLE # 6 - 5'0" WEST.	

NOTES: N = NO. OF BLOWS TO DRIVE _____ SPOON _____ WITH _____ LB. WT. _____ EA. BLOW.
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW.

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 1 OF 2 BORING NO. 7

PROJECT PROPOSED TRANSMISSION LINE ALONG B&O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER NO RAIN

DATE STARTED 5/11/71 COMPLETED 5/12/71 TECHNICIAN R. BATZER

GROUND WATER - CASING IN - 3'0" AT COMPLETION 5/12 TIME

BELOW SURFACE CASING OUT - 2'1" AT COMPLETION 5/12 TIME -WELLPOINT AT

DEPTH ELOW FACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N				
		26	13	41	-	54	1	1'0"-2'6" RUN # 1	FRAGMENTED ROCK, TRACE OF CLAY, ORGANIC MATTER AN SILT BROWN, WET, NON-PLASTIC 2'6"	
5'								2'6"-5'0" RUN # 2	(1'10") GREY, WEATHERED, INTERBEDDED SHALE AND DOLOMITE (23 + PIECES) 5'0"	
								5'0"-10'0" RUN # 3	(4'7") GREY TO DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, FEW VUGS IN CENTER AND LOWER PORTION OF RUN (38 PIECES) 10'0"	
10'								10'0"-15'0" RUN # 4	(4'11") GREY TO DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, DOLOMITE IN LOWER PORTION OF RUN, BROKEN IN UPPER PORTION (37 + PIECES) 15'0"	
15'								15'0"-20'0" RUN # 5	(4'4") GREY TO DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, SMALL VUGS IN UPPER PORTION OF RUN, SLIGHTLY BROKEN IN CENTER PORTION (25 + PIECES) 20'0"	
20'								20'0"-25'0"	(4'6") GREY TO DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, DOLOMITE IN CENTER OF RUN (23 + PIECES) 25'0"	
25'									BORING TERMINATED AT 25'0" NOTE: CORE DRILLED FROM 2'6" TO 25'0" RUN # 1-2'6"-5'0"-1'10" RECOVERY (73%) RUN # 2-5'0"-10'0"-4'7" RECOVERY (92%) RUN # 3-10'0"-15'0"-4'11" RECOVERY (98%) RUN # 4-15'0"-20'0"-4'4" RECOVERY (86%) RUN # 5-20'0"-25'0"-4'6" RECOVERY (90%)	
30'										

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 2 OF 2 BORING NO. 7

PROJECT PROPOSED TRANSMISSION LINE ALONG B&O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER NO RAIN

DATE STARTED 5/11/71 COMPLETED 5/12/71 TECHNICIAN R. BATZER

GROUND WATER - CASING IN - 3'0" AT COMPLETION 5/12 TIME

BELOW SURFACE CASING OUT - 2'9" AT COMPLETION 5/12 TIME -WELLPOINT AT

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N			
35'								NOTES: ADVANCED TEST HOLE WITH HOLLOW STEM AUGERS- NO WATER INDUCED INTO THE TEST HOLE FOR DRILLING PURPOSES EXCEPT FOR CORE DRILLING ROCK CORE DRILLED WITH (AX) 1 1/8" I.D. CORE BARREL AND DIAMOND BIT FROM 2'6" TO 25'0". NO WATER LOSS WHILE CORE DRILLING.	

NOTES: N = NO. OF BLOWS TO DRIVE _____ SPOON _____ WITH _____ LB. WT. _____ EA. BLOW.
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW.

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 1 OF 2 BORING NO. 8

PROJECT PROPOSED TRANSMISSION LINE ALONG B&O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER RAIN

DATE STARTED 5/12/71 COMPLETED 5/12/71 TECHNICIAN D. BARHITE

GROUND WATER - CASING IN - 2'0" AT COMPLETION 5/12 TIME _____

BELOW SURFACE CASING OUT - _____ AT COMPLETION / TIME _____ -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N			
		8	5	6	-	11	1	0'0"-1'6"	FILL 1'0" SOFT SILT, SOME VERY FINE SAND, LITTLE FRAGMENTED ROCK, TRACE OF CLAY BROWN, MOIST, NON-PLASTIC
5'								RUN # 1 5'0"-10'0"	(1'7") GREY TO DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, UPPER PORTION SLIGHTLY WEATHERED, DOLOMITE IN CENTER OF RUN (21 + PIECES)
10'								RUN # 2 10'0"-15'0"	(1'3") GREY TO DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, DOLOMITE LOCATED IN UPPER CENTER PORTION. (20 + PIECES)
15'								RUN # 3 15'0"-20'0"	(2'1") GREY TO DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, DOLOMITE IN UPPER PORTION OF RUN (37 + PIECES)
20'								RUN # 4 20'0"-25'0"	(2'7") GREY TO DARK GREY SHALE, MEDIUM SOFT, SLIGHTLY CALCAREOUS (MANY PIECES)
25'									25'0"
30'									BORING TERMINATED AT 25'0" NOTE: CORE DRILLED FROM 5'0" TO 25'0" RUN # 1-5'0"-10'0"-1'7" RECOVERY (32%) RUN # 2-10'0"-15'0"-1'3" RECOVERY (25%) RUN # 3-15'0"-20'0"-2'1" RECOVERY (42%) RUN # 4-20'0"-25'0"-2'7" RECOVERY (52%)

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW



ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 2 OF 2 BORING NO. 8

PROJECT PROPOSED TRANSMISSION LINE ALONG B&O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER RAIN

DATE STARTED 5/12/71 COMPLETED 5/12/71 TECHNICIAN D. BARHITE

GROUND WATER - CASING IN - 2'0" AT COMPLETION 5/12 TIME _____

BELOW SURFACE CASING OUT - _____ AT COMPLETION / TIME _____ -WELLPOINT AT _____

PTH LOW ACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N			
35'								NOTES: ADVANCED TEST HOLE WITH HOLLOW STEM AUGERS- NO WATER INDUCED INTO THE TEST HOLE FOR DRILLING PURPOSES EXCEPT FOR CORE DRILLING ROCK CORE DRILLED WITH (AX) 1 1/8" I.D. CORE BARREL AND DIAMOND BIT FROM 5'0" TO 25'0". LOST ALL WATER AT 7'0" WHILE CORE DRILLING. OFFSET TEST HOLE # 8 - 4'0" EAST. ROCK IS VERY SEAMY FROM 5'0" TO 25'0".	

NOTES: N = NO. OF BLOWS TO DRIVE _____ SPOON _____ WITH _____ LB. WT. _____ EA. BLOW.
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW.

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 1 OF 2 BORING NO. 9

PROJECT PROPOSED TRANSMISSION LINE ALONG B&O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER _____

DATE STARTED 5/12/71 COMPLETED 5/13/71 TECHNICIAN A. UTTER

GROUND WATER - CASING IN - AT GROUND SURFACE AT COMPLETION 5/13 TIME _____

BELOW SURFACE CASING OUT - AT COMPLETION / TIME -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6" 12"	12" 18"	18" 24"	N				
5'	1	1	5	12	-	17	1	0'0"-1'6"	TOPSOIL 0'6"	
	6								SOFT SILT, LITTLE SOFT PLASTIC CLAY (VARVED), TRACE C FINE ROUNDED GRAVEL	
	12								BROWN, MOIST, SLIGHTLY PLASTIC	
	21									
	26									
10'								5'0"-11'0"	RUN # 1 5'0"	
									(4'1") GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, UPPER PORTION SLIGHTLY WEATHERED (43 + PIECES)	
15'								11'0"-16'0"	RUN # 2 11'0"	
									(3'2") GREY TO DARK GREY, MEDIUM HARD, INTERBEDDED SHALE AND DOLOMITE, BADLY BROKEN IN CENTER PORTION OF RUN (22 + PIECES)	
20'								16'0"-25'0"	RUN # 3 16'0"	
									(8'6") GREY TO DARK GREY, MEDIUM HARD, INTERBEDDED SHALE AND DOLOMITE (30 PIECES)	
25'								25'0"	BORING TERMINATED AT 25'0"	
									NOTE: CORE DRILLED FROM 5'0" TO 25'0"	
									RUN # 1-5'0"-11'0" -4'1" RECOVERY (68%)	
									RUN # 2-11'0"-16'0"-3'2" RECOVERY (63%)	
									RUN # 3-16'0"-25'0"-8'6" RECOVERY (94%)	
30'										

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW.
C = NO. OF BLOWS TO DRIVE 2 1/2" CASING 12" WITH 300 LB. WT. 24" EA. BLOW.

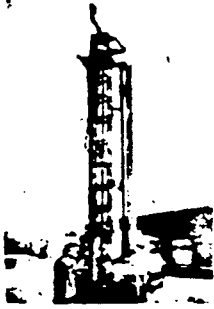
ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS



PROJECT NO. 2852 PAGE 2 OF 2 BORING NO. 9

PROJECT PROPOSED TRANSMISSION LINE ALONG B&O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER _____

DATE STARTED 5/12/71 COMPLETED 5/13/71 TECHNICIAN A. UTTER

GROUND WATER - CASING IN - AT GROUND SURFACE AT COMPLETION 5/13 TIME _____

BELOW SURFACE CASING OUT - AT COMPLETION / TIME -WELLPOINT AT _____

DEPTH LOW FACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N			
35'								NOTES: CORE DRILLED WITH (AX) 1 1/8" I.D. CORE BARREL AND DIAMOND BIT FROM 5'0" TO 25'0". LOST 50% OF WATER AT 10'0" WHILE CORE DRILLING. OFFSET TEST HOLE # 9 - 5'0" SOUTHEAST.	

NOTES: N = NO. OF BLOWS TO DRIVE _____ SPOON _____ WITH _____ LB. WT. _____ EA. BLOW.
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW.

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 1 OF 2 BORING NO. 10

PROJECT PROPOSED TRANSMISSION LINE ALONG B&O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER NO RAIN

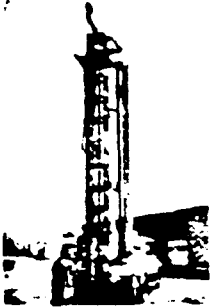
DATE STARTED 5/10/71 COMPLETED 5/11/71 TECHNICIAN D. BARHITE

GROUND WATER - CASING IN - 6'0" AT COMPLETION 5/11 TIME _____

BELOW SURFACE CASING OUT - _____ AT COMPLETION / TIME _____ -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N			
		2	5	8	-	13	1	0'0"-1'6"	RAILROAD FILL 0'6"
									LOOSE FINE TO VERY FINE SAND, SOME SILT BROWN, DAMP, NON-PLASTIC 3'0"
5'									
		13	12	16	-	28	2	5'0"-6'6"	FIRM FINE TO VERY FINE SAND, TRACE OF SILT REDDISH BROWN, WET, NON-PLASTIC
10'								RUN # 1 9'0"-11'0"	9'0" (1'1") GREY TO DARK GREY, MEDIUM HARD DOLOMITE, WEATHERED UPPER 2 INCHES, MUD SEAM AT 11'0"
								RUN # 2 11'0"-14'0"	11'0" (11 + PIECES)
									(0'11") GREY TO DARK GREY, MEDIUM HARD DOLOMITE, FEW STYLOLITIC SEAMS THROUGHOUT RUN (12 + PIECES)
15'								RUN # 3 14'0"-16'6"	14'0" (1'4") GREY TO DARK GREY, MEDIUM HARD DOLOMITE
								RUN # 4 16'6"-21'6"	16'6" (16 + PIECES)
									(1'7") GREY TO DARK GREY, MEDIUM HARD DOLOMITE, LOWER PORTION BADLY BROKEN (10 + PIECES)
20'								RUN # 5 21'6"-25'0"	21'6" (2'5") GREY TO DARK GREY, MEDIUM HARD DOLOMITE, FEW STYLOLITIC SEAMS THROUGHOUT RUN (18 PIECES)
									25'0"
25'									BORING TERMINATED AT 25'0"
									NOTE: CORE DRILLED FROM 9'0" TO 25'0" RUN # 1-9'0"-11'0"-1'1" RECOVERY (54%) RUN # 2-11'0"-14'0"-0'11" RECOVERY (31%) RUN # 3-14'0"-16'6"-1'4" RECOVERY (53%) RUN # 4-16'6"-21'6"-1'7" RECOVERY (32%) RUN # 5-21'6"-25'0"-2'5" RECOVERY (69%)
30'									

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW.
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW.



ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 2 OF 2 BORING NO. 10

PROJECT PROPOSED TRANSMISSION LINE ALONG B&O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER NO RAIN

DATE STARTED 5/10/71 COMPLETED 5/11/71 TECHNICIAN D. BARHITE

GROUND WATER - CASING IN - 6'0" AT COMPLETION 5/11 TIME _____

BELOW SURFACE CASING OUT - _____ AT COMPLETION / TIME _____ -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N				
35'									NOTES: ADVANCED TEST HOLE WITH HOLLOW STEM AUGERS- NO WATER INDUCED INTO TEST HOLE FOR DRILLING PURPOSES EXCEPT FOR CORE DRILLING ROCK. CORE DRILLED WITH (AX) 1 1/8" I.D. CORE BARREL AND DIAMOND BIT FROM 9'0" TO 25'0". MANY SEAMS NOTED IN RUN # 2 AND RUN #5. 9 INCH SEAM NOTED FROM 10'0" TO 10'9". LOST ALL WATER AT 10'0" WHILE CORE DRILLING.	

NOTES: N = NO. OF BLOWS TO DRIVE _____ SPOON _____ WITH _____ LB. WT. _____ EA. BLOW.
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW.

ROCHESTER DRILLING CO., INC.

961 LYELL AVE. / ROCHESTER, N.Y. 14606

SUBSURFACE GEOLOGICAL INVESTIGATIONS

716-458-0821

SOIL BORINGS • AUGER BORINGS • ROCK CORING • PROBES • DEEP WATER DRILLING • COMPACTION CONTROL
 SIEVE ANALYSES • MOISTURE CONTENTS • LIQUID AND PLASTIC LIMITS • CHEMICAL ANALYSES • TESTS PITS
 WATER OBSERVATION WELLS, 30"-72" DIA. HOLES, GEOLOGIC AND PRELIMINARY REPORTS, FOUNDATION BORINGS

PROJECT NO. 2852 PAGE 1 OF 1 BORING NO. 11

PROJECT PROPOSED TRANSMISSION LINE ALONG B&O RAILROAD, ROCHESTER, NEW YORK

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR MR. SABERNICK WEATHER _____

DATE STARTED 5/7/71 COMPLETED 5/7/71 TECHNICIAN A. UTTER

GROUND WATER - CASING IN - 13'0" AT COMPLETION 5/7 TIME _____

BELOW SURFACE CASING OUT - _____ AT COMPLETION / TIME _____ -WELLPOINT AT _____

PTH -OW ICE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N				
5'	10	8	6	5	-	11	1	0'0"-1'6"	TOPSOIL 0'2" MISCELLANEOUS FILL CONSISTING OF SAND, GRAVEL, ORGANIC MATTER, ASPHALT, ETC. BLACK, DAMP, NON-PLASTIC 3'0"	
	8									
	15									
	21									
10'	52							5'0"-6'6"	COMPACT SILT, SOME MEDIUM TO FINE SAND, LITTLE FINE ANGULAR GRAVEL BROWN, MOIST, NON-PLASTIC	
	15	21	15	12	-	27	2			
	17									
	19									
15'	21							10'0"-11'6"	BROWN, MOIST, NON-PLASTIC	
	15	9	11	11	-	22	3			
	22									
	36									
20'	51							13'6"		
	54							15'0"-16'6"	COMPACT TO DENSE, MEDIUM TO FINE SAND, SOME SILT, LITTLE FINE ANGULAR AND ROUNDED GRAVEL BROWN, WET, NON-PLASTIC	
	39	18	24	31	-	55	4			
	47									
25'	54							20'0"		
	71							20'0"-20'6"	FRAGMENTED ROCK GREY, WET, NON-PLASTIC 20'6"	
	73=67	72	-	-	-	72=6"	5	20'0"-20'6" RUN # 1	(4'0") DARK GREY, INTERBEDDED, MEDIUM HARD SHALE AND DOLOMITE, FEW SMALL VUGS THROUGHOUT RUN (41 PIECES)	
	82							20'6"-25'0"		
30'									25'0"	
									BORING TERMINATED AT 25'0"	
									NOTE: CORE DRILLED FROM 20'6" TO 25'0"	
									RUN # 1-20'6"-25'0"-4'0" RECOVERY (89%) NOTES: CORE DRILLED WITH (AX) 1 1/8" I.D. CORE BARREL AND DIAMOND BIT FROM 20'6" TO 25'0" NO WATER LOSS WHILE CORE DRILLING. OFFSET TEST HOLE # 11 - 1'6" NORTH.	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW.
 C = NO. OF BLOWS TO DRIVE 2 1/2" CASING 12" WITH 300 LB. WT. 24" EA. BLOW.

Seals in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Wash.	Stress Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
15							Begin coring at 17.5 ft.
	6	17.5					Reddish brown, fine-grained, thin to medium-bedded Sandstone. Trace light greenish gray mottling.
20	6	R-1	78/52	100/67	MOD		QUEENSTON SHALE
	6						Moderately weathered closely spaced partings from 17.5 to 22.4 ft.
	6						
	6						
	13						24.0
25	8	R-2	115/89	96/74	SL		Moderately weathered high angle joints from 18.5 to 18.7 ft., 19.7 to 19.9 ft. and 21.0 to 21.4 ft.
	7						QUEENSTON SHALE
	6						Moderately to severely weathered high angle and vertical joints, and broken Sandstone, from 22.3 to 24.0 ft.
	5						
	3						
30	4	R-3	120/77	100/64	MOD-SEV		High angle crack from 25.7 to 25.9 ft.
	4						
	3						
	3						
	3						34.0
35	5	R-4	116/114	97/95	SL		Twelve close low angle joints with trace slickensides from 26.0 to 31.1 ft. High angle joint from 32.1 to 32.3 ft.
	8						Severely weathered, iron-stained parting at 32.7 ft.
	8						QUEENSTON SHALE
	8						Severely weathered, high angle joint and broken Sandstone from 33.4 to 34.1 ft.
	6						
	6						
	2						
	4						
	3						
	3	44.0					Moderately to severely weathered thin zones of high angle joints and broken Sandstone from 34.6 to 44.0 ft.
							QUEENSTON SHALE
							Moderately weathered shaly parting at 44.9 ft. Rough, high angle joint from 49.1 to 49.4 ft.

#14

ROUNDS	WEATHERING		BEDDING/JOINT SPACING			RQD	
Do not scratch rough cut, rough epoxy rough rough	1. Fresh 2. Slight 3. Moderate	Mod. Severe Severe V. Severe Complete	V. thin Thin Medium Thick V. thick	V. Close Close Mod. Close Wide V. wide	< 2" 2" - 12" 12" - 36" 36" - 120" > 120"	> 90% 90-75 75-50 50-25 < 25	Excellent Good Fair Poor V. Poor

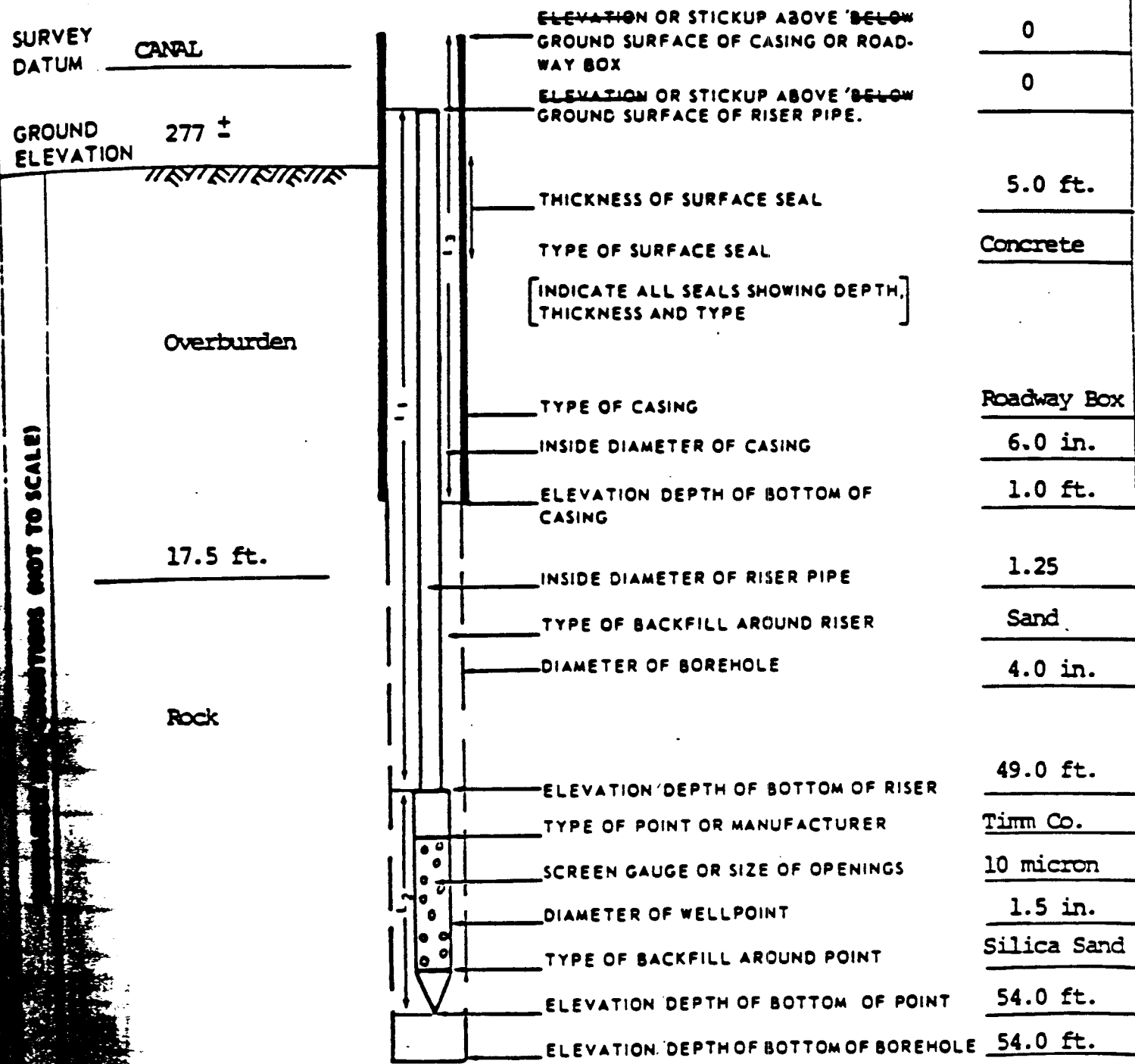
Sonde in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Wash.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
50	4	R-4 54.0			SL		Reddish brown, fine-grained, thin to medium-bedded Sandstone. Trace light greenish gray mottling. QUEENSTON SHALE. Severely weathered, iron-stained horizontal joint at 51.5 ft. Rough, high angle joint from 51.7 to 51.8 ft.
	5						
	5						
	6						
55							Bottom of Boring at 54.0 ft.

HARDNESS	WEATHERING		BEDDING/JOINT SPACING			RQD	
Can't scratch scratches diff. scratches easily smooth rough	Fresh V. slight Slight Moderate	Mod. Severe Severe V. Severe Complete	V. thin Thin Medium Thick V. thick	V. Close Close Mod. Close Wide V. wide	< 2" 2" - 12" 12" - 36" 36" - 120" > 120"	> 90% 90-75 75-50 50-25 < 25	Excellent Good Fair Poor

GROUND WATER OBSERVATION WELL REPORT

PROJECT: RG & E Station No. 5 Tunnel
 LOCATION: Rochester, NY
 CLIENT: Rochester Gas & Electric Corp.
 CONTRACTOR: Anderson Drilling Co. Inc.
 DRILLER: J. Jensen INSPECTOR: F. Serpe
 INSTALLATION DATE 14 Jan. 81

FILE NO. 741310
 WELL NO. OW 101
 BORING NO. B 101 (RGE)
 LOCATION see plan
 SHEET 1 OF 2



[FIGURES REFER TO: EL. _____ DEPTH X]

$$\left[\begin{array}{l} 49.0 \text{ ft.} \\ \text{LENGTH OF RISER PIPE (L}_1\text{)} \end{array} \right] + \left[\begin{array}{l} 5.0 \text{ ft.} \\ \text{LENGTH OF POINT (L}_2\text{)} \end{array} \right] = \left[\begin{array}{l} 54.0 \text{ ft.} \\ \text{PAY LENGTH} \end{array} \right]$$

CORE BORING REPORT

No.	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Worth.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
			in.	%			
							Begin coring at 36.3 ft.
		36.3					
		R-1	$\frac{39}{32}$	$\frac{93}{77}$	SL		Light gray, fine to medium-grained, thick-bedded Sandstone.
		39.8					THOROLD SANDSTONE
					SL	40.9	
		R-2	$\frac{112}{111}$	$\frac{101}{99}$ *	SL		Reddish brown, fine to medium-grained, thin to medium-bedded Sandstone, trace light gray mottling. Very closely to moderately closely spaced argillaceous partings. GRIMSEY SANDSTONE Severely weathered shaly parting at 43.8 ft.
		49.0					
		R-3	$\frac{120}{115}$	$\frac{100}{88}$	SL		Moderately weathered shaly partings at 52.6 and 53.7 ft. Rough, severely weathered vertical joint and broken rock from 55.0 to 55.2 ft. GRIMSEY SANDSTONE Pink and light gray mottled, fine-grained Sandstone from 55.2 to 63.5 ft.
		59.0					
			$\frac{99}{95}$	$\frac{103}{96}$ *	SL		Severely weathered shaly partings at 61.2, 61.6, 61.8 and 65.2 ft. GRIMSEY SANDSTONE Light reddish brown, fine to medium-grained Sandstone with trace light gray mottling from 63.5 to 67.0 ft. Trace cross-bedding.
							* RQD based on core recovered.
							Bottom of Boring at 67.0 ft. Observation well installed in completed borehole.
		WEATHERING		BEDDING/JOINT SPACING		RQD	
		V. Fresh V. Slight	Mod. Severe	V. Thin Thin	V. Close Close	< 2"	> 90%

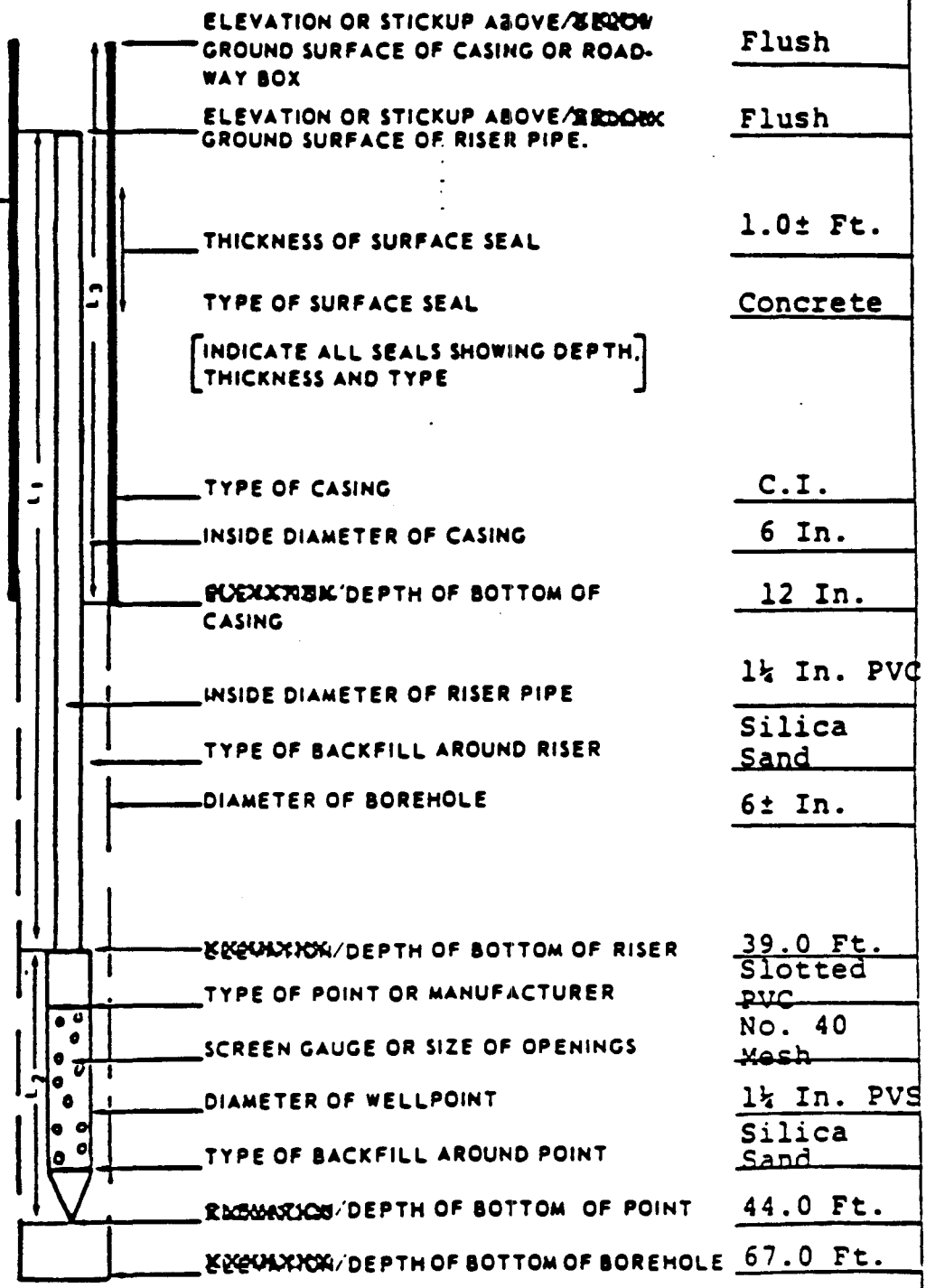
PROJECT: St. Paul Boulevard Interceptor
 LOCATION: Rochester, New York
 CLIENT: O'Brien & Gere
 CONTRACTOR: Rochester Drilling Co., Inc.
 DRILLER: J. Ripley INSPECTOR: CWE
 INSTALLATION DATE 7/11/80

FILE NO. 7399
 WELL NO. OW101 (St.P.)
 BORING NO. B101
 LOCATION West Side-Middle Falls Area
 SHEET 1 OF 2

SURVEY DATUM Rochester City

GROUND ELEVATION 383.9

See Test Boring Log



[FIGURES REFER TO: EL. _____ DEPTH _____ X]

$$\left[\frac{\text{Ft.}}{\text{OF CASING } L_2} \right] \left[\frac{39.0 \text{ Ft.}}{\text{LENGTH OF RISER PIPE } (L_1)} + \frac{5.0 \text{ Ft.}}{\text{LENGTH OF POINT } (L_2)} \right] = \frac{44.0 \text{ Ft.}}{\text{PAY LENGTH}}$$

PROJECT: RG & E Station 5 Intake Tunnel
 CLIENT: Rochester Gas and Electric Corp.
 CONTRACTOR: Anderson Drilling Co., Inc.

FILE NO. 741310
 SHEET NO. 1 of 5
 LOCATION: _____
 ELEVATION: 393+
 DATE START: 1/15/81
 DATE FINISH: 1/15/81
 DRILLER: J. Jensen
 INSPECTOR: F.M. Serpe

GROUNDWATER		DEPTH TO			CASING	SAMPLER	CORE BARREL
DATE	TIME	WATER	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE		
					SIZE		
					NUMBER OF		
					WAGERS FALL		

DEPTH - FEET	STRATA CHANGE	CASING BLOW PER FOOT	SAMPLER BLOW PER FEET	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5						SOIL OVERBURDEN to 21.5 ft. TOP OF ROCK
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
21.5						

BLOWS FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-2	VERY LOOSE	0-2	VERY SOFT	1 - SPLIT SPOON	OVERBURDEN = <u>21.5 ft.</u>
2-4	LOOSE	2-4	SOFT	7 - THIN WALL TUBE	ROCK = <u>128.5 ft.</u>
4-8	MEDIUM COMPACT	4-8	MEDIUM STIFF	U - UNSTUCCED PISTON	SAMPLES _____
8-15	COMPACT	8-15	STIFF	0 - OPEN END SOO	HOLE NO. <u>B 102 (RGE)</u>
15-30	VERY COMPACT	15-30	VERY STIFF	0 - SOIL SAMPLE	

CORE BORING REPORT

Scale in Feet	Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Worth.	Screen Change Tests	FIELD CLASSIFICATION AND REMARKS
			m.	%			
20							Begin coring at 21.5 ft.
	3	R-1	85/55	101/65*	SL-MOD		Light to medium gray, fine to medium-grained thin bedded, fossiliferous dolomitic Limestone, interbedded with dark gray, very thin, closely to very closely spaced dolomitic Shale. Trace stylolites. REYNALDES LIMESTONE * RQD based on core recovered. Closely to very closely spaced, moderately weathered partings from 21.5 to 34.9 ft. Severely weathered shaly parting at 22.9 ft. Severely weathered Limestone from 23.7 to 24.1 ft. Severely weathered clayey Shale and very thin, very closely spaced Limestone beds from 25.2 to 27.0 ft. Medium gray, fine-grained Siltstone from 31.3 to 31.9 ft. Thin, severely weathered shale beds at 30.3 and 32.4 ft. 32.9 Red, medium-grained, oolitic, fossiliferous 33.3 FURNACEVILLE MEMBER, hematitic Limestone. Severely weathered Shale and 0.2 ft. vertical joint at 34.2 ft. Severely weathered Shale and thin Limestones from 35.3 to 36.0 ft.
	4				SEV		
25	3				SL		
	4				SEV		
	4	SL-MOD					
	4	R-2	99/46	100/51	SL-MOD		
	3				SL-MOD		
30	4				SL-MOD		
	3				SL-MOD		
	4	R-3	119/85	99/71	SL-MOD		
	3				SL-MOD		
35	4				SEV		
	4				SEV		
	3	R-4	58/42	100/72	SL-MOD		
	4				SEV		
	5				SEV		
	6				SEV		
	6					36.0	MAPLEWOOD SHALE Severely weathered partings at 36.0 to 36.2 ft. Smooth, low angle joint from 36.5 to 36.6 ft. Moderately weathered parting at 37.3 ft. Rough, high angle joint from 38.5 to 38.7 ft. MAPLEWOOD SHALE Severely weathered low angle joint at 40.6 ft. Two very close, low angle shears at 46.6 ft. Severely weathered parting at 47.3 and 47.6 ft. Rough, high angle joint from 48.5 to 48.8 ft. Smooth, low angle joint at 49.0 ft. Severely weathered zones from 50.2 to 50.5 ft. and 52.0 to 52.9 ft. Smooth high angle joint from 53.0 to 53.2 ft. Severely weathered vertical joint from 53.2 to 53.3 ft.
	6					53.3	Light gray, fine to medium-grained, thick-bedded THOROLD SANDSTONE Sandstone.

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
<ul style="list-style-type: none"> white can't scratch scratches gilt scratches easily scratches smooth 	Fresh v. slight slight moderate	Mod. Severe Severe v. Severe Complete	v. thin Thin Medium Thick v. Close Close Mod. Close Wide < 2" 2" - 12" 12" - 36" 36" - 120" > 90% 90-75 75-50 50-25 Excellent Good Fair Poor

Sonde in Feet	Drill Rate Min. per Feet	Core No. Depth Range	RECOVERY RQD		Graded Log Weath.	Strata Change Type	FIELD CLASSIFICATION AND REMARKS
			in.	%			
125	4	R-11 128.5			SL	<p>Reddish brown, fine-grained, thin to medium-bedded Sandstone, trace light gray to greenish gray, very thin, closely spaced Limestone beds.</p> <p>QUEENSTON SHALE</p> <p>Smooth, low angle joint at 125.1 ft.</p>	
	4						
	4						
	4						
130	8	R-12 136.5			MOD-SEV	<p>Moderately to severely weathered Sandstone with very closely spaced argillaceous partings from 128.5 to 129.7 ft.</p> <p>QUEENSTON SHALE</p> <p>Severely weathered shaly partings at 132.3, 132.8, 133.4 and 136.6 ft.</p> <p>*RQD based on core recovered.</p>	
	4						
	4						
	5.5						
	5.5		112/85	117/76*	SL		
135	4.5	R-13 146.5				<p>QUEENSTON SHALE</p> <p>Severely weathered shaly parting at 142.9 ft.</p>	
	4.5						
	3.5						
	5						
140	4	R-14 150.0			SL	<p>QUEENSTON SHALE</p> <p>Seven low angle, trace slickensided joints or shears from 146.8 to 148.5 ft.</p>	
	3		122/122	102/100*			
	4						
	2						
	2						
145	3.5	R-14 150.0			SL-MOD	<p>Bottom of Boring at 150.0 ft.</p> <p>Observation well installed in completed borehole.</p>	
	3.5		44/41	105/93*			
	6				SL		

WEATHERING	BEDDING/JOINT SPACING	RQD
From V. slight	V. IRM Thin	> 90%
Mod. Severe Severe	V. Close Close	90-75
	< 2" 2" - 12"	Excellent Good

GROUND WATER OBSERVATION WELL REPORT

PROJECT: RG & E Station 5 Tunnel
 LOCATION: Rochester, N.Y.
 CLIENT: Rochester Gas & Electric Corp.
 CONTRACTOR: Anderson Drilling Co. Inc.
 DRILLER: J. Jenson INSPECTOR: F. Serpe
 INSTALLATION DATE 19 Jan. 81

FILE NO. 741310
 WELL NO. OW 102
 BORING NO. B 102 (RGE)
 LOCATION See plan
 SHEET 1 OF 2

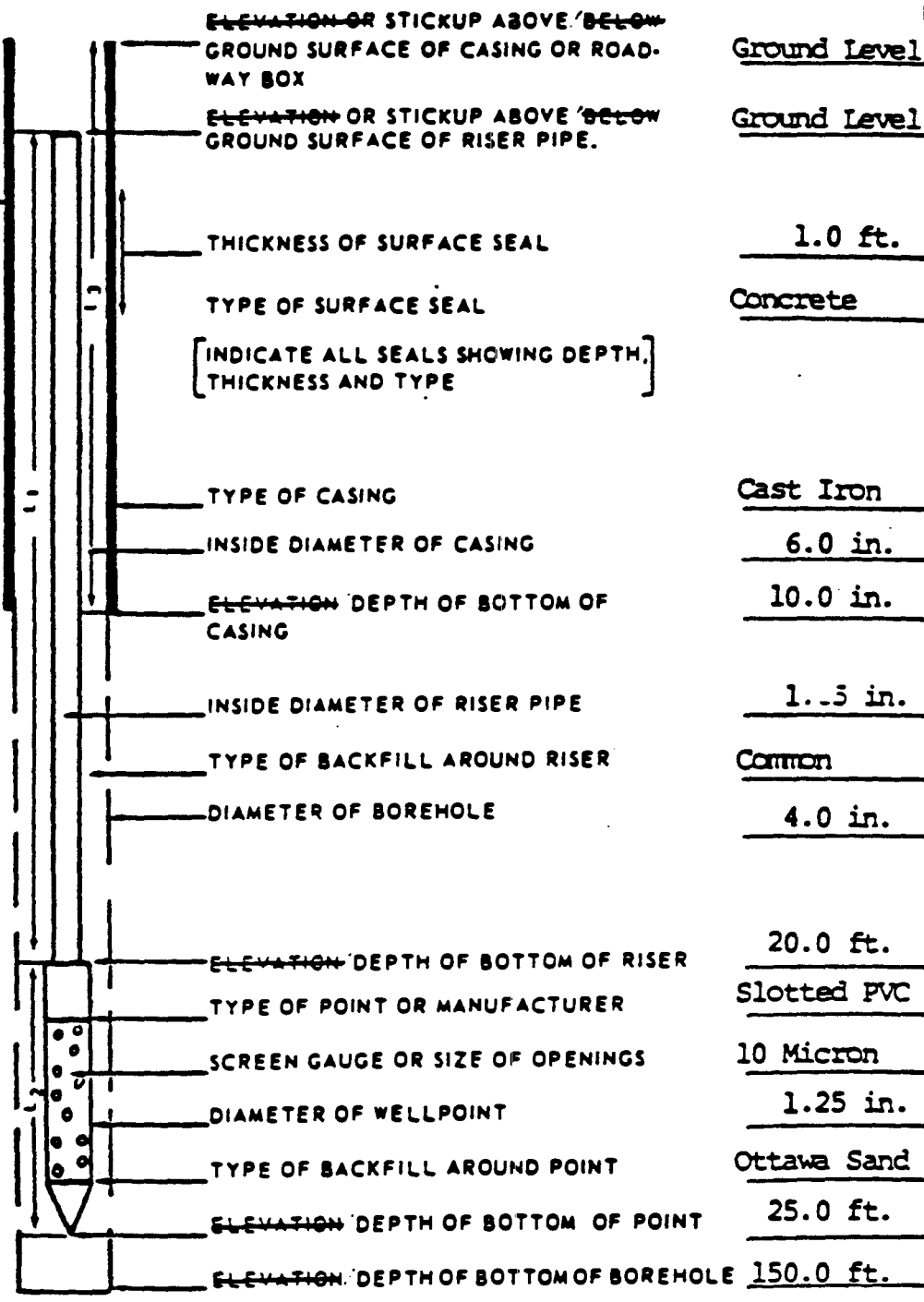
SURVEY DATUM CANAL

GROUND ELEVATION 393 ±

NOT TO SCALE

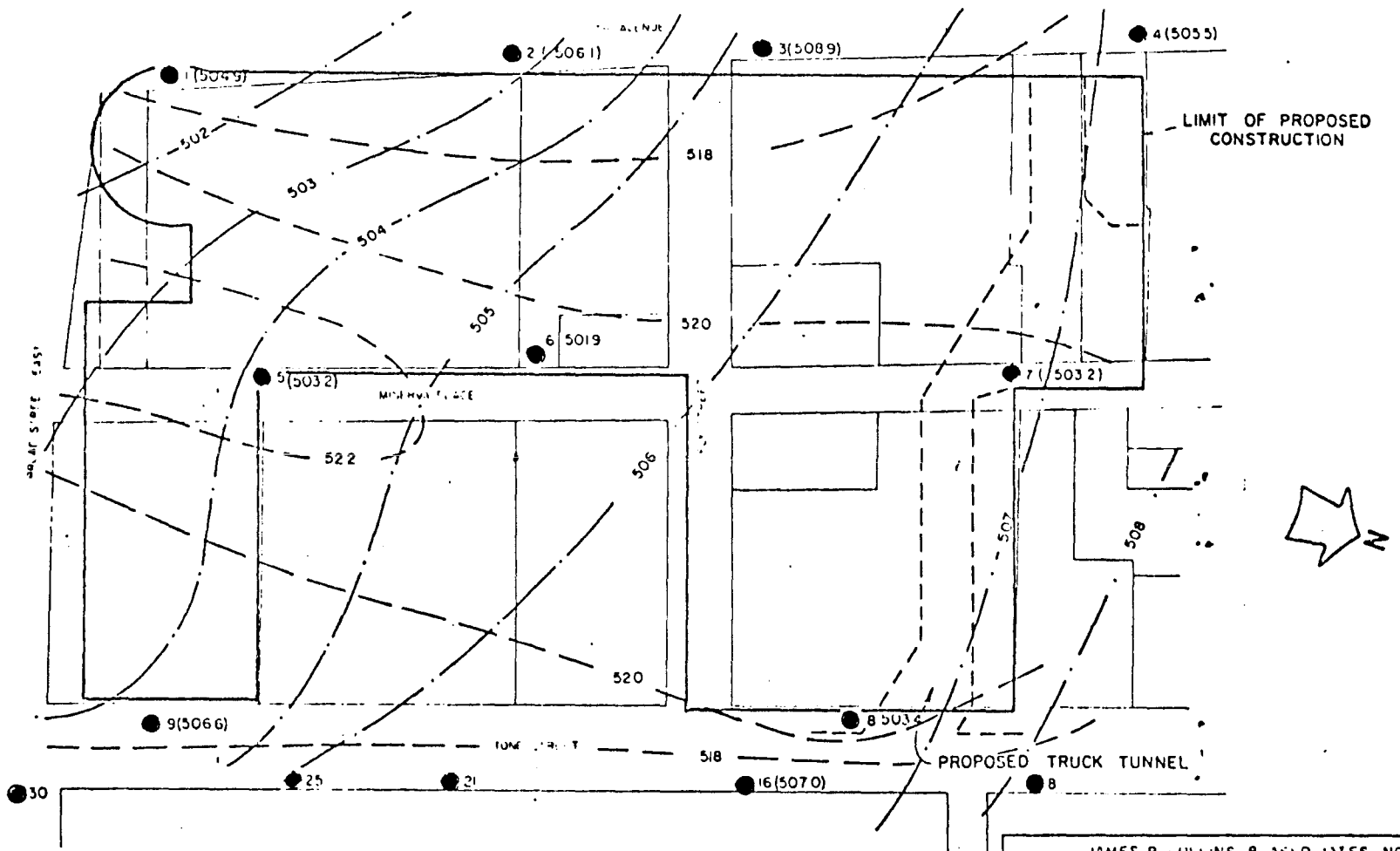
Overburden

21.5 ft.



[FIGURES REFER TO: EL. _____ DEPTH X]

20.0 ft. + 5.0 ft. = 25.0 ft.
 LENGTH OF RISER PIPE



LEGEND

- 19-5073 GROUNDWATER ELEVATION
- TOP OF GLACIAL TILL
- · - · - TOP OF ROCK

JAMES P. CULLINS & ASSOCIATES, INC.

ESTIMATED TILL AND ROCK CONTOURS
CROSSROADS SOUTH GARAGE
ROCHESTER, NY

DATE: 10/15/87	BY: BS	FIGURE 3
----------------	--------	----------

FROM LEGGETTE, 1935

RECORD OF WELLS AND ANALYSES IN HUNTER COUNTY, N. Y.
RECEIPTS TEST QUADRANGLE (CONT.)

Well No.	Location	Owner	DESCRIPTION					CHEMICAL ANALYSIS (PARTS PER MILLION)											
			Surface Elev.	Type of Well	Depth of Well (ft.)	Man. Depth to Head (ft.)	Water bear- ing test	Temp.	Total Solids (Ca. + Mg.)	Calcium (Ca.)	Magnesium (Mg.)	Sodium (Na.)	Potassium (K.)	Chloride (Cl.)	Sulfate (SO ₄)	Iron (Fe.)	Phosphate (P ₂ O ₅)	Fluoride (F.)	
0187	Holland Road	J. Brin	420	Drilled	52	0	17	Quam.-Med.											
0188	do.	A. Decker	420	Drilled	38.4	0		Quam.											
0189	do.	C. B. McDowell	420	Drilled	38	0		Quam.-Med.											
0190	do.	F. Liscomb	420	Drilled	16	0		Quam.											
0191	do.	do.	420	Drilled		0		Quam.											
0192	do.	U. Wolf	422	Drilled	17	0		Quam.											
0193	do.	do.	422	Drilled	0	0		Quam.											
0194	Latican Road	A. Deval	420	Drilled	0	0		Quam.											
0195	do.	Mrs. B. Wollard	420	Drilled		0		Quam.											
0196	do.	W. B. Hayes	420	Drilled	0	0		Quam.											
0197	St. Paul Road	L. Verrier	382	Drilled		0		Quam.											
0198	do.	J. Verrier	382	Drilled		0		Quam.											
0199	do.	J. Croft	382	Drilled	7.3	0		Quam.											
0200	do.	do.	382	Drilled	0	0		Quam.											
0201	do.	do.	382	Drilled	0	0		Quam.											
0202	do.	P. Erbe	382	Drilled	0	0		Quam.											
0203	do.	do.	382	Drilled	0	0		Quam.											
0204	do.	C. W. Hupp	310	Drilled	13	0		Quam.											
0205	do.	do.	310	Drilled	0	0		Quam.											
0206	do.	do.	310	Drilled	0	0		Quam.											
0207	do.	do.	310	Drilled	0	0		Quam.											
0208	do.	do.	310	Drilled	0	0		Quam.											
0209	do.	do.	310	Drilled	0	0		Quam.											
0210	do.	do.	310	Drilled	0	0		Quam.											
0211	do.	do.	310	Drilled	0	0		Quam.											
0212	do.	do.	310	Drilled	0	0		Quam.											
0213	do.	do.	310	Drilled	0	0		Quam.											
0214	do.	do.	310	Drilled	0	0		Quam.											
0215	do.	do.	310	Drilled	0	0		Quam.											
0216	do.	do.	310	Drilled	0	0		Quam.											
0217	do.	do.	310	Drilled	0	0		Quam.											
0218	do.	do.	310	Drilled	0	0		Quam.											
0219	do.	do.	310	Drilled	0	0		Quam.											
0220	do.	do.	310	Drilled	0	0		Quam.											
0221	do.	do.	310	Drilled	0	0		Quam.											
0222	do.	do.	310	Drilled	0	0		Quam.											
0223	do.	do.	310	Drilled	0	0		Quam.											
0224	do.	do.	310	Drilled	0	0		Quam.											
0225	do.	do.	310	Drilled	0	0		Quam.											
0226	do.	do.	310	Drilled	0	0		Quam.											
0227	do.	do.	310	Drilled	0	0		Quam.											
0228	do.	do.	310	Drilled	0	0		Quam.											
0229	do.	do.	310	Drilled	0	0		Quam.											
0230	do.	do.	310	Drilled	0	0		Quam.											
0231	do.	do.	310	Drilled	0	0		Quam.											
0232	do.	do.	310	Drilled	0	0		Quam.											
0233	do.	do.	310	Drilled	0	0		Quam.											
0234	do.	do.	310	Drilled	0	0		Quam.											
0235	do.	do.	310	Drilled	0	0		Quam.											
0236	do.	do.	310	Drilled	0	0		Quam.											
0237	do.	do.	310	Drilled	0	0		Quam.											
0238	do.	do.	310	Drilled	0	0		Quam.											
0239	do.	do.	310	Drilled	0	0		Quam.											
0240	do.	do.	310	Drilled	0	0		Quam.											
0241	do.	do.	310	Drilled	0	0		Quam.											
0242	do.	do.	310	Drilled	0	0		Quam.											
0243	do.	do.	310	Drilled	0	0		Quam.											
0244	do.	do.	310	Drilled	0	0		Quam.											
0245	do.	do.	310	Drilled	0	0		Quam.											
0246	do.	do.	310	Drilled	0	0		Quam.											
0247	do.	do.	310	Drilled	0	0		Quam.											
0248	do.	do.	310	Drilled	0	0		Quam.											
0249	do.	do.	310	Drilled	0	0		Quam.											
0250	do.	do.	310	Drilled	0	0		Quam.											
0251	do.	do.	310	Drilled	0	0		Quam.											
0252	do.	do.	310	Drilled	0	0		Quam.											
0253	do.	do.	310	Drilled	0	0		Quam.											
0254	do.	do.	310	Drilled	0	0		Quam.											
0255	do.	do.	310	Drilled	0	0		Quam.											
0256	do.	do.	310	Drilled	0	0		Quam.											
0257	do.	do.	310	Drilled	0	0		Quam.											
0258	do.	do.	310	Drilled	0	0		Quam.											
0259	do.	do.	310	Drilled	0	0		Quam.											
0260	do.	do.	310	Drilled	0	0		Quam.											
0261	do.	do.	310	Drilled	0	0		Quam.											
0262	do.	do.	310	Drilled	0	0		Quam.											
0263	do.	do.	310	Drilled	0	0		Quam.											
0264	do.	do.	310	Drilled	0	0		Quam.											
0265	do.	do.	310	Drilled	0	0		Quam.											
0266	do.	do.	310	Drilled	0	0		Quam.											
0267	do.	do.	310	Drilled	0	0		Quam.											
0268	do.	do.	310	Drilled	0	0		Quam.											
0269	do.	do.	310	Drilled	0	0		Quam.											
0270	do.	do.	310	Drilled	0	0		Quam.											
0271	do.	do.	310	Drilled	0	0		Quam.											
0272	do.	do.	310	Drilled	0	0		Quam.											
0273	do.	do.	310	Drilled	0	0		Quam.											
0274	do.	do.	310	Drilled	0	0		Quam.											
0275	do.	do.	310	Drilled	0	0		Quam.											
0276	do.	do.	310	Drilled	0	0		Quam.											
0277	do.	do.	310	Drilled	0	0		Quam.											
0278	do.	do.	3																



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

961 Lyell Avenue • Rochester, New York 14606
716-458-0821

PROJECT NO. 1355 PAGE 1 OF 2 BORING NO. B-1

PROJECT SUBSURFACE INVESTIGATIONS, 115-KV. LINE, STATION 7-48
 CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, 89 EAST AVENUE, ROCHESTER, NEW YORK
 ELEVATION 520' INSPECTOR _____ WEATHER _____
 DATE STARTED 4/17/74 COMPLETED 4/17/74 TECHNICIAN R. BATZER
 GROUND WATER - CASING IN - 6'5" AT COMPLETION 4/7 TIME _____
 BELOW SURFACE - CASING OUT - 2'6" 4/7/74 -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N			
0'								RAILROAD FILL AND BROWN WET MEDIUM TO FINE SAND, LITTLE SILT, COARSE TO FINE GRAVEL 3'10"	
5'								VERY DENSE GRAY TO BROWN SATURATED ROCK FRAGMENTS, LITTLE SILT AND FINE SAND 6'0"	
5'		150				150	1	5'0"-5'5" RUN #1 6'0"-11'0" REC. 4'10"	
10'		5"				5"		MEDIUM MOTTLED GRAY DOLOMITIC SHALE, FEW SMALL VUGS, FEW THIN CLAY & GYPSUM SEAMS INTERBEDDED WITH THIN MEDIUM TO HARD GRAY DOLOMITE, CORE IN MANY PIECES, RANGING IN SIZE FROM CHIPS TO 3" 11'0"	
15'								RUN #2 11'0"-16'0" REC. 4'5" MEDIUM MOTTLED GRAY DOLOMITIC SHALE, FEW SMALL VUGS, FEW THIN CLAY AND GYPSUM SEAMS INTERBEDDED WITH THIN MEDIUM TO HARD GRAY DOLOMITE, CORE IN MANY PIECES, RANGING IN SIZE FROM CHIPS TO 6" 16'0"	
20'								RUN #3 16'0"-21'0" REC. 4'9" MEDIUM MOTTLED GRAY DOLOMITIC SHALE, FEW THIN GYPSUM SEAMS, FEW SMALL VUGS, CORE IN 27 PIECES RANGING IN SIZE FROM 1" TO 6" 21'0"	
25'								RUN #4 21'0"-26'0" REC. 4'2" MEDIUM MOTTLED GRAY DOLOMITIC SHALE, FEW THIN GYPSUM SEAMS, FEW SMALL VUGS, 12 PIECES RANGING IN SIZE FROM 2" TO 8" 26'0"	
30'								RUN #5 26'0"-30'0" REC. 5'3" MEDIUM MOTTLED GRAY DOLOMITIC SHALE, FEW THIN CLAY AND GYPSUM SEAMS, 23 PIECES RANGING IN SIZE FROM 1/2" TO 4" 30'0"	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

961 Lyell Avenue · Rochester, New York 14606
716-458-0821

PROJECT NO. 1355 PAGE 2 OF 2 BORING NO. B-1

PROJECT SUBSURFACE INVESTIGATIONS, 115-KV. LINE, STATION 7-48

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, 89 EAST AVENUE, ROCHESTER, NEW YORK

ELEVATION _____ INSPECTOR _____ WEATHER _____

DATE STARTED 4/17/74 COMPLETED 4/17/74 TECHNICIAN R. BATZER

GROUND WATER - CASING IN - 6'5" AT COMPLETION 4/7 TIME _____

BELOW SURFACE - CASING OUT - 2'6" 4/7/74 -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N				
35'								RUN #6 30'0"-35'0" REC. 5'4"	MEDIUM MOTTLED GRAY BROKEN DOLOMITIC SHALE, FEW THIN GYPSUM SEAMS, FEW SMALL VUGS, CORE IN MANY PIECES RANGING IN SIZE FROM CHIPS TO 4", BADLY BROKEN AT 31'9" TO 32'0" AND 34'0" TO 35'0"	
									35'0"	
40'									BORING TERMINATED AT 35'0"	
									NOTES: -ADVANCED TEST HOLE WITH HOLLOW STEM AUGER CASING -CORE DRILLED WITH SERIES M DOUBLE TUBE CORE BARREL AND DIAMOND BIT	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

961 Lyell Avenue · Rochester, New York 14606
716-458-0821

PROJECT NO. 1355 PAGE 1 OF 2 BORING NO. B-2

PROJECT SUBSURFACE INVESTIGATIONS, 115-KV. LINE, STATION 7-48
 CLIENT ROCHESTER GAS AND ELECTRIC CORPORATION, 89 EAST AVENUE, ROCHESTER, NEW YORK
 ELEVATION 522 INSPECTOR _____ WEATHER _____
 DATE STARTED 5/6/74 COMPLETED 5/6/74 TECHNICIAN J. HAMMOND
 GROUND WATER - CASING IN - 1'0" AT COMPLETION 5/6 TIME _____
 BELOW SURFACE - CASING OUT - 3'5" 5/6/74 -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N				
5										
		4	6	6		12	1	5'0"-6'6"	FIRM BROWN MOIST SILT, TRACE OF CLAY, FINE SAND, COARSE TO FINE GRAVEL AND ORGANIC MATTER	
10										
		6	14	19		33	2	10'0"-11'6"	COMPACT DAMP...	
										14'0"
15		100				100	3	15'0"-15'0"	ROCK FRAGMENTS	15'0"
		0"				0"		RUN #1 15'0"-20'0" REC. 5'0"	MEDIUM DARK GRAY BROKEN DOLOMITIC SHALE, FEW STYLOLITIC SEAMS, FEW CLAY SEAMS, FEW SMALL VUGS, INTERBEDDED WITH THIN DOLOMITE STRATA, CORE IN MANY PIECES RANGING IN SIZE FROM CHIPS TO 6"	20'0"
20								RUN #2 20'0"-25'0" REC. 5'0"	MEDIUM DARK GRAY DOLOMITIC SHALE, FEW CLAY AND GYPSUM SEAMS, ZONE OF MEDIUM TO SMALL VUGS AND CRYSTALLIZATION NOTED FROM 20'0"-21'0", 24 PIECES RANGING IN SIZE FROM 1/4" TO 5"	25'0"
25								RUN #3 25'0"-30'0" REC. 5'0"	MEDIUM DARK GRAY DOLOMITIC SHALE, FEW CLAY AND GYPSUM SEAMS, FEW SMALL VUGS, 15 PIECES RANGING IN SIZE FROM 1/4" TO 7"	30'0"
30										30'0"

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

961 Lyell Avenue · Rochester, New York 14606
716-458-0821

PROJECT NO. 1355 PAGE 2 OF 2 BORING NO. B-2
 PROJECT SUBSURFACE INVESTIGATIONS, 115-KV. LINE, STATION 7-48
 CLIENT ROCHESTER GAS AND ELECTRIC CORPORATION, 89 EAST AVENUE, ROCHESTER, NEW YORK
 ELEVATION _____ INSPECTOR _____ WEATHER _____
 DATE STARTED 5/6/74 COMPLETED 5/6/74 TECHNICIAN J. HAMMOND
 GROUND WATER - CASING IN - 1'0" AT COMPLETION 5/6 TIME _____
 BELOW SURFACE - CASING OUT - 3'5" 5/6/74 -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N			
35							RUN #4 30'0"-35'0" REC. 5'0"	MEDIUM DARK GRAY DOLOMITIC SHALE, FEW CLAY AND GYPSUM SEAMS, FEW SMALL VUGS, BROKEN ZONE FROM 34'0" TO 35'0", CORE IN MANY PIECES RANGING IN SIZE FROM CHIPS TO 4" 35'0"	
40							RUN #5 35'0"-40'0" REC. 5'0"	MEDIUM DARK GRAY DOLOMITIC SHALE, FEW STYLOLITIC SEAMS, FEW GYPSUM SEAMS, FEW SMALL VUGS, 16 PIECES RANGING IN SIZE FROM 1/4" TO 7" 40'0"	
45								BORING TERMINATED AT 40'0" NOTES: -ADVANCED TEST HOLE WITH HOLLOW STEM AUGER CASING -CORE DRILLED WITH SERIES M DOUBLE TUBE CORE BARREL AND DIAMOND BIT	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW

PROJECT NO. 1355 PAGE 1 OF 1 BORING NO. B-3
PROJECT SUBSURFACE INVESTIGATIONS, 115-KV. LINE, STATION 7-48
CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, 89 EAST AVENUE, ROCHESTER, NEW YORK
ELEVATION 520 INSPECTOR _____ WEATHER _____
DATE STARTED 4/17/74 COMPLETED 4/17/74 TECHNICIAN R. BATZER
GROUND WATER - CASING IN - 3'0" AT COMPLETION 4/17 TIME _____
BELOW SURFACE - CASING OUT - 2'0" 4/17/74 -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6" 12"	12" 18"	18" 24"	N			
5'								RAILROAD FILL	
								FIRM BROWN WET MEDIUM TO FINE SAND, SOME S BROKEN ROCK	
10'							RUN #1 5'0"-10'0" REC. 4'2"	MEDIUM GRAY BROKEN DOLOMITIC SHALE, SOME C SEAMS, INTERBEDDED WITH MEDIUM HARD GRAY DO FEW OFF VERTICAL STYLOLITIC SEAMS, CORE IN MANY PIECES RANGING IN SIZE FROM CHIPS TO 2" BADLY BROKEN AT 5'0"-5'4" AND AT 9'6"-10'0"	
							RUN #2 10'0"-15'0" REC. 3'8"	MEDIUM GRAY BROKEN DOLOMITIC SHALE, SOME CLAY SEAMS INTERBEDDED WITH MEDIUM HARD GR. DOLOMITE, FEW OFF VERTICAL STYLOLITIC SEAMS CORE IN MANY PIECES RANGING IN SIZE FROM CHIF TO 2"	
15'							RUN #3 15'0"-20'0" REC. 5'1"	MEDIUM DARK GRAY DOLOMITIC SHALE, FEW CLAY SEAMS, FEW OFF VERTICAL SEAMS, BADLY BROKEI ZONE AT 19'6" TO 20'6", CORE IN 19 PIECES RANGING IN SIZE FROM 1" TO 6"	
20'								BORING TERMINATED AT 20'0"	
								NOTES: -ADVANCED TEST HOLE WITH HOLLOW STEM AUGER -CORE DRILLED WITH SERIES M DOUBLE TUBE COR BARREL AND DIAMOND BIT	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" E/
C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ E/

961 Lyell Avenue · Rochester, New York 14606
716-458-0821

PROJECT NO. 1355 PAGE 1 OF 1 BORING NO. B-4

PROJECT SUBSURFACE INVESTIGATIONS, 115-KV. LINE, STATION 7-48
 CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, 89 EAST AVENUE, ROCHESTER, NEW YORK
 ELEVATION 518 INSPECTOR _____ WEATHER _____
 DATE STARTED 4/16/74 COMPLETED 4/16/74 TECHNICIAN R. BATZER
 GROUND WATER - CASING IN - ARTISIAN: 5" AT COMPLETION 4/16 TIME _____
 BELOW SURFACE - CASING OUT - ABOVE GROUND LEVEL 4/16/74 -WELLPOINT AT _____
ARTESIAN WELL: 5" ABOVE GROUND LEVEL

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER					SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N			
								RAILROAD FILL 0'11"	
5'								FIRM BROWN WET MEDIUM TO FINE SAND, SOME SILT, LITTLE COARSE SAND 4'0"	
		6	7			13	1	5'0"-7'0" FIRM BROWN MOIST FINE TO VERY FINE SAND, SOME SILT, TRACE OF COARSE GRAVEL 7'6"	
10'				8	7	15		BROKEN ROCK 9'10"	
								RUN #1 9'10"-14'10" REC. 5'0" MEDIUM DARK GRAY BROKEN DOLOMITIC SHALE, CORE IN MANY PIECES RANGING IN SIZE FROM CHIPS TO 3" 14'10"	
15'								RUN #2 14'10"-19'10" REC. 5'0" MEDIUM DARK GRAY DOLOMITIC SHALE, INTERBEDDED WITH GRAY DOLOMITE, FEW GYPSUM SEAMS, CORE IN 20+ PIECES RANGING IN SIZE FROM 1/4" TO 12" 19'10"	
20'								BORING TERMINATED AT 19'10"	
								NOTES: -ADVANCED TEST HOLE WITH HOLLOW STEM AUGER CASING -CORE DRILLED WITH SERIES M DOUBLE TUBE CORE BARREL AND DIAMOND BIT	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

961 Lyell Avenue · Rochester, New York 14606
716-458-0821

PROJECT NO. 1355 PAGE 1 OF 1 BORING NO. B-5

PROJECT SUBSURFACE INVESTIGATIONS, 115-KV. LINE, STATION 7-48
CLIENT ROCHESTER GAS & ELECTRIC CORPORATION, 89 EAST AVENUE, ROCHESTER, NEW YORK
ELEVATION 520 INSPECTOR _____ WEATHER _____
DATE STARTED 4/16/74 COMPLETED 4/16/74 TECHNICIAN J. HAMMOND
GROUND WATER - CASING IN - 9'4" AT COMPLETION 4 16 TIME _____
BELOW SURFACE - CASING OUT - 5'6" 4/16/74 -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	5' 12"	12' 18"	18' 24"	N				
	27									
	300	126	88	54		142	1	1'0"-2'6"	VERY DENSE GRAY DAMP CONCRETE	
5										
		10	18	18		35	2	5'0"-6'6"	COMPACT GRAY MOIST CONCRETE, LITTLE ORGANIC MATTER	
									8'6"	
10									LOOSE DARK BROWNISH-GRAY MOIST SILT AND ORGANIC MATTER, TRACE OF SAND AND GRAVEL	
	5	2	2	2		4	3	10'0"-11'6"		
	16								12'0"	
	27									
	50									
15	50									
		50	100			150	4	15'0"-15'6"		
			0"			6"				
								RUN #1 15'6"-20'6" REC. 4'2"	MEDIUM DARK GRAY BROKEN DOLOMITIC SHALE, FEW SMALL VUGS, CORE IN MANY PIECES RANGING IN SIZE FROM CHIPS TO 2"	
20									20'6"	
								RUN #2 20'6"-25'6" REC. 4'10"	MEDIUM DARK GRAY BROKEN DOLOMITIC SHALE, FEW SMALL VUGS, CORE IN MANY PIECES RANGING IN SIZE FROM CHIPS TO 3"	
25									25'6"	
30									BORING TERMINATED AT 25'6"	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPDOON 12" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE 2" CASING WITH 300 LB. WT. 24" EA. BLOW



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

961 Lyell Avenue · Rochester, New York 14606
716-458-0821

PROJECT NO. 1355 PAGE 1 OF 1 BORING NO. B-6
 PROJECT SUBSURFACE INVESTIGATIONS, 115-KV. LINE, STATION 7-48
 CLIENT ROCHESTER GAS AND ELECTRIC CORPORATION, 89 EAST AVENUE, ROCHESTER, NEW YORK
 ELEVATION 50 INSPECTOR _____ WEATHER _____
 DATE STARTED 4/16/74 COMPLETED 4/16/74 TECHNICIAN J. HAMMOND
 GROUND WATER - CASING IN - 5'8" AT COMPLETION 4 / 16 TIME _____
 BELOW SURFACE - CASING OUT - 4'10" 4/16/74 -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N				
5									MISCELLANEOUS FILL CONSISTING OF BROWN MOIST SAND, SILT, GRAVEL, CINDERS ETC. 4'6"	
								RUN #1 5'0"-10'0" REC. 3'10"	BROKEN AND WEATHERED ROCK 5'6"	
10									MEDIUM DARK GRAY BROKEN DOLOMITIC SHALE, FEW CLAY SEAMS, FEW SMALL VUGS, CORE IN MANY PIECES RANGING IN SIZE FROM CHIPS TO 2" 10'0"	
								RUN #2 10'0"-15'0" REC. 4'8"	MEDIUM DARK GRAY BROKEN DOLOMITIC SHALE, FEW CLAY SEAMS, FEW SMALL VUGS, CORE IN MANY PIECES RANGING IN SIZE FROM CHIPS TO 2" 15'0"	
15									BORING TERMINATED AT 15'0" NOTES: -ADVANCED TEST HOLE WITH HOLLOW STEM AUGER CASING -CORE DRILLED WITH SERIES M DOUBLE TUBE CORE BARREL AND DIAMOND BIT	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

961 Lyell Avenue • Rochester, New York 14606
716-458-0821

PROJECT NO. 1355 PAGE 1 OF 1 BORING NO. B-7
 PROJECT SUBSURFACE INVESTIGATIONS, 115-KV. LINE, STATION 7-48
 CLIENT ROCHESTER GAS AND ELECTRIC CORPORATION, 89 EAST AVENUE, ROCHESTER, NEW YORK
 ELEVATION 505 INSPECTOR _____ WEATHER _____
 DATE STARTED 4/16/74 COMPLETED 4/16/74 TECHNICIAN R. BATZER
 GROUND WATER - CASING IN - 5'3" AT COMPLETION 4/16 TIME _____
 BELOW SURFACE - CASING OUT - 4'9" 4/16/74 -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	5" 12"	12" 18"	18" 24"	N				
									RAILROAD FILL	2'0"
5									LOOSE TO FIRM BROWNISH-GRAY DAMP TO MOIST SILT AND VERY FINE SAND	6'0"
		3	5			8	1	5'0"-7'0"		
				10	16	26			DECOMPOSED AND BROKEN ROCK	
10								10'0"-10'2"	NO RECOVERY	10'2"
		150	x	x		150	2	RUN #1 10'2"-15'2" REC. 4'3"	MEDIUM DARK GRAY BROKEN DOLOMITIC SHALE, INTERBEDDED WITH GRAY DOLOMITE, FEW CLAY SEAMS, FEW SMALL VUGS, CORE IN MANY PIECES RANGING IN SIZE FROM 1/4" TO 2"	15'2"
15		2"				2"		RUN #2 15'2"-20'2" REC. 4'11"	MEDIUM DARK GRAY BROKEN DOLOMITIC SHALE, INTERBEDDED WITH GRAY DOLOMITE, FEW CLAY SEAMS, FEW SMALL VUGS, CORE IN MANY PIECES RANGING IN SIZE FROM CHIPS TO 3"	20'2"
20									BORING TERMINATED AT 20'2"	
25									NOTES: -ADVANCED TEST HOLE WITH HOLLOW STEM AUGER CASING -CORE DRILLED WITH SERIES M DOUBLE TUBE CORE BARREL AND DIAMOND BIT	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

961 Lyell Avenue · Rochester, New York 14606
716-458-0821

PROJECT NO. 1355 PAGE 1 OF 1 BORING NO. 8
 PROJECT SUBSURFACE INVESTIGATIONS, 115-KV LINE, STATION 7-48
 CLIENT ROCHESTER GAS AND ELECTRIC CORPORATION, 89 EAST AVENUE, ROCHESTER, NEW YORK
 ELEVATION 505 INSPECTOR _____ WEATHER _____
 DATE STARTED 4/16/74 COMPLETED 4/16/74 TECHNICIAN R. BATZER
 GROUND WATER - CASING IN - 5'9" AT COMPLETION 4/16 TIME _____
 BELOW SURFACE - CASING OUT - 7'3" 4/16/74 -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N				
5									RAILROAD FILL	
									4'0"	
		1	2			3	1	5'0"-7'0"	LOOSE BROWN WET COARSE TO FINE SAND, TRACE OF SILT	
				1	2	3			6'0"	
									LOOSE BROWN WET SILT, SOME FINE SAND, TRACE OF CLAY	
10									9'6"	
		150	x	x		150	2	10'0"-10'4"	VERY DENSE BROWNISH-GRAY MOIST DECOMPOSED AND WEATHERED ROCK, LITTLE SILT AND FINE SAND	
		4"				4"			11'4"	
								RUN #1 11'4"-16'4" REC. 4'5"	MEDIUM DARK GRAY BROKEN DOLOMITIC SHALE, FEW SMALL VUGS, FEW THIN CLAY SEAMS, CORE IN MANY PIECES RANGING IN SIZE FROM CHIPS TO 2"	
15								RUN #2 16'4"-21'4" REC. 4'11"	16'4"	
									MEDIUM DARK GRAY BROKEN DOLOMITIC SHALE, FEW SMALL VUGS, FEW THIN CLAY SEAMS, CORE IN MANY PIECES RANGING IN SIZE FROM CHIPS TO 4"	
20									21'4"	
									BORING TERMINATED AT 21'4"	
25									NOTES: -ADVANCED TEST HOLE WITH HOLLOW STEM AUGER CASING -CORE DRILLED WITH SERIES M DOUBLE TUBE CORE BARREL AND DIAMOND BIT	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

961 Lyell Avenue · Rochester, New York 14606
716-458-0821

PROJECT NO. 1355 PAGE 1 OF 1 BORING NO. B-9
 PROJECT SUBSURFACE INVESTIGATIONS, 115-KV. LINE, STATION 7-48
 CLIENT ROCHESTER GAS AND ELECTRIC CORPORATION, 89 EAST AVENUE, ROCHESTER, NEW YORK
 ELEVATION 505 INSPECTOR _____ WEATHER _____
 DATE STARTED 5/7/74 COMPLETED 5/7/74 TECHNICIAN J. HAMMOND
 GROUND WATER - CASING IN - 1'6" AT COMPLETION 5/7 TIME _____
 BELOW SURFACE - CASING OUT - 1'0" 5/7/74 -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N				
5										
		4	4	5		9	1	5'0"-6'6"	LOOSE DARK BROWN MOIST FILL CONSISTING OF CINDERS, SAND, SILT, GRAVEL ETC.	
10		100				100	3	9'6"-9'6"	ROCK FRAGMENTS	
		0"				0"		RUN #1 9'6"-14'6" REC. 2'5"	MEDIUM SOFT GRAY BROKEN DOLOMITIC SHALE FEW CLAY SEAMS, FEW OFF VERTICAL SEAMS, CORE IN MANY PIECES, RANGING IN SIZE FROM CHIPS TO 3"	
15										
								RUN #2 14'6"-19'6" REC. 5'2"	MEDIUM SOFT GRAY BROKEN DOLOMITIC SHALE, FEW CLAY SEAMS, FEW OFF VERTICAL SEAMS, CORE IN MANY PIECES RANGING IN SIZE FROM CHIPS TO 3"	
20										
									BORING TERMINATED AT 19'6"	
									NOTES: -ADVANCED TEST HOLE WITH HOLLOW STEM AUGER CASING -CORE DRILLED WITH SERIES M DOUBLE TUBE CORE BARREL AND DIAMOND BIT	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW

TEST BORING LOG

PROJECT St. Simon's Episcopal Church HOLE NO. 20
 LOCATION Upper Falls Urban Renewal SURF. ELEV. 506.76
 DATE STARTED 1/26/72 COMPLETED 1/26/72 JOB NO. 7203
 GROUND WATER Depth on completion, 8'0"

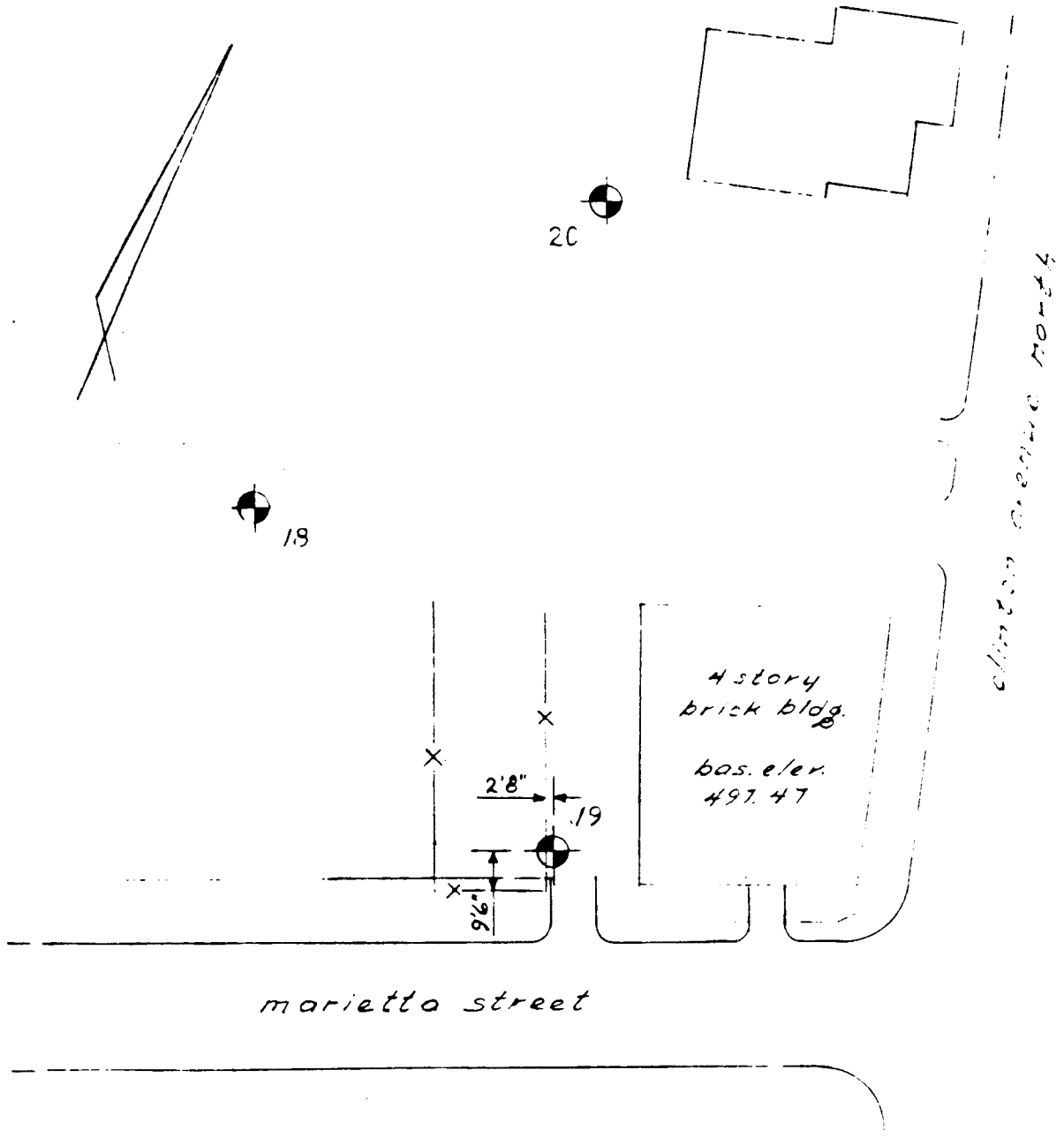
N= NO. OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C= NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

BORING MADE WITH DRILLED IN CASING

DEPTH	C.	N.	SAMPLE NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
5'0"		3/3 4	1	0'0"- 1'6"	Brown moist loose fine SAND, little fine gravel 3'0"
					Brown moist medium dense SILT, some very fine sand
10'0"		6/12 12	2	5'0"- 6'6"	9'0"
					Brown wet loose SILT, some fine sand and fine gravel
15'0"		7/37	3	10'0"- 11'0"	No Rec.
20'0"		4/3 6	4	15'0"- 16'6"	17'0"
					Grey wet very dense fine SAND, some fine gravel
25'0"		25/40 45	5	20'0"- 21'6"	23'0"
					Top of rock Run #1, 23'0" - 28'0" Rec. 3/4" - 56% Grey hard weathered DOLOMITE
30'0"					Bottom of boring 28'0"
					NOTE: Coring time in rock 3-4 minutes per foot; no water loss.



Marietta street

Clinton Avenue North

Parratt-Wolff Inc.	
<i>St. Simons' Episcopal Church Upper Falls Urban Renewal</i>	
72 23	
scale 1" = 40'	January 31, 1972

DUNN GEOSCIENCE CORP.
Rock Core Log

Surface Elev. 521
≈ 522'
Inclination From Horiz. 90°

Hole Depth 175'
Bearing

Boring No. Job No. A-4
CS-3-816

(West) Chas. H. Sells, Inc.

Inspector R.W.S. Log Date 12/17/74

Location Rochester, N.Y.

Casing Used 4" Casing to 31'

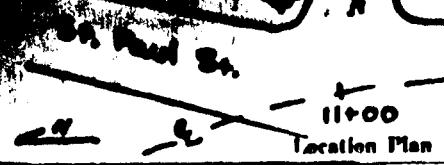
Drilling Co. Rochester Drilling Co. Rig. CME 55

Core Size NX

Driller Don Sweeting Drill 12/16 to 1/3

Sheet 1 of 6

Rock Quality Parameters



Depth Scale	Surface Outcrops	Purpose of Log Rock quality for tunnel design	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Decomposition	Strength "S"	Fracturing "F"
							25	50	75	90			
	Geologic Description	Remarks											
	1" Asphalt 6" Concrete												
	Rubble - Concrete & Brick Fragments												
5'	Red brown silt, some sand, brick fragments	Note - Overburden not sampled.											
	0'-8" Misc Fill												
10'	Red brown silt, fine to medium sand, moist, some c-f. gravel.	Note - Unless otherwise indicated, fractures are almost horizontal, hairline, bedding plane breaks.											
15'	(Overburden)												
20'													
25'													
		26' to 30' - Boulder, Dolomite											

Job No. CS-3-816
Boring No. A-4
Sheet 1 of 6

DUNN GEOSCIENCE CORP.
Rock Core Log

BORING NO. A-4
SHEET 2 of 6

PENFIELD

DECEW

Depth (ft)	Geologic Description	Remarks	Joints etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters				
						25	50	75	90	"D"	"S"	"F"		
26 to 30		Boulder												
31	Top of rock													
33	DOLOMITE - Hard fine to medium crystalline, "sandy". Rock fairly massive & uniform. Thin, horizontal stylolites occur. Rock contains black, shaley 1/4" to 1" layers at irregular 1' to 2' intervals.	3" Shaley "Flow breccia" Alqamat zone.				5.0				1	1	3		
36.4		3/4" - 1" Black shale seam				4.0								
		(Hole back filled to 30' - Casing reset)												
40	Rock tends to split occasionally along these horizontal plane shaley partings.	3" Flow breccia zone		12/19/74		4.0								
42.2		1" black shale seam - broken								1	1	3		
46.5						4.0								
52		1/4" Vugs				4.0								
55						4.0								
60	DOLOMITE - Moderately hard (+), fine crystalline 1" to 3" bedded with darker (N4) 1/8" to 1/4" argillaceous bands. Bands appear competent. Rock contains minor amount of 1/4" to 1" gypsum pods.	1/4" White gypsum pod		12/20/74		4.0								
						4.0				1	2	3		

CS-3-BIG

A-4

2 of 6

BUNN GEOSCIENCE CORP.
Rock Core Log

BORING NO. A.4
SHEET 3 of 6

22'
69'
45'

DECEW
GATES
ROCHESTER

N₄
N₅
N₄
N₄
N₅

Geologic Description	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters				
						25	50	75	90	"D"	"S"	"F"		
65' (contact gradational)	65'4"-65'8" Gypsum & dolomite pod.				4.0									
70' DOLOMITE - Moderately hard & moderately hard (+) fine crystalline, 1" to 6" irregularly bedded. Dark grey (N4) argillaceous bands increase in thickness from 1" to 3".	45' - 141' 2" / 310' km.				4.0									
75' Rock contains some 1/4" white gypsum nodules, & occasional mm. gypsum seams (horizontal) Lighter bands slightly harder than darker bands.	79'-2" Clay filled seam			12/30/74	4.0					1	2	3		
80' (contact gradational)					4.0									
85' DOLOMITIC MUDSTONE - Moderately hard, somewhat shaley, fine to very fine grained, 6" to 1' bedded with 2" lighter (N5) dolomite layers interbedded.					4.0									
90' 1/2" white gypsum pod					4.0									
95'														

DUNN GEOSCIENCE CORP.
Rock Core Log

BORING NO. A-4
 SHEET 4 of 6

Date	Water Level	Elevation at Core Exit	Geologic Log	Depth in Feet	Geologic Description	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D. 25 50 75 90	Rock Quality Parameters		
												"D"	"S"	"F"
				100	DOLOMITIC MUDSTONE - Some-what shaley, moderately hard, very fine grained. Horizontal white gypsum partings occur at 6" to 1' intervals. Rock tends to split along these gypsum partings.	1" white gypsum pod				5.0				
				105							5.0			
				110							5.0			
				115							4.0			
				120							4.0			
				125	MUDSTONE - Shaley moderately hard to soft, slightly dolomitic. Numerous white gypsum partings occur at 6" to 1' intervals. Rock is dark, banded with lighter 1" to 2" dolomitic bands at 6" to 1' intervals. Lighter bands are moderately hard.	← 126' approx. tunnel invert				4.5				
				130										

N4

N4

1/3/75

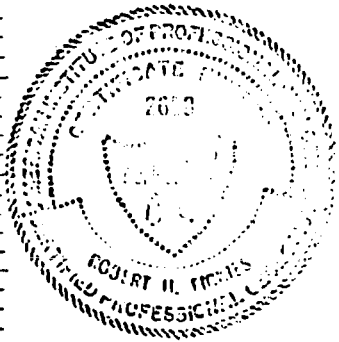
ROCHESTER

100.85°

DUNN GEOSCIENCE CORP.
Rock Core Log

BORING NO. A.4
 SHEET 6 of 6

Depth Feet	Geologic Description	Remarks	Joints etc.	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters		
							25	50	75	90	"D"	"S"	"F"
170						30					1	2	3
175	END HOLE @ 175'												



100 85'

1"=100'

DUNN GEOSCIENCE CORP. Rock Core Log

Surface Elev. 524' 4" Hole Depth 175'
 Inclination 90° From Horiz. Bearing
 Job No. CS-3-816 A.5

St. Paul 15100

Client Chas. H. Sells, Inc. Inspector P.N.A. Log Date 12/17/74
 Location Pleasant e St. Paul St., Rochester, N.Y. Casing 4" casing to 30'
 Used
 Drilling Co. Rochester Drilling Co. Rig. CME-55 Core Size NX
 Driller Art Utter Drill 12/17/74 to 12/21/74

Sheet 1 of 6

Location Plan

Rock Quality Parameters

Muck Unit	Water Loss %	Bedding & Core Axis	Block Color	Graphic Log	Depth Scale	Surface Outcrops	Purpose of Log	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Decomposition	Strength	Fracturing
						Geologic Description	Rock quality for tunnel design					Remarks	25	50	75			
					0'	concrete sidewalk												
					5'	Manmade fill - sandy, silty, with much concrete & brick rubble												
					10'	Sand and silt, some coarse to fine gravel.												
					15'	(OVERBURDEN-not sampled)												
					20'													
					21.5'													
					22.5'													
					25'													

21.5
12/21/74
12/20/74
12/19/74

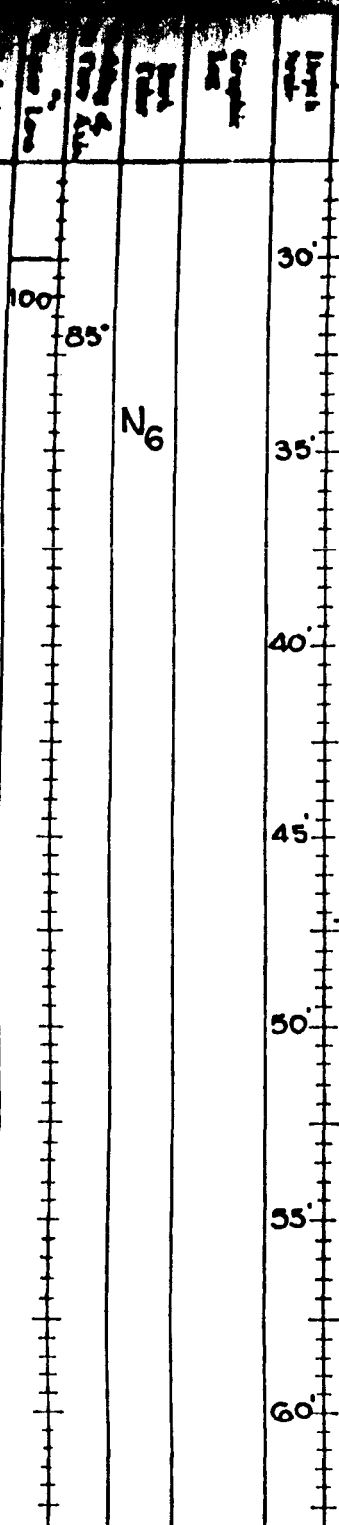
overburden becomes wet at 22.5'

Job No. CS-3-816
 Boring No. A.5
 Sheet 1 of 6

DUNN BIOSCIENCE CORP.
Rock Core Log

BORING NO. A-5
 SHEET 2 of 6

PENFIELD



Depth (ft)	Geologic Description
30'	Top of rock at 30'
30' - 45'	DOLOMITE - Hard, medium crystalline, some quartz sand. Fairly massive bedded. Few vertical stylolites noted. Vertical seams appear quite competent. Rock breaks along thin, low angle, black, shaley seams spaced generally from 6" to 2' apart.
45' - 50'	$\frac{1}{4}$ " black, shaley bands occur at regular 1' to 2' intervals.

Remarks
NOTE - All joints, unless otherwise noted, are almost horizontal, hairline fractures.

Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.			Rock Quality Parameters			
				25	50	75	90	"D"	"S"	"F"
			4.2					1	1	3
		12/21/74	4.0					1	1	2
		12/20/74 12/19/74	3.6					1	1	2
			2.6					1	1	2

DUNN BIOSCIENCE CORP.
Rock Core Log

BOHRING NO. 170
SHEET 3 of 6

Depth	Geologic Description	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D. 25 50 75 90	Rock Quality Parameters		
								"D"	"S"	"F"
65	DOLOMITE - Moderately hard (+) fine crystalline, 1" to 3" bedded with darker (N ₄) 1/4" to 1/2" argillaceous bands. These bands appear competent. Rock contains a moderate amount of 1/4" white, gypsum nodules.	Note - Below this level, Rock emits H ₂ S odor when struck with hammer. 2 open vugs, 1" diameter				5.0		1	2	2
70										
75	DOLOMITE - Moderately hard, fine crystalline, 1" to 6" irregular bedded dark gray, argillaceous bands increase in thickness from 1" to 2". Rock contains abundant 1/4" gypsum nodules, and occasional white gypsum seams. Few fossil hash layers noted.	Slight H ₂ S odor detected during drilling 449 N2 307								
80		Gypsum parting								
85		Note - darker layers slightly softer than lighter layers.								
90		1/2" gypsum pods								
95	(contact gradational) DOLOMITIC MUDSTONE - Somewhat shaly, moderately hard, very fine grained 6" to 1' bedded, with 2" lighter, dolomite layers interbedded.									

DECEW

GATES

DRILLER

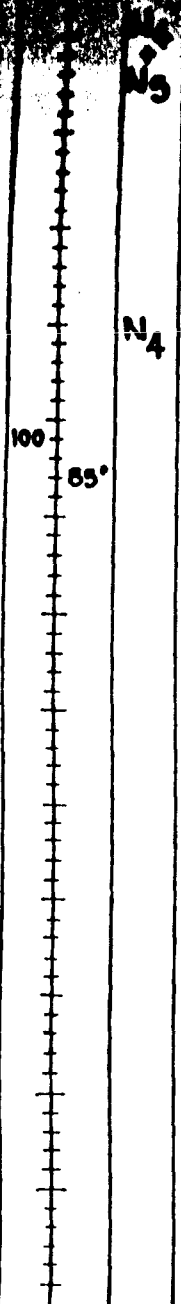
12/21/74
12/20/74
12/19/74

Jun. No. CS-3-816
Boring No. A-5
Sheet 3 of 6

ROCHESTER CORP.
Rock Core Log

BORING NO. A-5
SHEET 4 of 6

ROCHESTER



Geologic Description	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters					
						25	50	75	90	"D"	"S"	"F"			
100-105 DOLOMITIC MUDSTONE - Somewhat shaly, moderately hard, very fine grained, 6" to 1' bedded with 2" lighter dolomite layers interbedded. Horizontal, white gypsum seams (mm.) occur at 6" to 1' intervals. Rock tends to split along these gypsum partings.			- gypsum		6.2					1	2	2			
105-110 - Rock becomes more uniformly dark (N4) with lighter layers becoming less frequent and thinner (1/2")	108' to 118' Packer test zone #1 K = 292.9 $\frac{ft}{yr}$ @ 50psi									1	2	2			
110-115	3.5" sample taken from Box 7														
115-120 DARK MUDSTONE, dolomitic, somewhat shaly, very fine grained, moderately hard. White gypsum partings occur at 2" to 6" intervals	- 117' 3" clay filled, horizontal joints (2) - 118' 9" to 120' sample taken (A5-1-1) for testing. - 118' to 128' Packer test zone #2 K = 0 (took no water) @ 50psi		- clay		6.6					1	2	3			
120-125	- 127' Approx. Tunnel Inv.														
125-130					7.5					1	2	3			
					6.0					1	2	3			

CS-3-816
A-5
4 of 6

COAL CO. CO.
Rock Core Log

BORING NO. A-5
 SHEET 5 of 6

ROCHESTER

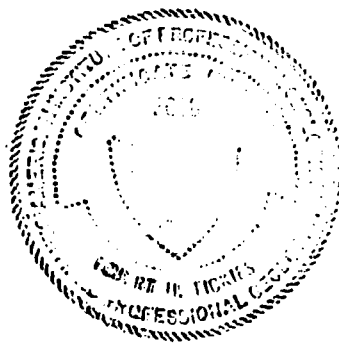
Depth (ft)	Sample Description	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters			
							25	50	75	90	"D"	"S"	"F"	
130	MUDSTONE - Shaly, slightly dolomitic, moderately hard to soft. Numerous gypsum seams at 1" to 3" intervals. Few large (1") gypsum pods.	- 2" white gypsum pod - 1" white gypsum pod												
140	Rock is dark (N ₄) with lighter (N ₅) dolomitic bands at <1" intervals, lighter bands moderately hard, generally 2" thick.				12/21/74	4.0				1	2	3		
150						6.5				1	2	3		
160	MUDSTONE - Shaly, dolomitic, medium to soft. White, horizontal gypsum seams occur at 2" to 6" intervals. Few 1/2" to 1" gypsum pods. Rock is banded at 6" to 1' intervals with lighter, dolomitic 1" layers.	161' - 2" sample taken from Box 10				6.5				1	2	3		

Job No. CS-3-816
 Boring No. A-5
 Sheet 5 of 6

DUNN GEOSCIENCE CORP.
Rock Core Log

BORING NO. A-5
 SHEET 6 of 6

Depth Feet	Geologic Description	Remarks	Joints etc.	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters		
							25	50	75	90	"D"	"S"	"F"
170						60					1	2	3
175	END of HOLE at 175'												



Job No. CS-3-816
 Boring No. A-5
 Sheet 6 of 6

DAVIS GEOSCIENCE CORP.
Rock Core Log

Surface Elev. *523.7*
≈ 520' Hole Depth **135'**
Inclination **90°** From Horiz. Bearing
Boring No. **A-6**
Job No. **CS-3-816**

Client **Chas. H. Sells, Inc.** Inspector **R.W.S.** Log Date **1/23/75**
Location **South Ave., Rochester, N.Y.** Casing **4" flush joint to 16.5'** Used
Drilling Co. **Rochester Drilling** Rtg. **CME 55** Core Size **NX**
Driller **Don Sweating** Drill **1/22/75 to**

Sheet 1 of 5

1" = 100'
Location Plan

Rock Quality Parameters

Depth (ft)	Surface Outcrop	Purpose of Log	Rock quality for tunnel design	Joints, etc.	Fillings	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Fracturing -F-	Strength -S-	Decomposition -D-	
								25	50	75	90				
0 - 15			OVERBURDEN (not sampled) Reddish brown silt, sand, and gravel. Probable fill material												
15			Top of Rock												
15 - 20			DOLOMITE - Hard, medium crystalline, sandy, fairly massive with zones of "wispy" shaly (mm.) algal concentrations. Rock contains an occasional 1/4" black shale band.												
20				19" 4" void - lost all drill water											
20 - 25				1" weathered horizontal joint											
25															

LOG. NO. **CS-3-816** Boring No. **A-6** Sheet 1 of 5

ROCKWATER CORP.
Rock Core Log

BORING NO. A 6
SHEET 2 of 5

Depth (ft)	Geologic Description	Remarks	Joints etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.			Rock Quality Parameters			
						25	50	75	90	"D"	"S"	"F"
30	DOLOMITE - Hard, medium crystalline, sandy, fairly massive with zones of "wispy" shaly (mm.) algal concentrations. Rock contains an occasional 1/4" black shale band.	24' to 37' 6" "wispy" algal zone			9	25	50	75	90	1	1	2
35												
40		2 gypsum filled vugs 2" Diameter 36' 6" - 1" black shale band				1.1				1	1	2
45												
50	DOLOMITE - Hard, medium crystalline, sandy, fairly massive with 1/4" to 1" black shale bands at regular 1' to 2' intervals.	48' 1/2" black shale band 50' 6" 2" black shale band 53' 2" black shale - broken				1.8				1	1	2
55												
60		mm. gypsum parting										

35'
51 1/2'

Drill. No. CS-3-816
Geologic No. A-6
Sheet 2 of 5

DUNN GEOSCIENCE CORP.
Rock Core Log

BORING NO. A-6
 SHEET 3 of 5

Elev.	Geologic Description	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.			Rock Quality Parameters					
							25	50	75	90	"D"	"S"	"F"		
65		- mm. gypsum seam													
70	DOLOMITE - Moderately hard(+), medium crystalline, sandy. Rock slightly less hard than above. Uniform bedded every 1' to 2' with 1/2" black shale bands.	- 66' - 67' - distorted thin shale layers													
75	DOLOMITE - Moderately hard(+), crystalline. Bedded every 3" to 6" with 1/2" black shale bands.					2.0				1	1	2			
80															
85	(contact gradational) DOLOMITE - Moderately hard (+) and moderately hard, fine crystalline. Lighter dolomite bedded every 3" to 6" with 2" to 4" darker dolomitic mudstone bands.					1.9				1	1	2			
90	Rock contains an occasional white gypsum pod or mm. gypsum parting.					2.4				1	1	2			
95						2.4				1	1	2			

523
 85
 438
 112
 216

5L/2/1
 20/1

N5

N5 + N4

Job No. CS-3-816
 Boring No. A-6
 Sheet 3 of 5

ROCHESTER CORP.
Rock Core Log

BORING NO. A-6
SHEET 4 of 5

DATES

ROCHESTER

N₃
+
N₄

N₄
+
N₅

N₄

Depth Description	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters					
						25	50	75	90	"D"	"S"	"F"			
100					1.8					1	1	2			
(contact gradational) DOLOMITIC MUDSTONE - Moderately hard, fine crystalline, bedded every 1" with 2" to 3" lighter bands. Rock contains mm. white gypsum partings at 6" intervals.					2.2					1	1	2			
DOLOMITIC MUDSTONE - Moderately hard, very fine crystalline. Uniform dark, with abundant mm. white gypsum partings at 3" to 6" intervals. Rock tends to split along these partings.	-Note - Between 117'6" and 127'6", a seam containing natural gas was intersected. Gas flowed from hole for several hours when cone barrel was pulled at 127'6" 118'9" 1/4" weathered seam appears water worn - probable gas seam.			1/27	23					1	2	3			
APPROXIMATE TUNNEL INVERT (123')					24					1	2	3			

AMERICAN CORP.
Rock Core Log

BORING NO. A-6
SHEET 5 of 5

Geologic Description	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters		
						25	50	75	90	"D"	"S"	"F"
					2.4					1	2	3
End Hole at 135'												

*135' End
SD Rock*



DUNN GEOSCIENCE CORP.
Rock Core Log

Surface Elev. *511.4*
506

Hole Depth **115'**

Boring No.

Inclination From Horiz. **90°**

Bearing

Job No. **CS-3-816**

A-7

Client **Chas. H. Sells, Inc.**

Inspector **R.W.S.**

Log Date **1/16-21/75**

Sheet 1 of 4

Location **Water St., Rochester, N.Y.**

Casing **4" to 7' Left 5' casing in ground for Used observation well installation**

Drilling Co. **Rochester Drilling**

Rig. **CME 53**

Core Size **NX**

Driller **Don Sweeting**

Drill **1/16/75 to 1/21/75**

Rock Quality Parameters

Depth	Surface Outcrops	Purpose of Log	Rock quality for tunnel design	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Fracturing "F"	
								Recovery					Decomposition "D"
	Geologic Description	Remarks					25	50	75	90			
0-5	Medium dense, brown silt & fine sand, little coarse to fine gravel, little brick, ash, organic matter. (wet)	S-1 Blows 3/5/5											
5-10	OVERBURDEN - Consisting of miscellaneous fill material. May contain boulders of varying size. Silt & fine sand, brown, some brick fragments, organic matter (wet). Top of Rock T'	S-2 Blows 3/100/- Boulder				DAY 2/4/75							
10-15	DOLOMITE - Hard, medium crystalline sand, fairly massive with zones of "wispy" shaly (mm.) algal concentrations. Rock contains an occasional 1/4" black shale band.	Observation well installed 5'-7'					2				1	2	2
15-20		"wispy" algal zone Note - Unless otherwise indicated, fractures are almost horizontal, hairline, bedding plane breaks.					2				1	1	2
20-25						19'8"							
25-27.4		Sample A-7-1-1 26'6" to 27'4"				27'6"	18				1	1	3

PENFIELD

CS-3-816

A-7

10

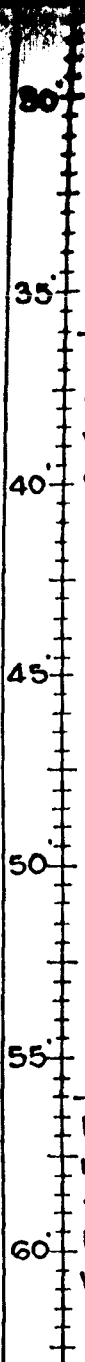
Rock Core Log

BORING NO. A-7
 SHEET 2 of 4

PENFIELD

N5

DECEW



Geologic Description

DOLOMITE - Hard, medium crystalline sandy, fairly massive with 1/4" to 1/2" black shale bands at regular 1' to 2' intervals

DOLOMITE - Moderately hard (+), medium crystalline sandy. Rock slightly less hard than above. Uniform, bedded every 1' to 2' with 1/2" black shale bands.

Remarks

2' Algal mat - shaly flow breccia layer

3" Algal mat band

1" black shale band

Below this level, core has noticeable H₂S odor

4" undulating shaly zone

Drilling Rate Min./Ft.	Core Recovery and R.Q.D. 25 50 75 90	Rock Quality Parameters		
		"D"	"S"	"F"
1.8		1	1	3
1.8		1	1	2
1.8		1	1	1
1.6		1	1	1
1.8		1	1	2

2 1/2" / hr

CS-3-816

A-7

2 of 4

INDUSTRIAL CORP.
Rock Core Log

DRILLING NO. A-7
SHEET 3 of 4

GATES
 20
 85
 ROCHESTER

N5
 +
 N4
 67.5
 L
 85.3
 R
 N4
 +
 N5

65' DOLOMITE - Moderately hard (+)
 fine crystalline. Bedded with 1/2"
 black shaly bands every 3" to 6".
 (contact gradational)
 70' DOLOMITE - Moderately hard (+) &
 moderately hard, fine crystalline.
 Lighter dolomite bedded every
 3" to 6" with 2" to 4" darker
 dolomitic mudstone bands. Rock
 contains an occasional white
 gypsum pod or mm. gypsum
 parting.
 80' 511.4
 60.0
 413.9
 60.0
 360.0
 60.0
 85' (contact gradational)
 90' DOLOMITIC MUDSTONE -
 Moderately hard, fine cry-
 stalline, bedded every 1' with
 2" to 3" lighter dolomite bands.
 Some mm. white gypsum part-
 ings at 6" intervals
 95'

Remarks
 H₂S odor in core
 clay filled 1/4" seam
 1" broken zone
 1" clay filled horizontal
 joint
 Packer test
 95' - 105'

Drilling Rate Min./Ft.	Core Recovery and R.Q.D. 25 50 75 90	Rock Quality Parameters		
		"D"	"S"	"F"
1.8		1	1	2
2.0		1	1	2
2.2		1	2	3
2.6		1	2	3

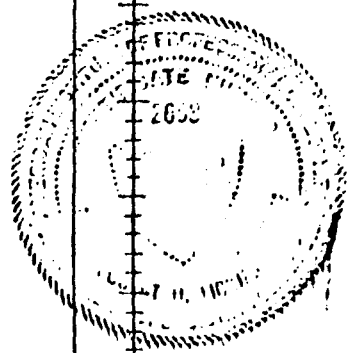
CS-3-816 | A-7 | 3 of 4

DUNN GEOSCIENCE CORP.
Rock Core Log

BORING NO. A-7
 SHEET 4 of 4

Depth (ft)	Geologic Description	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters		
							25	50	75	90	"D"	"S"	"F"
97' 8"	DOLOMITIC MUDSTONE - Moderately hard, fine grained, somewhat shaly, with mm. white gypsum partings occurring at 6" intervals. Rock tends to split easily along these partings.	97' 8" $\frac{1}{4}$ " open seam				2.6					1	2	3
100'		Heavy natural gas flow from hole for several hours.				2.4					1	2	3
103'		Sample A-7-1-2 103' to 103' 7"											
105'		105' 10" to 106' 2" Dolomite filled seam		dolomite									
110'		-1" gypsum pods				2.6					1	2	3
115'		Packer test - 105' to 115'											
End Hole @ 115'													
		Note - Observation wells installed at 5' to 7' and 110' to 115'											
		Note - Natural gas still seeping from deep well point on 2/4/75											

N4
 20
 85



ENVIRONMENTAL SCIENCE CORP.
Rock Core Log

Surface Elev. 527'
Inclination From Horiz. 90°

Hole Depth 136'
Bearing

Boring No.
Job No. CS-3-816

A

Client **Chas. H. Sells, Inc.**

Inspector **R.W.S.**

Log Date **1/6/75**

Sheet 1 of 5

Location **South Ave., Rochester, N.Y.**

Casing Used **4" to 27"**

Drilling Co. **Rochester Drilling**

Rig. **CME-55**

Driller **Art Utter**

Drill **12/31/75 to 1/7/75**

Core Size **NX**

Rock Quality Parameters

Depth Feet	Geologic Description	Purpose of Log Rock quality for tunnel design	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Fracturing %
								25	50	75	90	
0	concrete											
5	Brown, damp, fine sand, some silt, little coarse to fine gravel (Probable Fill) (not sampled)		Note-Overburden logged from auger flights only.									
10	Brown, damp, fine sand, some coarse to fine gravel, trace silt. (not sampled)		Note-Unless otherwise indicated, fractures are almost horizontal, hairline, bedding plane breaks.									
15												
20												
25	Gray, moist fine sand, some coarse to fine gravel, trace silt											
27	Top of rock at 27'											

South Ave.
Scale
F=100'
Location Plan

Decomposition
Strength
Fracturing

5.0
1 2 4

Rock Core Log

SHEET 2 of 5

Stratigraphic Description	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters		
						25	50	75	90	"D"	"S"	"F"
30' N5 DOLOMITE - Hard, medium crystalline, fairly massive with horizontal stylolites (mm. shaly partings) occurring at irregular 6" to 1' intervals. Most of the partings are competent, few are open.	} 12" open, crushed zone - Lost water 29'				5.0					1	2	5
					3.5							
45' N6 DOLOMITE - Hard, fine crystalline, sandy, medium to thin bedded, with horizontal stylolites occurring at irregular intervals. Some zones are thin bedded, with shaly, fossil hash layers.	Note - Rock from 41' to 50' slightly harder than surrounding beds.				4.0					1	1	2
					6.5							
55' N6 DOLOMITE - Hard, medium crystalline, sandy, fairly massive with 1/2" to 1" black, shaly bands occurring at 6" to 2' intervals. Rock also has stylolitic zones broken along 2" to 6" shaly seams.					3.5					1	1	3

36'

SL/L/1

Job No. CS-3-816
 Horing No. A-8
 Sheet 2 of 5

BORING NO. A-8

SHEET 3 of 5

Geologic Description

Remarks

Joints

Fillings
etc.

Stabilized
Water
Levels

Drilling Rate
Min./Ft.

Core
Recovery
and
R.Q.D.
25 50 75 90

Rock Quality
Parameters

"D" "S" "F"

65' DOLOMITE - Hard, medium crys-
talline, sandy, fairly massive, with
1/2" to 1" black, shaly bands occur-
ing at 6" to 2' intervals.

} 12" "flow breccia" zone
- 2" "flow breccia" band

70'

75'

80' 1/2" black shaly bands occur at
regular 1' to 2' intervals.

1/2" weathered shale
seam - 1" white gypsum pod

85'

90' DOLOMITE - Hard (-) fine crys-
talline, 1" to 3" bedded with
darker (N4) 1/4" to 1/2" argillaceous
bands. These bands appear
competent. Rock contains a
few 1/4" white gypsum nodules.

95'

5.5

5.5

6.0

1 1 2

1 1 4

1 1 2

1 1 2

1 1 2

N5

N5

PENFIELD

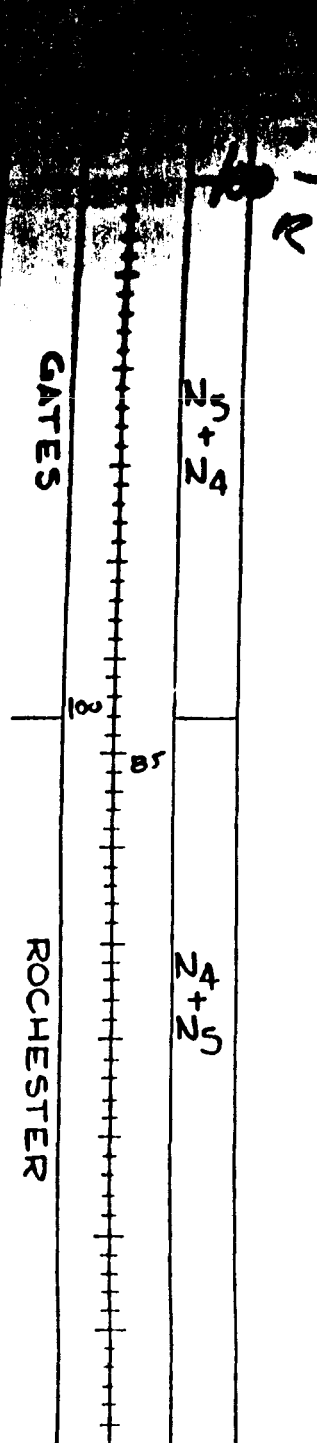
DECEW

SL/LV

CS-3-BIG A-D

COCA
Core Log

DRILLING NO. A-8
 SHEET 4 of 5



Depth Description	Remarks	Joints etc.	Fillings	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters		
						25	50	75	90	"D"	"S"	"F"
105' DOLOMITE - Moderately hard, fine crystalline 1" to 6" irregularly bedded with dark, argillaceous bands 1" to 2" thick. Rock contains abundant 1/4" white gypsum nodules, and occasional white gypsum mm. seams.	527 130 421 142 <u>286</u>				6.0					1	1	3
110' contact gradational	Note: Darker layers slightly softer than lighter layers.				6.2					1	2	3
115' DOLOMITIC MUDSTONE - Moderately hard, somewhat shaly, very fine grained. 6" to 1' bedded with 2" lighter dolomite layers. Horizontal, white gypsum partings occur at 6" to 1' intervals. Rock tends to split along these gypsum partings. Rock becomes more uniformly dark, with light layers less frequent & thinner.	1/4" clay filled horiz. joint 117' Natural gas occurrence - see end of log. Note: From 117' down core barrel bound in hole, coated with black oily residue, H ₂ S odor.		GL/L/I		8.7					1	2	3
125'												
130'	← APPROXIMATE TUNNEL INVERT (129')				5.5					1	2	3

CS-3-816
 A-8
 4 of 5

LOG SHEET
Core Data Log

BORING NO. A-0
SHEET 5 of 5

Strata Description

Remarks

Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters		
				25	50	75	90	"D"	"S"	"F"
			5.5					1	2	3

End of hole at 136'

Note - 10' steel packer tube lost in bottom of hole - grouted in.
Note - At 117' a 1/2" seam was intercepted which yielded a large quantity of Natural Gas. Initially water and gas flowed from the hole 40' above ground level through the drill rods. Gas stopped flowing after 3 hours.



GEOSCIENCE CORP.
Rock Core Log

Surface Elev. $\approx 525' \pm 3$ Hole Depth 135'
Inclination From Horiz. 90° Bearing
Boring No. A-9
Job No. CS-3-816

Client **Chas. H. Sells, Inc.** Inspector **R.W.S.** Log Date **1/6/75**
Location **South Ave., Rochester, N.Y.** Casing Used **4" to 27'**
Drilling Co. **Rochester Drilling** Rig. **CME-SS** Core Size **NX**
Driller **Don Sweeting** Drills **2/31/74 to 1/8/75**

Sheet 1 of 5

Rock Quality Parameters

$\Gamma = 100^\circ$ Location Plan

Mud Unit	Water Loss	Bedding & Layer Axis	Mud Color	Graphic Log	Depth Scale	Surface Outcrops	Purpose of Log	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Recomposition	Strength "S"	Fracturing "F"
						Geologic Description	Rock quality for tunnel design					25	50	75	90			
					5'	OVERBURDEN Olive brown silt, fine sand.												
					10'	Not sampled - logged from auger flights only.												
					15'													
					20'													
					25'													
						Top of rock at 27'												
							Overburden is dry to top of rock											

Core Log

BORING NO. A-2
 SHEET 2 of 5

PENFIELD

N5

N6

30' DOLOMITE - Hard, medium cry-
 stalline, fairly massive with
 some horizontal stylolites
 occurring at irregular intervals.
 Most of these partings are
 competent, few are open.

35'

40'

45' DOLOMITE - Hard, fine cry-
 stalline, sandy. Medium to thin
 bedded, with horizontal stylolites
 occurring at irregular intervals.
 Some zones are thin bedded,
 with shaly, fossil hash layers.

50'

55' DOLOMITE - Hard, medium cry-
 stalline, sandy. Fairly massive
 with 1/2" to 1" black, shaly bands
 occurring at 6" to 2' intervals.
 Rock also has stylolitic zones
 broken along 2" to 6" shaly
 seams.

60'

"Wispy" algal zone

1/6/75
 5/1/75
 1/8/75

Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters		
		25	50	75	90	"D"	"S"	"F"
	4.4					2		3
						1	1	2
	5.0					1	1	2
	4.0					1	1	2
	4.0					1	1	2
	9.0					1	1	3
	5.0					1	1	3
	5.0					1	1	2

CS-3-816 | A-2

Geologic Description

Remarks

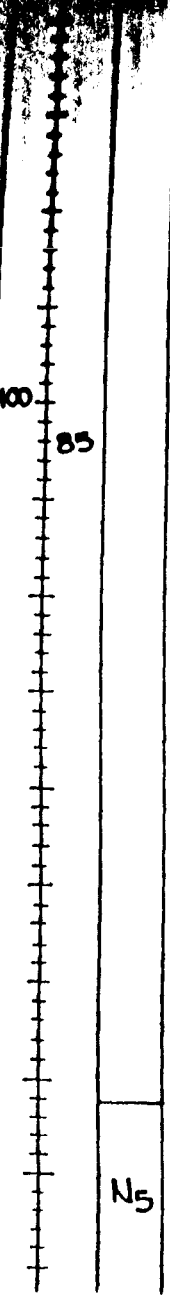
65-70' **DOLOMITE** - Hard, medium crystalline, sandy. Fairly massive with 1/2" to 1" black, shaly bands occurring at 6" to 2' intervals. Rock also has stylolitic zones broken along 2" to 6" shaly seams.

75' - 80' 1/2" black shaly bands occur at regular 1' to 2' intervals

85' - 95'

PENFIELD

DECEW



N5

Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./ft.	Core Recovery and R.Q.D. 25 50 75 90	Rock Quality Parameters		
					"D"	"S"	"F"
	5/8/1		5.0		1	1	2
			5.0		1	1	3
			6.0		1	1	2
	1/8/1		6.0		1	1	1
			6.0		1	1	1
			7.0		1	1	2
			7.0		1	1	2
			7.0		1	1	2

CS-3-816 | A-9 | 3 of 5

SCREW

GATES

ROCHESTER

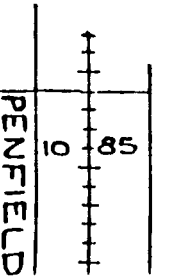
N₃
 L
 106
 R
 N₅
 +
 N₄
 N₄
 +
 N₅

Depth Description	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters		
						25	50	75	90	"D"	"S"	"F"
100' DOLOMITE - Hard, fine crystalline, 1" to 3" bedded with darker (N ₄) 1/4" to 1/2" argillaceous bands. These bands appear competent. Rock contains a few 1/4" white gypsum nodules.	525 126 417 112 211				7.0					1	1	2
105'					7.0					1	1	2
110' DOLOMITE - Moderately hard (t) fine crystalline, 1" to 6" irregular bedded with dark argillaceous bands 1" to 2" thick. Rock contains some gypsum nodules and few gypsum seams.	Note - Darker layers slightly softer than lighter layers.				7.0					1	2	3
115'	-115' 1/2" horizontal clay filled seam. Natural gas flowed from hole for several hours.		clay		8.0					1	2	3
(contact gradational)					7.0					1	2	3
120' DOLOMITIC MUDSTONE - Moderately hard, somewhat shaly, very fine grained. 6" to 1' bedded with lighter 2" dolomite layers. Horizontal white gypsum partings occur at 6" to 1' intervals. Rock tends to split along these partings.					7.0					1	2	3
125'	126' 7" - Open horizontal seam, possible 11" wide. Large gas occurrence. High pressure for several hours.				6.0					1	2	3
130'	130' 1" - clay seam				4.0					1	2	3

5L/8/75

Core Data Log

Strata Description	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters		
						25	50	75	90	"D"	"S"	"F"
	133' 3" clay seam 1/2"			SL/S/	4.0					1	2	3
End of Hole at 135'												
Packer Test Zones 125' to 135' @ 60 psi K = 379.5 f/yr @ 50 psi K = 367.8 " @ 40 psi K = 430.3 " 115' to 135' @ 60 psi K = 228.9 f/yr @ 50 psi K = 240.2 " @ 40 psi K = 241.0 "												



2
 U.
 OCCUR

ROCK SCIENCE CORP.
Rock Core Log

Surface Elev. ^{579.8} 525 Hole Depth 135'
Inclination 90° From Horiz. Bearing

Boring No. A-
Job No. CS-3-816

Client **Chas. H. Sells, Inc.**
Location Howell St., Rochester, N.Y.
Drilling Co. **Rochester Drilling** Rtg. **CME 55**
Driller **Art Utrr** Drill **1/8/75 to 1/13/75**

Inspector **R.W.S.** Log Date **1/8/75**
Casing Used **4" to 23'**
Core Size **NX**

Sheet 1 of 5
Rock Quality Parameters

Depth (ft)	Surface Stratigraphy	Geologic Description	Purpose of Log Rock quality for tunnel design	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Decomposition	Strength	Fracturing	
									25	50	75	90				
0	Blacktop	Coarse to fine gravel														
5		Miscellaneous fill material (damp) coarse to fine sand, silt, gravel, possible cobbles and boulders. (not sampled)		Note-Unless otherwise indicated, fractures are almost horizontal, hairline, bedding plane breaks.												
10	OVERBURDEN	Brown silt & sand, some gravel (not sampled)														
15																
20		Gray damp, fine sand, some coarse to fine gravel, little silt. (not sampled)														
23		Top of rock at 23'														
25		DOLOMITE - Moderately hard (+) medium crystalline, sandy uniform. Horizontal stylolites occur at 1' to 2' intervals.		4' pitted dolomite to 1/8" openings					3.5				1	1	3	
25									5.5				1	1	2	

PENFIELD 10 85

Job No. CS-3-816
Boring No. A-10
Sheet 1 of 5

Stratigraphic Description

Remarks

Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.			Rock Quality Parameters			
				25	50	75	90	"D"	"S"	"F"
			5.5					1	1	2
			6.5					1	1	1
			7.6					1	1	2
			7.4					1	1	2

30' **DOLOMITE** - Moderately hard (+) medium crystalline, sandy, uniform horizontal stylolites occur at 1' to 2' intervals.

35'

40' **DOLOMITE** - Hard, medium crystalline. Some increase in quartz sand from above. Uniformly massive with occasional horizontal stylolites. Rock contains a distinct zone of closely spaced, (1/2") wispy stylolites as noted.

45'

50'

55'

60'

1" open vug

35' lost drill water.

-38' water returned - dark brown, slight H₂S odor

40' lost drill water

-1" gypsum pod.

3 1/2' wispy, stylolitic zone

-1" gypsum pod

8" zone, "wispy" dolomite with stylolites.

SL/10/1/1
 SL/6/1/1
 SL/13/1/1

PENFIELD

N₅

BORING NO. A-10

SHEET 3 of 5

PENFIELD

DECEM

N₅

70'

75'

80'

85'

90'

95'

DOLOMITE - Hard, medium crystalline. Some increase in quartz sand from above. Uniformly massive with occasional horizontal stylolites. Rock contains a distinct zone of closely spaced, (1/2") wispy stylolites as noted.

DOLOMITE - Moderately hard (+) medium crystalline, sandy fairly massive with 1/2" to 1" black shaly bands at 6" to 2' intervals. Shale bands are somewhat softer than lighter dolomite.

- 3" "flow breccia"
 - 1" black shale - weathered
 - 6" "flow breccia"
 - 2" broken black shale seam

Remarks

Joints

Filings etc.

Stabilized Water Levels

Drilling Rate Min./Ft.

Core Recovery and R.Q.D.
 25 50 75 90

Rock Quality Parameters

"D" "S" "F"

7.4

8.0

7.8

8.3

6.4

1 1 2

1 1 2

1 1 1

1 1 2

1 1 2

SL/E/1
 SL/O/1

CS-3-016 A-10 3 of 5

BUNN GEOSCIENCE CORP.
Rock Core Log

BORING NO. A-10
SHEET 4 of 5

DECEMBER

100.85

N₅
+
N₄

L

106.5

R

110'

115'

120'

125'

130'

DOLOMITE - Moderately hard (+) fine crystalline, 1" to 3" bedded with with darker (N₄) 1/4" to 1/2" argillaceous band. Few 1/4" to 1" white gypsum nodules noted.

contact gradational

DOLOMITE - Moderately hard, fine crystalline 1" to 6" irregularly bedded with dark, argillaceous bands 1" to 2" thick. Rock contains occasional 1/4" white gypsum nodules & few mm. gypsum seams.

120'-130' - Packer test #2
@ 50psi K=309.2 ft³/yr

contact gradational

DOLOMITIC MUDSTONE - Moderately hard, dark, argillaceous, 6" to 1' bedded with lighter 1" to 2" dolomite bands. Abundant mm. white gypsum partings at 3" to 6" intervals. Rock tends to split easily along these partings.

Remarks

520
107

413
142

271

110'-120' - Packer test #1
@ 50psi K=144.5 ft³/yr

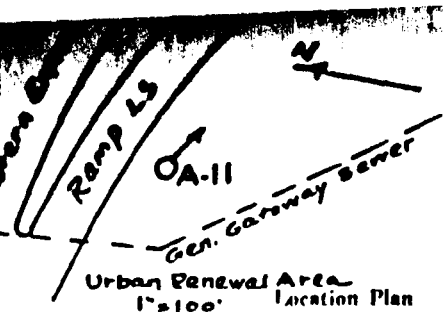
120' inspector noted slight H₂S odor from hole.

126' tunnel invert
When rods were pulled at 130' gas & water flowed from hole for several hours.

Drilling Rate Min./Ft.	Core Recovery and R.Q.D. 25 50 75 90	Rock Quality Parameters		
		"D"	"S"	"F"
6.4		1	1	2
7.0		1	2	2
6.5		1	2	3
6.0		1	2	3
8.0		1	2	3

SL/0/1
SL/0/1

Job No.
CS-3-816
Boring No.
A-10
Sheet
4 of 5



DUNN GEOSCIENCE CORP. Rock Core Log		Surface Elev. 505.3 ~ 500'	Hole Depth 145'	Boring No. A-11
		Inclination From Horiz. 45°	Bearing 580°E	Job No. CS-3-816
Client Chas. H. Sells, Inc.		Inspector R.W.S.	Log Date	
Location Rochester, N.Y.		Casing Used 4" to 12"		Sheet 1 of 5
Drilling Co. Rochester Drilling	Rig. Mobil B40H	Core Size NX		Rock Quality Parameters
Driller Jim Hammond	Drill 10/17/75 to 12/22/75			

Water Loss	Inclining to Core Axis	Rock Color	Graphic Log	Depth Scale	Surface Outcrops	Purpose of Log	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D. 25 50 75 90	Rock Quality Parameters			
					Geologic Description	High angle joint frequency determination						Decomposition	Strength "S"	Fracturing "F"	
				0											
				5	OVERBURDEN (not sampled) vertical overburden depth 7' 14"										
				10											
				15	DOLOMITE - Hard, medium crystalline sandy. Fairly massive with occasional bedding plane stylolites.										
				19											
				20											
				21											
				22											

Note - All joints, unless otherwise indicated, are hairline, bedding plane fractures.

Note 45° angle boring

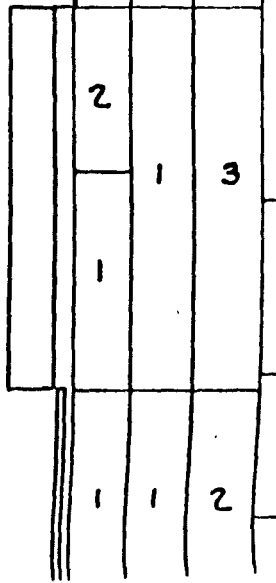
2" broken-joint intersection "

broken-joint intersection "

2" broken zone "

pitted zone

19'
6/12/71



Job No.
Boring No.
She 1 of 5

Core Log

WIRING NO. A-11
SHEET 2 of 5

PENFIELD

100 45+
N5

30'
35'
40'
45'
50'
55'
60'

DOLOMITE - Hard, medium crystalline, sandy. Fairly massive with occasional bedding plane stylolites.

3' 2" open joint \perp to bedding

"wispy" $\frac{1}{4}$ " spaced stylolites - algal zone

- gypsum parting

"wispy" shaly algal zone

- 62' 2" High angle joint intersecting bedding

Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters		
					25	50	75	90	"D"	"S"	"F"
				2.2					1	1	2
				2.2					1	1	2
				2.3					1	1	1
				2.8					1	1	1

CS-3-816 A-11 2 of 5

DUNN GEOSCIENCE CORP.
Rock Core Log

BORING NO. A-11
SHEET 3 of 5

PENFIELD

Elev.	Geologic Description	Remarks	Joints etc.	Fillings	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters		
							25	50	75	90	"D"	"S"	"F"
65'	DOLOMITE - Hard, medium-crystalline, sandy. Fairly massive with occasional bedding plane stylolites.	- 1/4" white gypsum seam - 64'7"-joint intersection ⊥ to bedding 1/4" black shale band				2.5					1	1	1
75'	DOLOMITE - Hard, medium crystalline, 3" to 6" bedded with 1/4" to 1/2" black shale bands, few white gypsum partings.	73'5" open joint ⊥ to bedding, rotted 1/4" open - Driller comments "Rock getting harder" Traces of shaly brecciated algal mat		1/2" / 1"		3.8					1	1	3
85'	DOLOMITE - Hard, medium crystalline, sandy. 1' to 2' bedded with 1/2" black shale bands	} 12" shaly brecciated algal mat Joint intersection ⊥ to bedding				5.0					1	1	3
90'						6.0					1	1	2

DRILLING LOG

DRILLING NO. A-11
SHEET 4 of 5

DECEW
 GATES
 100' 45"
 N5
 126.1
 N5
 N4

100'
 105'
 110'
 115'
 120'
 125'
 130'

DOLOMITE - Moderately hard (+), medium crystalline sandy, with occasional 1/2" to 1" black shale bands at irregular intervals.

(contact gradational)

DOLOMITE - Moderately hard (+), fine crystalline bedded 6" to 1' intervals with darker 2" to 4" dolomitic mudstone.

Remarks

2" contorted shale band

Core has slight H₂S odor

-13 1/4" - 1" broken zone // possible joint intersection

504
 176
 319
 194
 236

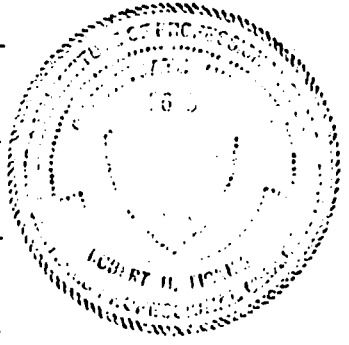
Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters		
	25	50	75	90	"D"	"S"	"F"
6.0					1	1	1
6.0					1	1	1
6.0					1	2	2
6.5					1	2	3

WATER CORP.
Core Log

BORING NO. A-11
SHEET 5 of 5

GATES

Depth Description	Remarks	Joints	Fillings etc.	Stabilized Water Levels	Drilling Rate Min./Ft.	Core Recovery and R.Q.D.				Rock Quality Parameters		
						25	50	75	90	"D"	"S"	"F"
130' DOLOMITE - Moderately hard (+), fine crystalline bedded 6" to 1' intervals with darker 2" to 4" dolomitic mudstone.	137 1/4" joint intersection ⊥ to bedding				5.5					1	2	3
					6.7					1	2	3
					12.0					1	2	3
140' 145'	140' cone barrel plugged, possible joint intersection Yellow spalerite crystals on bedding plane Bottom 2' Rock broken at 2" to 6" intervals											4
End of hole at 145'	slight H ₂ S odor in core											



CS-3-016 A-11 5 of 5

STER

LLING

OMPANY, INC.

SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

PROJECT NO. 1476 PAGE 1 OF 1 BORING NO. P-110
Subsurface Exploration and Testing Culver-Goodman Tunnel
Rochester Pure Waters District

390.3 INSPECTOR D. Andrews WEATHER _____
STARTED 8-13-75 COMPLETED 8-13-75 TECHNICIAN J. Hammond
WATER - CASING IN - 1.0 AT COMPLETION / TIME _____
FACE - CASING OUT - _____ -WELLPOINT AT _____

BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
6"	6" 12"	12" 18"	18" 24"	N				
1	0	0	1	0		S-1	0.0 - 2.0 Loose gray fine SAND, little silt trace peat <u>-FLOOD PLAIN DEPOSIT-</u>	
1	0	1	3	1		S-2	5.0 - 7.0 Loose gray fine SAND, little silt trace peat 9.5	
9	10	10	12	20		S-3	10.0-12.0 Firm gray CINDERS and ASH, little silt, trace sand - FILL -	
18	23	12	12	55		S-4	15.0-17.0 Compact brown sandy SILT, little gravel, trace brick - FILL -	
							RUN #1 19.0-22.0 REC. 53%	
							BOULDERS 20.0 Green SHALE <u>SODUS SHALE</u> 21.5	
							RUN #2 22.0-29.5 REC. 80%	
							Gray fossiliferous LIMESTONE <u>REYNALES LIMESTONE</u>	
							Bottom of Exploration at 29.5'	

N = NO OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. B.
WITH LB. WT. EA. B.



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

Project: Rochester Gas & Electric Corp. - Beebe Station - Environmental Improvements
Subsurface Soil Investigations at the site of the Proposed Central Treatment Facility.

PROJECT NO. 1879

PAGE 1 OF 1 BORING NO. 1

PROJECT SEE ABOVE

CLIENT Sear Brown Associates

ELEVATION 415.5 INSPECTOR E. McGee WEATHER _____

DATE STARTED 8-22-77 COMPLETED 8-22-77 TECHNICIAN D. Steele

GROUND WATER - CASING IN - 0'6" AT COMPLETION / TIME

BELOW SURFACE - CASING OUT - hole caved at 7'0" -WELLPOINT AT _____

PTH LOW FACE	C	BLOWS ON SAMPLER						SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	5" 12"	12" 18"	18" 24"	N				
		4	10			14		0'0"-2'0"	miscellaneous fill material consisting of firm black damp to wet cinders, ashes, coal, sand, gravel, brick, concrete. petroleum odor noted. -fill-	
		10	9			19	1	2'0"-4'0"		
		17	7		1	4	5	2	4'0"-6'0"	6'0"
		6	11		11	43	54	3	6'0"-8'0"	miscellaneous fill material consisting of firm brown/black damp to wet silt, sand, gravel, little brick, concrete, cinders, ashes. petroleum odor noted. -fill-
		12	6		10	9	19	4	8'0"-10'0"	
		5	11		6	3	9	5	10'0"-12'0"	13'6"
		7	9		7	12	19	6	12'0"-14'0"	miscellaneous fill material consisting of firm to loose brown/black wet coarse to fine sand and medium to fine gravel, little cinders, ashes, brick, organic matter. petroleum odor noted.
					7	6	13	7	20'0"-21'6"	
		3	7	7			14	8	21'6"-23'6"	-fill-
		9	11		11	14	25	9	23'6"-25'6"	24'0"
		19	15		22	22	44	10	25'6"-26'6"	26'8"
					100	100	11	11	Boring terminated at 26'8" (refusal), NOTE: Advanced test boring with hollow stem auger casing.	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 100 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

Project: Rochester Gas & Electric Corp. - Beebe Station - Environmental Improvements
Subsurface Soil Investigations at the site of the Proposed Central Treatment Facility.

PROJECT NO. 1870

PAGE 1 OF 2 BORING NO. 2

PROJECT SEE ABOVE

CLIENT Sear Brown Associates

ELEVATION 415.4 INSPECTOR E. McGee WEATHER _____

DATE STARTED 8-22-77 COMPLETED 8-22-77 TECHNICIAN D. Steele

GROUND WATER - CASING IN - 15'8" AT COMPLETION / TIME _____

BELOW SURFACE - CASING OUT - hole caved at 10'0" -WELLPOINT AT _____

DEPTH OF SAMPLE	BLOWS ON SAMPLER						SAMPLE NO	SOIL AND ROCK CLASSIFICATION REMARKS
	0" 6"	3" 12"	6" 18"	9" 24"	12" 36"	N		
0'0"-2'0"	9	10			19		miscellaneous fill material consisting of brown/black cinders, ashes, gravel, sand, brick, concrete.	
			10	15	25	1		
	12	0			21			
2'0"-4'0"			15	20	35	2	-fill- 4'0"	
	4	7			11			
4'0"-6'0"			7	7	14	3	firm brown gray moist silt, little coarse to fine sand, traces of clay, organic material, cinders and ashes.	
	7	10			17			
6'0"-8'0"			10	12	22	4		
	4	6			10			
10'0"-12'0"			8	8	16	5	-fill- 12'0"	
	21	35			56			
12'0"-14'0"			12	14	26	6	firm to very dense brown moist coarse to fine gravel and coarse to fine sand, trace of silt, traces of cinders, ashes, brick, concrete, organic material.	
	7	8			15			
14'0"-16'0"			13	15	28	7	compact brown moist.	
							-fill- 20'0"	
20'0"-22'0"	10	20			30		compact brown wet coarse to fine gravel, little silt and sand, trace of cinders and ashes.	
			13	2	26	8	petroleum odor noted.	
							firm brown wet.	
							-fill- 25'6"	
25'0"-27'0"	7	21			28		miscellaneous fill material consisting of compact to very dense brown/black cinders, ashes, brick, concrete, silt, sand, gravel.	
			41	35	77	9	petroleum odor noted.	
							-fill- 20'0"	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOCN 12" WITH 250 LB. WT. 2" EA. BLOW
C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

Project: Rochester Gas & Electric Corp. - Beebe Station - Environmental Improvements
Subsurface Soil Investigations at the site of the Proposed Central Treatment Facility.

PROJECT NO. 1870

PAGE 2 OF 2 BORING NO. 2

PROJECT SEE ABOVE

CLIENT Sear Brown Associates

ELEVATION 415.4 INSPECTOR _____ WEATHER _____

DATE STARTED 8-22-77 COMPLETED 8-22-77 TECHNICIAN D. Steele

GROUND WATER - CASING IN - 15'8" AT COMPLETION / TIME

BELOW SURFACE - CASING OUT - hole caved at 10'0" -WELLPOINT AT _____

DEPTH BELOW FACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N				
		20	41				01		very dense brown/black moist coarse to fine gravel, some coarse to fine sand, and silt, traces of cinders, ashes, brick. 33'6"	
				47	42	83	10	30'0"-32'0"		
									Boring terminated at 33'6" (refusal) NOTE: Advanced test boring with hollow stem auger casing.	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLOW



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

Project: Rochester Gas & Electric Corp. - Beebe Station - Environmental Improvements
Subsurface Soil Investigations at the site of the Proposed Central Treatment Facility.

PROJECT NO. 1879 PAGE 1 OF 1 BORING NO. 4
 PROJECT SEE ABOVE
 CLIENT Sear Brown Associates
 ELEVATION 415.6 INSPECTOR _____ WEATHER _____
 DATE STARTED 8-23-77 COMPLETED 8-23-77 TECHNICIAN D. Steele
 GROUND WATER - CASING IN - 12'0" AT COMPLETION / TIME _____
 BELOW SURFACE - CASING OUT - 8'2" -WELLPOINT AT _____

PTH LOW ACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N				
									miscellaneous fill material consisting of firm black/brown moist cinders, ashes, concrete, brick, sand, gravel, silt, wood.	
		6	27				33			
				15	6	21	1	4'0"-6'0"		
		6	11				17			
				12	12	24	2	6'0"-8'0"		
		6	7				13			
				6	10	16	3	8'0"-10'0"		
		10	13				23			
				12	10	22	2	10'0"-12'0"	-fill- 12'0"	
		6	5				11			
				2	5	7	5	12'0"-14'0"	loose brown moist to wet coarse to fine gravel and coarse to fine sand, little silt, cinders, ashes, organic material. petroleum odor noted.	
		100				100	6	20'0"-20'3"	brown/black wet.	
		3					3		-fill- 22'8"	
									Boring terminated at 22'8" (refusal) NOTE: Advanced test boring with hollow stem auger casing.	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 140 LB WT 30" EA BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB WT _____ EA BLOW



SUBSURFACE GEOLOGICAL INVESTIGATIONS
CONCRETE AND SOIL-TESTING AND INSPECTION

45 Steel Street • Rochester, New York 14606
716 - 458-0821

Project: Rochester Gas & Electric Corp. - Beebe Station - Environmental Improvements
Subsurface Soil Investigations at the site of the Proposed Central Treatment Facility.

PROJECT NO. 1879

PAGE 1 OF 1 BORING NO. 5

PROJECT SEE ABOVE

CLIENT Sear Brown Associates

ELEVATION 415.8 INSPECTOR _____ WEATHER _____

DATE STARTED 8-23-77 COMPLETED 8-23-77 TECHNICIAN D. Steele

GROUND WATER - CASING IN - 15'0" AT COMPLETION / TIME _____

BELOW SURFACE - CASING OUT - 9'7" -WELLPOINT AT _____

PTH LOW FACE	C	BLOWS ON SAMPLER						SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	5" 12"	12" 18"	18" 24"	N				
									miscellaneous fill material consisting of loose black moist coal, cinders, ashes.	
5		2	3				5			
				5	4		9	1	4'0"-6'0"	
		4	4				8			
				4	14	18	24	2	6'0"-8'0"	
		8	6				24		-fill- 9'0"	
10				5	5		20	3	8'0"-10'0"	
		15	100				116	4	10'0"-10'9"	
			3				9		compact to very dense brown moist coarse to fine gravel, some coarse to fine sand and silt, traces of cinders, ashes, concrete. petroleum odor noted.	
		41	12				50			
				33	20		53	5	12'0"-14'0"	
5									-fill- 15'0"	
20									miscellaneous fill material consisting of loose to dense brown/black wet coarse to fine gravel, brick, sand, concrete, cinders, ashes. petroleum odor noted.	
		5	20				25			
				23	21		44	6	20'0"-22'0"	
									dense brown/black saturated	
25		3	23				31			
				23	21		44	7	25'0"-27'0"	
									dense brown/black wet.	
									-fill- 28'3"	
30									Boring terminated at 28'3" (refusal).	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 10" WITH 140 LB. WT. 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE _____ CASING WITH _____ LB. WT. _____ EA. BLOW

NOTE: Advanced test boring with hollow stem auger casing.



SUBSURFACE INVESTIGATIONS
 Test: Borings - Land - Off-Shore
 TESTING AND INSPECTION
 Concrete - Soils - Asphalt - Steel
 Chemical - Piles - Non-Destructive
 45 Steel Street - Rochester, N. Y. 14606
 Office: 716-453-0821
 Telex: 978-462

PROJECT NO. 1047 PAGE 1 OF 2 BORING NO. B-1
 PROJECT Rochester Gas & Electric Corporation - Beebe Station - CTF Project
 CLIENT Sear-Brown Associates, P.C.
 ELEVATION _____ INSPECTOR _____ WEATHER 18°C - Cloudy
 DATE STARTED 1-30-78 COMPLETED 1-30-78 TECHNICIAN A. Hitter
 GROUND WATER - CASING IN - 18'6" AT COMPLETION / TIME _____
 BELOW SURFACE - CASING OUT - 21'0" -WELLPOINT AT _____

DEPTH FACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N				
		61	45	31		76	1	1'0"-2'6"	Miscellaneous fill material consisting of very dense black/gray damp cinders, ashes, coal, gravel, concrete.	
5		5	2	4		7	2	5'0"-6'6"	Loose black/gray damp cinders, ashes, silt, sand, gravel, concrete, coal.	
10		1	1	1		2	3	10'0"-11'6"	Very loose brown wet sand, silt, gravel, cinders, ashes, organic material.	
15		1	3	1		5	4	15'0"-16'6"	Loose brown/black wet sand, silt, cinders, ashes, wood.	
20		5	2	1		7	5	20'0"-21'6"	Loose brown/black saturated gravel, silt, sand, cinders, organic material.	
25		2				2	6	25'0"-25'12"	Very dense brown moist silt and shale fragments. (Weathered Shale)	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 10" WITH 300 LB. WT. 30" EA. BLO.
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB. WT. _____ EA. BLO.

PROJECT NO. 1047

PAGE 1 OF 2 BORING NO. 2-3

PROJECT Rochester Gas & Electric Corporation - Beebe Station - CTF Project

CLIENT Sear-Brown Associates, P.C.

ELEVATION _____ INSPECTOR _____ WEATHER 20°F - Cloudy

DATE STARTED 1-25-78 COMPLETED 1-27-78 TECHNICIAN A. Utter

GROUND WATER - CASING IN - 24'0" AT COMPLETION / TIME _____

BELOW SURFACE - CASING OUT - 22'8" -WELLPOINT AT _____

TH OW CE	C	BLOWS ON SAMPLER					SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N			
		25	50			75			
				25	15	40	1	0'0"-2'0"	Miscellaneous fill material consisting of: very dense to dense brown/black damp cinders, ashes, coal, brick, concrete, gravel, sand, silt, organic material.
		14	18			32			
				16	18	34	2	2'0"-4'0"	
		12	10			22			
				8	8	16	3	4'0"-6'0"	Firm brown damp.
		9	8			17			
				7	6	13	4	6'0"-8'0"	Firm brown damp.
		21	10			31			
				9	8	17	5	8'0"-10'0"	Firm brown damp. -Fill- 10'6"
		10	8			18			
				8	8	16	6	10'0"-12'0"	Firm brown moist coarse to fine gravel, some coarse to fine sand and silt.
		7	8			15			
				8	7	15	7	12'0"-14'0"	
		6	7			13			
				6	6	12	8	14'0"-16'0"	Firm brown moist medium to fine gravel, some coarse to fine sand and silt, trace of brick. -Fill- 17'0"
		11	8			19			
				4	3	7	9	16'0"-18'0"	Medium brown damp clayey silt, some ashes, little sand and gravel. -Fill- 18'0"
		22	7			29			
				7	11	18	10	18'0"-20'0"	Firm brown/black saturated coarse to fine gravel, little coarse to fine sand and silt, trace to little organic material. -Fill- 22'0"
		8	8			16			
				8	14	22	11	20'0"-22'0"	
		4	5			9			
				4	5	9	12	22'0"-24'0"	Loose black saturated silt and coarse to fine sand, little medium to fine gravel, little organic material. -Fill- 24'0"
		7	12			19			
				14	15	29	13	24'0"-26'0"	Firm to compact brown wet coarse to fine sand and medium to fine gravel, trace of silt, trace of organic material. -Fill- 26'0"
		31	25			56			
				24	41	65	14	26'0"-28'0"	Very dense brown damp coarse to fine gravel, some fine sandy silt. 28'0"
		25	30			55			
				25	20	45	15	28'0"-29'8"	** 29'8"

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 10" WITH 140 LB WT 30" EA. BLOW
C = NO. OF BLOWS TO DRIVE CASING WITH _____ LB WT _____ EA. BLOW
** Very dense brown damp fine sandy silt, little
fine gravel and coarse to medium sand, trace
of organic material, ashes 29'8"



SUBSURFACE INVESTIGATIONS
 Test Borings - Land - Off-Shore
 TESTING AND INSPECTION
 Concrete - Soils - Asphalt - Steel
 Chemical - Piles - Non-Destructive
 45 Steel Street - Rochester, N. Y. 14606
 Office: 716-458-0821
 Telex: 978-462

PROJECT NO. 1047 PAGE 2 OF 2 BORING NO. B-3
 PROJECT Rochester Gas & Electric Corporation - Beebe Station - CEF Project
 CLIENT Sear-Brown Associates, P.C.
 ELEVATION _____ INSPECTOR _____ WEATHER 20°C - Cloudy
 DATE STARTED 1-25-78 COMPLETED 1-27-78 TECHNICIAN A. Utter
 GROUND WATER - CASING IN - 24'0" AT COMPLETION / TIME _____
 BELOW SURFACE - CASING OUT - 22'8" -WELLPOINT AT _____

PTH LOW ACE	C	BLOWS ON SAMPLER						SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N				
									Run No. 1 30'0"-35'0" Recovery 1'0"	Very dense cobbles, gravel, sand. 35'0"
		100 6					100 6	15	35'0"-35'6"	Very dense brown saturated coarse to fine gravel and coarse to fine sand, little to trace of silt. Few cobbles noted. 40'0"
									Run No. 2 40'0"-45'0" Recovery 4'5"	Soft to medium hard gray shale with thin to thick mud (weathered shale) seams. Core in many pieces from chips to 3' long.
									Run No. 3 45'0"-50'0" Recovery 1'10"	
									Run No. 4 50'0"-52'0" Recovery: 1'6"	Soft to medium hard interbedded shale and limestone with few thick weathered shale seams. 52'0"
										Boring terminated at 52'0"
										Note: Advanced test boring with hollow stem auger casing to 30'0". Core drilled with AX series "1" double tube core barrel and diamond bit from 30'0" to 35'0" and 40'0" to 52'0".

NOTES: N = NO OF BLOWS TO DRIVE 2" SPOON 12" WITH 110 LB WT 30" EA. BLO.
 C = NO OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB WT _____ EA. BLO.

PROJECT NO. 1047

PAGE 1 OF 2 BORING NO. 210

PROJECT Rochester Gas & Electric Corporation - Beebe Station - OIP Project

CLIENT Sear-Brown Associates, P.C.

ELEVATION _____ INSPECTOR _____ WEATHER 100% - Cloudy

DATE STARTED 1-21-78 COMPLETED 1-21-78 TECHNICIAN A. Utter

GROUND WATER - CASING IN - 24'0" AT COMPLETION / TIME _____

BELOW SURFACE - CASING OUT - 23'1" -WELLPOINT AT _____

DEPTH - FACE	C	BLOWS ON SAMPLER					SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N			
								No Samples 0'0"-42'0" At Owner's Request	
								Miscellaneous Fill Material	
								-Fill- 2-10"	
								Silty fine sand, some medium to fine gravel and coarse to medium sand.	

NOTES: N = NO. OF BLOWS TO DRIVE 2" SPOON 12" WITH 100 LB WT 20" EA BLOW
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB WT _____ EA BLOW



SUBSURFACE INVESTIGATIONS
 Test Borings - Land - Off-Shore
 TESTING AND INSPECTION
 Concrete - Soils - Asphalt - Steel
 Chemical - Piles - Non-Destructive
 45 Steel Street - Rochester, N. Y. 14606
 Office: 716-453-0521
 Telex: 978-462

PROJECT NO. 1047 PAGE 2 OF 2 BORING NO. B-10
 PROJECT Rochester Gas & Electric Corporation - Beebe Station - CIP Project
 CLIENT Sear-Brown Associates, P.C.
 ELEVATION _____ INSPECTOR _____ WEATHER PROG - Cloudy
 DATE STARTED 7-31-78 COMPLETED 7-31-78 TECHNICIAN J. Hagan
 GROUND WATER - CASING IN - 24'0" AT COMPLETION / TIME _____
 BELOW SURFACE - CASING OUT - 23'1" -WELLPOINT AT _____

PTH LOW ACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0' 6"	6' 12"	12' 18"	18' 24"	N				
								Run No. 1 30'0"-33'0" Recovery 0'8"	Cobbles, Gravel, Sand. 33'0"	
								No Samples 0'0"-42'0" at Owner's Request.	Silty fine sand, some coarse to fine gravel and coarse to medium sand. Partially weathered shale. Refusal 42'0"	
								Run No. 2 42'0"-47'0" Recovery 4'10"	Soft to medium hard gray shale with few thin limestone interbeds. Few thin weathered shale seams noted. Core in many pieces from chips to 3 1/2" long. 47'0"	
									Boring terminated at 47'0" Note: Advanced test boring with hollow stem auger casing to 25'0". Advanced test boring with 2 1/2" extra heavy drive pipe casing to 42'0" Core drilled with AX series "X" double tube core barrel and diamond bit from 30'0"-33'0", and 42'0"-47'0". Broke augers in hole twice while drilling at 23 feet. Second auger not recovered.	

NOTES: N = NO. OF BLOWS TO DRIVE _____ 2" SPOON _____ 12" WITH _____ LB AT _____ EA BLO.
 C = NO. OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB AT _____ EA BLO.

PROJECT NO. 1047 PAGE 1 OF 2 BORING NO. B-12
PROJECT Rochester Gas & Electric Corporation - Beebe Station - OIF Project
CLIENT Sear-Brown Associates, P.O.
ELEVATION _____ INSPECTOR _____ WEATHER 200F - Cloudy, Breeze
DATE STARTED 2-2-78 COMPLETED 2-2-78 TECHNICIAN A. Wren
GROUND WATER - CASING IN - 24'0" AT COMPLETION / TIME _____
BELOW SURFACE - CASING OUT - Boring cased at 26'0" -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER						SAMPLE NO.	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	5" 12"	12" 18"	15" 24"	N				
5									No Samples 0'0"-29'6" At Owner's Request	
10										Miscellaneous Fill Material
15										
20										
25										
30										
35										
40										
45										
50										
55										
60										
65										
70										
75										
80										
85										
90										
95										
100										
105										
110										
115										
120										
125										
130										
135										
140										
145										
150										
155										
160										
165										
170										
175										
180										
185										
190										
195										
200										
205										
210										
215										
220										
225										
230										
235										
240										
245										
250										
255										
260										
265										
270										
275										
280										
285										
290										
295										
300										
305										
310										
315										
320										
325										
330										
335										
340										
345										
350										
355										
360										
365										
370										
375										
380										
385										
390										
395										
400										
405										
410										
415										
420										
425										
430										
435										
440										
445										
450										
455										
460										
465										
470										
475										
480										
485										
490										
495										
500										

NOTES: N=NO OF BLOWS TO DRIVE 2" SPOON 10" WITH 120 LB WT 20" EA BLOW
C=NO OF BLOWS TO DRIVE _____ CASING _____ WITH _____ LB WT _____ EA BLOW

PROJECT NO. 1047 PAGE 2 OF 2 BORING NO. B-12
PROJECT Rochester Gas & Electric Corporation - Beebe Station - OIF Project
CLIENT Sear-Brown Associates, P.C.
ELEVATION _____ INSPECTOR _____ WEATHER 2007 Cloudy, Flurries
DATE STARTED 2-2-78 COMPLETED 2-2-78 TECHNICIAN A. Utter
GROUND WATER - CASING IN - 24'0" AT COMPLETION / TIME _____
BELOW SURFACE - CASING OUT - Boring caved at 16'0" -WELLPOINT AT _____

DEPTH BELOW SURFACE	C	BLOWS ON SAMPLER					SAMPLE NO	DEPTH OF SAMPLE	SOIL AND ROCK CLASSIFICATION REMARKS
		0" 6"	6" 12"	12" 18"	18" 24"	N			
		26	46	120	146	1	29'6"-30'11"	Very dense brown wet coarse to fine gravel and coarse to fine sand, little silt.	
				5	11				
		30	70		130	2	34'6"-35'6"	Very dense brown damp coarse to fine gravel and coarse to fine sand, some silt. 37'0"	
		100	71		171	3	39'6"-40'6"	Very dense gray damp shale gravel, little weathered shale.	
		146	200		246	4	45'0"-45'10"	Very dense brown wet shale gravel, some sand and silt, trace of clay.	
		100			100	5	50'0"-50'4"	Very dense brown damp silt and very fine sand, little shale gravel. Refusal 51'0"	
		4			4		51'0"-56'0"	Run No. 1 Recovery 111"	
								Medium hard gray limestone. Jointing is close to wide and open. Few thin shale partings and weathered shale seams noted. Core in many pieces from chips to 10' long.	
								56'0"	
								Boring terminated at 56'0"	
								Note: Advanced test boring with hollow stem auger casing to 51'0". Core drilled with AII series "01" double	

NOTES: N = NO OF BLOWS TO DRIVE 3" SPOON 10" WITH 100 LB WT 30" EA BLOW
C = NO OF BLOWS TO DRIVE _____ CASING WITH _____ LB WT _____ EA BLOW

tube core barrel and diamond bit from 51'0"-56'0".

CORE BORING REPORT

Drill Rate in. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS		
		in.	%					
						(Note: First 0.4 ft. of rock lost in river, due in part to bad lifter. Lifter replaced before R-2.) Begin coring at 18.6 ft.		
3	18.6			MOD-	>10	FRACTURE FREQUENCY (FRACT./FT.)	Grayish brown to greenish gray shale.	
6	R-1	37	70	SEV	4		LOWER SODUS SHALE	
6		12	23	SEV	20		Irregular low angle joint at 21.4 ft.	
5					20		Severely weathered low angle joints at 21.5 and 22.0 ft.	
4	24.0	9/5	75/42		210		23.0	
3	R-2			MOD-			Light to medium gray fine to medium-grained crystalline, fossiliferous Limestone, interbedded with dark gray, very thin-bedded Shale. Trace pits, vugs and stylolites. Closely spaced argillaceous partings.	
3				SEV			REYNALES LIMESTONE	
2			84	100	SL-			
2			51	61	MOD			Rough, vertical joint from 24.2 to 24.3 ft. Rough, short, high angle joint at 24.5 ft. Short vertical joint at 25.3 ft. Hard, very thin siliceous zones at 29.4, 30.7, 31.8 and 33.0 ft. Pitted chert, with irregular, tight, vertical cracks, from 35.3 to 35.7 ft.
3	31.0						REYNALES LIMESTONE	
3	R-3			MOD				
4			104	96	SL-			
5			68	63	MOD			
4								
4	40.0						39.9 Red, medium-grained, oolitic, fossiliferous,	
4							39.4 FURNACEVILLE MEMBER hematitic Limestone.	
5							REYNALES LIMESTONE	
6		28	123	MOD			*RQD based on core recovered.	
6		4	14*				41.9	
6	R-4						6 Light greenish gray, argillaceous Shale.	
7							7 MAPLEWOOD SHALE	
6			91	94				7 Smooth, low angle joints at 43.0, 43.6, 45.7, 46.4 and 47.4 ft.
7			0	0**	MOD			
7	50.0						** Quality of rock core reduced due to drilling problems.	
7					SEV			

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
<ul style="list-style-type: none"> - Knife can't scratch - scratches diff. - scratches easily - grooves - carves 	<ul style="list-style-type: none"> Fresh V. slight Slight Moderate 	<ul style="list-style-type: none"> Mod. Severe Severe V. Severe Complete 	<ul style="list-style-type: none"> V. thin V. Close < 2" Thin Close 2" - 12" Medium Mod. Close 12" - 36" Thick Wide 36" - 120" V. thick V. wide > 120"
			<ul style="list-style-type: none"> > 90% 90-75 75-50 50-25 < 25
			<ul style="list-style-type: none"> Excellent Good Fair Poor V. Poor

CORE BORING REPORT

Drill Rate in. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS			
		in.	%						
4	50.0					4	Light greenish gray, argillaceous Shale. MAPLEWOOD SHALE Smooth, low angle joints at 52.2, 52.4, 52.6, 53.4, 53.5, 55.2, 56.4, 56.5 and 58.0 ft. Smooth, high angle joint from 52.3 to 52.8 ft. Smooth, tight, high angle joint from 53.6 to 53.8 ft. Rough, moderately dipping joints at 55.6 ft. and from 58.1 to 58.2 ft. Rough, moderately to severely weathered, vertical joint from 58.2 to 60.0 ft. ** Quality of rock core reduced due to drilling problems.		
5				SL-		2			
5				MOD		4			
6				SEV		>10			
6	R-5	95 48	79 40**			2			
6								6	
5						SL-			4
5						MOD			>10
6						SEV			>10
6									>10
6	60.0				60.0				
6									
4	R-6	44 34	92 71	SL-					
4					MOD				
4									
	64.0								

FRACTURE FREQUENCY
(FRACTURES/FT.)

Light greenish gray, fine to medium-grained, medium-bedded Sandstone.
 THOROLD SANDSTONE
 Thin, reddish mottled zone at 62.8 ft.

BOTTOM OF BORING AT 64.0 FT.

NOTE: After completion, casing was damaged and borehole lost. No water pressure tests were completed and borehole was not grouted.

FIELD HARDNESS	WEATHERING		BEDDING/JOINT SPACING			RQD
- Knife can't scratch - scratches drill - scratches easily - grooves - carves	Fresh V. Slight Slight Moderate	Mod. Severe Severe V. Severe Complete	V. Thin Thin Medium Thick V. Thick	V. Close Close Mod. Close Wide V. wide	< 2" 2" - 12" 12" - 36" 36" - 120" > 120"	> 90% 90-75 75-50 50-25 < 25
					Excellent Good Fair Poor V. Poor	

TEST BORING REPORT

HOLE NO. B602

St. Paul Boulevard Interceptor Improvements
O'Brien & Gere Engineers, Inc.
Drill & Test, Inc.

FILE NO. 749940
SHEET NO. 1 of 3
LOCATION: E. Side of River
ELEVATION 390.0 NCD
DATE START 16 May 64
DATE FINISH 17 May 64
DRILLER: W. Skura
INSPECTOR: E. Amos

LAYER	DEPTH TO: (Ft.)		CASING	SAMPLER	CORE BARREL
	WATER	BOTTOM OF CASING			
0830	0	19.5	19.5		
0820	0	19.5	58.5		

TYPE	HW	S/S	NX
SIZE in.	4	1-3/8	2-1/8
HAMMER WT lb.	--	140	--
HAMMER FALL in.	--	30	--

DEPTH RANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 4 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
0.0 - 0.5				
0.5 - 1.0				
1.0 - 1.5				
1.5 - 2.0				
2.0 - 2.5				
2.5 - 3.0				
3.0 - 3.5				
3.5 - 4.0				
4.0 - 4.5				
4.5 - 5.0				
5.0 - 5.5				
5.5 - 6.0				
6.0 - 6.5				
6.5 - 7.0				
7.0 - 7.5				
7.5 - 8.0				
8.0 - 8.5				
8.5 - 9.0				
9.0 - 9.5				
9.5 - 10.0				
10.0 - 10.5				
10.5 - 11.0				
11.0 - 11.5				
11.5 - 12.0				
12.0 - 12.5				
12.5 - 13.0				
13.0 - 13.5				
13.5 - 14.0				
14.0 - 14.5				
14.5 - 15.0				
15.0 - 15.5				
15.5 - 16.0				
16.0 - 16.5				
16.5 - 17.0				
17.0 - 17.5				
17.5 - 18.0				
18.0 - 18.5				
18.5 - 19.0				
19.0 - 19.5				
19.5 - 20.0				
20.0 - 20.5				
20.5 - 21.0				
21.0 - 21.5				
21.5 - 22.0				
22.0 - 22.5				
22.5 - 23.0				
23.0 - 23.5				
23.5 - 24.0				
24.0 - 24.5				
24.5 - 25.0				
25.0 - 25.5				
25.5 - 26.0				
26.0 - 26.5				
26.5 - 27.0				
27.0 - 27.5				
27.5 - 28.0				
28.0 - 28.5				
28.5 - 29.0				
29.0 - 29.5				
29.5 - 30.0				
30.0 - 30.5				
30.5 - 31.0				
31.0 - 31.5				
31.5 - 32.0				
32.0 - 32.5				
32.5 - 33.0				
33.0 - 33.5				
33.5 - 34.0				
34.0 - 34.5				
34.5 - 35.0				
35.0 - 35.5				
35.5 - 36.0				
36.0 - 36.5				
36.5 - 37.0				
37.0 - 37.5				
37.5 - 38.0				
38.0 - 38.5				
38.5 - 39.0				
39.0 - 39.5				
39.5 - 40.0				
40.0 - 40.5				
40.5 - 41.0				
41.0 - 41.5				
41.5 - 42.0				
42.0 - 42.5				
42.5 - 43.0				
43.0 - 43.5				
43.5 - 44.0				
44.0 - 44.5				
44.5 - 45.0				
45.0 - 45.5				
45.5 - 46.0				
46.0 - 46.5				
46.5 - 47.0				
47.0 - 47.5				
47.5 - 48.0				
48.0 - 48.5				
48.5 - 49.0				
49.0 - 49.5				
49.5 - 50.0				
50.0 - 50.5				
50.5 - 51.0				
51.0 - 51.5				
51.5 - 52.0				
52.0 - 52.5				
52.5 - 53.0				
53.0 - 53.5				
53.5 - 54.0				
54.0 - 54.5				
54.5 - 55.0				
55.0 - 55.5				
55.5 - 56.0				
56.0 - 56.5				
56.5 - 57.0				
57.0 - 57.5				
57.5 - 58.0				
58.0 - 58.5				
58.5 - 59.0				
59.0 - 59.5				
59.5 - 60.0				
60.0 - 60.5				
60.5 - 61.0				
61.0 - 61.5				
61.5 - 62.0				
62.0 - 62.5				
62.5 - 63.0				
63.0 - 63.5				
63.5 - 64.0				
64.0 - 64.5				
64.5 - 65.0				
65.0 - 65.5				
65.5 - 66.0				
66.0 - 66.5				
66.5 - 67.0				
67.0 - 67.5				
67.5 - 68.0				
68.0 - 68.5				
68.5 - 69.0				
69.0 - 69.5				
69.5 - 70.0				
70.0 - 70.5				
70.5 - 71.0				
71.0 - 71.5				
71.5 - 72.0				
72.0 - 72.5				
72.5 - 73.0				
73.0 - 73.5				
73.5 - 74.0				
74.0 - 74.5				
74.5 - 75.0				
75.0 - 75.5				
75.5 - 76.0				
76.0 - 76.5				
76.5 - 77.0				
77.0 - 77.5				
77.5 - 78.0				
78.0 - 78.5				
78.5 - 79.0				
79.0 - 79.5				
79.5 - 80.0				
80.0 - 80.5				
80.5 - 81.0				
81.0 - 81.5				
81.5 - 82.0				
82.0 - 82.5				
82.5 - 83.0				
83.0 - 83.5				
83.5 - 84.0				
84.0 - 84.5				
84.5 - 85.0				
85.0 - 85.5				
85.5 - 86.0				
86.0 - 86.5				
86.5 - 87.0				
87.0 - 87.5				
87.5 - 88.0				
88.0 - 88.5				
88.5 - 89.0				
89.0 - 89.5				
89.5 - 90.0				
90.0 - 90.5				
90.5 - 91.0				
91.0 - 91.5				
91.5 - 92.0				
92.0 - 92.5				
92.5 - 93.0				
93.0 - 93.5				
93.5 - 94.0				
94.0 - 94.5				
94.5 - 95.0				
95.0 - 95.5				
95.5 - 96.0				
96.0 - 96.5				
96.5 - 97.0				
97.0 - 97.5				
97.5 - 98.0				
98.0 - 98.5				
98.5 - 99.0				
99.0 - 99.5				
99.5 - 100.0				

FIELD CLASSIFICATION AND REMARKS

NOTE: This borehole was drilled in the Genesee River using barge-mounted equipment. All depths were measured from the water surface on the date the borehole was started. The river elevation at that time is given above.

MUDLINE AT 6.0 FT.

SOIL OVERBURDEN
(No Soil Samples Obtained)

CASING REFUSAL AT 19.5 FT.

FT.	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
	VERY LOOSE	0-2	VERY SOFT	S --- SPLIT SPCON	OVERBURDEN 19.5
	LOOSE	2-4	SOFT	T --- THIN WALL TUBE	ROCK 24.0
	MEDIUM COMPACT	4-8	MEDIUM STIFF	U --- UNDISTURBED PISTON	SAMPLES ---
	COMPACT	8-15	STIFF	C --- OPEN END SOO	HOLE NO B602
	VERY COMPACT	15-30	VERY STIFF	W --- WASH SAMPLE	

CORE BORING REPORT

Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
		in.	%			
-						Begin coring at 19.5 ft.
5	19.5	32	103	MOD-		<p>FRACTURE FREQUENCY (FRACT./FT.)</p> <p>Grayish brown to greenish gray Shale.</p> <p>LOWER SODUS SHALE</p> <p>Smooth, low angle joints at 20.8, 21.7 and 21.9 ft.</p> <p>*RQD based on core recovered.</p>
5		9	28*	SEV	22.1	
3						<p>Light to medium gray, fine to medium-grained, crystalline, fossiliferous Limestone, interbedded with dark gray, very thin-bedded Shale. Trace pits, vugs and stylolites. Closely spaced argillaceous partings.</p> <p>REYNALES LIMESTONE</p> <p>Severely weathered, shaly parting at 23.8 ft. Moderately weathered, rough, vertical joints from 24.2 to 24.4 and 28.5 to 29.3 ft. Hard, very thin, siliceous zones with tight, vertical cracks at 28.0, 30.1, 30.6, 32.3, 32.5, 32.7 and 33.0 ft. Vuggy, pitted chert, with slightly to moderately weathered, high angle to vertical cracks and joints, from 34.2 to 35.2 ft.</p>
4	R-1			MOD-		
4		80	90	SEV		
4		26	29			
4				MOD	26.7	
4	29.5					
5				MOD-		<p>37.0 Red, medium-grained, oolitic, fossiliferous, hematitic Limestone</p> <p>37.5 FURNACEVILLE MEMBER</p> <p>REYNALES LIMESTONE</p>
5	R-2	96	89	SEV		
5		43	40	MOD		
5					WPT2	
5				MOD-	37.3	
5				SEV		
5	38.5					
5		35	146	MOD		<p>*RQD based on core recovered.</p> <p>Light, greenish gray, argillaceous Shale.</p> <p>MAPLEWOOD SHALE</p> <p>Smooth, low angle joints at 40.5, 41.7, 48.0, 48.3 and 49.2 ft. Severely weathered, clayey parting at 48.4 ft.</p>
5		8	23*		40.5	
5				MOD		
5				SEV		
5	R-3	75	73			<p>FRACTURE FREQUENCY (FRACTURES/FT.)</p> <p>**Quality of rock core reduced due to drilling problems.</p>
5		34	35**	SL-		
5				MOD		
5				MOD-	46.7	
5	48.5			SEV		
5				MOD		

FIELD HARDNESS	WEATHERING		BEDDING/JOINT SPACING			RQD
Hard - Knife can't scratch - scratches diff. Medium - scratches easily - grooves - carves Soft - carves	Fresh V. slight Slight Moderate	Mod. Severe Severe V. Severe Complete	V. thin Thin Medium Thick V. thick	V. Close Close Mod. Close Wide V. wide	< 2" 2" - 12" 12" - 36" 36" - 120" > 120"	> 90% 90-75 75-50 50-25 < 25
						Excellent Good Fair Poor V. Poor

CORE BORING REPORT

Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS	
		in.	%				
5	R-4	112 28	93 23**	MOD	WPT1 57.3	9	Light greenish gray argillaceous Shale. MAPLEWOOD SHALE Intersecting, smooth, low angle and moderately dipping joints at 50.2 ft. Smooth, low angle joints at 50.6, 51.3, 51.8, 53.5 and 56.5 ft. Smooth high angle joints from 51.0 to 51.3 and 52.5 to 52.7 ft. Smooth, moderately dipping joint at 51.8 ft.
5							
5							
5							
5							
5							
5							
5							
5							
5							
6	R-5	56 28	93 47**	SL- MOD	SEV 59.0	10	Light gray fine to medium-grained, medium-bedded Sandstone. THOROLD SANDSTONE Thin reddish mottled zone at 62.0 ft. ** Quality of rock core reduced due to drilling problems.
6							
6							
6							
6							
BOTTOM OF BORING AT 63.5 FT. Borehole grouted to depth of 19.5 ft.							

FRACTURE FREQUENCY (FRACTURES/FT.)

FIELD HARDNESS	WEATHERING		BEDDING/JOINT SPACING				RQD
Hard - Knife can't scratch -- scratches diff. Medium - scratches easily -- grooves Soft - carves	Fresh V. slight Slight Moderate	Mild, Severe Severe V. Severe Complete	V. thin Thin Medium Thick V. thick	V. Close Close Med Close Wide V. wide	< 2" 2" - 12" 12" - 36" 36" - 120" > 120"	> 90% 90-75 75-50 50-25 < 25	Excellent Good Fair Poor V. Poor

6 A OF NEW YORK
CHESTER, NEW YORK

TEST BORING REPORT

MOLE NO. B603

St. Paul Boulevard Interceptor Improvements

FILE NO. 739940

O'Brien & Gere Engineers, Inc.

SHEET NO. 1 of 3

FACTOR Drill & Test, Inc.

LOCATION: Brewer St.

ELEVATION 413.3 NCD

DATE START 18 May 1984

DATE FINISH 22 May 1984

DRILLER W. Skura

INSPECTOR F. Amos

TIME	WATER	DEPTH TO		TYPE	CASING	SAMPLER	CORE BARREL
		BOTTOM OF CASING	BOTTOM OF HOLE				
1350	25.9	Auger	28.5	REG ID	3-1/4	1-3/8	2-1/8
0830	22.0		29.8	HAMMER	--	140	--
1100	21.5		90.7	HAMMER	--	30	--

STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
	3	8	S-1	0 - 1.5	Medium compact brown, red, and black gravelly SAND, trace organics, with brick, coal and cinders. -TOPSOIL AND FILL-
	2	5	S-2	5.0 - 6.5	Loose red gravelly SAND, little silt.
	5	7	S-3	10.0 - 11.5	Medium compact red sandy GRAVEL, little silt.
	10	12	S-4	15.0 - 16.5	Compact, red sandy GRAVEL, little silt. -FILL-
17.5	4	8	S-5	20.0 - 21.5	Medium compact grayish green silty CLAY, trace gravel and organics, grading to sandy SILT.
	4	18	S-6	25.0 - 26.5	Compact brown medium to fine gravelly SAND, trace clay. Wet. -ALLUVIUM-
28.0				28.0	TOP OF ROCK AT 28.0 FT.
	100		S-7	28.5	Greenish gray, severely weathered SHALE.

DEPT. FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-2	VERY SOFT	S - SPLIT SPOON	OVERBURDEN 28.0
4-10	LOOSE	2-4	SOFT	T - THIN WALL TUBE	ROCK 62.7
10-30	MEDIUM COMPACT	4-8	MEDIUM STIFF	U - UNDISTURBED PISTON	SAMPLES 7
30-50	COMPACT	8-15	STIFF	O - OPEN END ROD	MOLE NO. B603
50-100	VERY COMPACT	15-30	VERY STIFF	W - WASH SAMPLE	

Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY PQD		Graphic Log Width	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
		in.	%			
						Begin Coring at 29.0 Ft.
—	29.0			SEV	>10	Dark greenish gray to grayish brown Shale.
—				MOD-	>10	Trace fossils.
3				SEV	6	LOWER SODUS SHALE
3	R-1				>10	Four light gray, thin to very thin shell Lime- stone beds, from 30.6 to 34.9 ft. Severely weathered clayey Shale from 32.0 to 32.5 ft. and 34.9 to 35.1 ft. Moderately weathered, smooth low angle joint at 35.5 ft. Severely weather- ed, rough, vertical joint from 35.7 to 35.9 ft. Intersecting, curved, smooth high angle and moderately dipping joints from 36.9 to 37.3 ft. Intersecting, smooth, moderately dipping and low angle joints from 38.3 to 38.6 ft. Short vertical joint in very thin limestone bed at 41.6 ft.
3		98	91	MOD	3	
3		26	24		4	
3				SEV	>10	
3				MOD-	5	
3	38.0			SEV	7	
3					10	
3		53	100	MOD	7	
3		0	0**		8	
3				MOD-	9	** Quality of rock core reduced due to drilling problems.
3	R-2			SEV	>10	
4				MOD	42.4	
4				MOD-	42.5	Light to medium gray, fine to medium-grained, crys- talline, fossiliferous Limestone, interbedded with dark gray, very thin-bedded Shale. Trace pits, vugs, and stylolites. Closely spaced argillaceous part- ings.
4		57	85	SEV		
4		21	31			
4	48.0			SL-		REYNALES LIMESTONE
4				MCD		Small vug, lined with gypsum, at 42.7 ft. Rough, vertical crack from 43.8 to 44.0 ft. Severely weath- ered clayey Shale partings at 44.2 and 45.0 ft. Rough open, vertical cracks from 46.7 to 46.8, 48.4 to 48.6, 49.2 to 50.8, and 53.5 to 54.0 ft. Moderate- ly weathered, rough, vertical joint, partly open and lined with selenite, from 55.3 to 56.4 ft. Hard, very thin siliceous zones at 51.7, 52.3 and (verti- cally cracked) 57.7 ft.
4				SL-	51.4	
4				MOD	53.1	
4	R-3	116	97			
4		74	62			
5				MOD		
7						
5	58.0					
3				SL-		58.6 Red, medium-grained, oolitic, fossiliferous, 59.2 FURNACEVILLE MEMBER hematic Limestone.
3				MOD		REYNALES LIMESTONE

FRACTURE FREQUENCY
(FRACTURES/FT.)

WPT3
WPT2

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
Hard rd ic. Hard ft soft	— Knife can't scratch — scratches diff. — scratches easily — grooves — Carves	Thin Medium Thick V. thick	Excellent Good Fair Poor V. Poor
	Fresh V. slight Slight Moderate	V. Close Close Mod. Close Wide V. wide	> 90% 90-75 75-50 50-25 < 25
	Mod. Severe Severe V. Severe Complete	< 2" 2" - 12" 12" - 36" 36" - 120" > 120"	

E. A. OF NEW YORK
HESTER, NEW YORK

TEST BORING REPORT

MOLE NO. B604

PROJECT: St. Paul Boulevard Interceptor Improvements
 CONTRACTOR: O'Brien & Gere
 DRILLER: Drill & Test, Inc.

FILE NO. 739940
 SHEET NO. 1 of 4
 LOCATION: West River Bank
 ELEVATION: 377.8
 DATE START: 27 July 84
 DATE FINISH: 2 Aug. 84
 DRILLER: W. Skura
 INSPECTOR: F.C. AMOS

TIME	WATER	BOTTOM-OF-CASING	BOTTOM-OF-MOLE	TYPE	Flush	S.S.	NY
12:00	0	--	0	SIZE 10 in.	4	1-3/8	2 1/8
				HAMMER WT lb.	---	140	---
				HAMMER FALL ft.	---	30	---

STRATA CHANGE	CASING BLOW PER FOOT	SAMPLER BLOW PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE
		2		0
		4	S-1	1.5
		100/2		
		55		3.0
		20	S-2	
		44		5.0
		24		
		32		7.0
		10	S-3	
		44		
		23		7.0
		25	S-4	
8.0		100/5		8.0

FIELD CLASSIFICATION AND REMARKS

No recovery. Cobbles, boulders. No casing used.

Spun casing to 3.0 ft. Boulders.

Very compact gray gravelly SAND, trace clay. Larger fragments are shale and dolomite.

-ALLUVIUM-

Very compact gray gravelly SAND, trace clay. Larger fragments are shale and dolomite.

-ALLUVIUM-

Compact gravelly SAND, little clay.

TOP OF ROCK AT 8.0 FT.

FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
	VERY LOOSE	0-3	VERY SOFT	S --- SPLIT SPOON	OVERBURDEN 8.0 Ft.
	LOOSE	3-4	SOFT	T --- THIN WALL TUBE	ROCK 79.5
	MEDIUM COMPACT	4-8	MEDIUM STIFF	U --- UNDISTURBED PISTON	SAMPLES 3
	COMPACT	8-13	STIFF	O --- OPEN END ROD	MOLE NO. B604
	VERY COMPACT	13-20	VERY STIFF	W --- WASH SAMPLE	

CORE BORING REPORT

Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS		
		in.	%					
3	R-4	115 91	96 76	SL	WPT5	4	Light greenish gray, argillaceous Shale.	
3				MOD		5	MADLEWOOD SHALE	
3							2	Smooth, moderately dipping joint at 40.6 ft.
3						SL	1	Severely weathered, shaly, low angle joints at
3							4	40.8, 41.5 and 41.8 ft. Smooth, low angle
3						MOD	10	joint at 41.2 ft. Rough, moderately dipping
3							3	joint at 41.9 ft. Smooth, low angle joint at
3						SL	1	43.6 ft. Severely weathered shaly parting at
3							1	44.2 ft. Several very close moderately to sev-
3							1	erely weathered bedding plane joints from
3	R-5	123 113	103 92*	SL	WPT4	1	45.0 to 46.0 ft. High angle joint at 46.0 ft.	
3				MOD		1	Light greenish gray to gray, fine to medium-	
3							1	grained, thick-bedded Sandstone.
3						SL	1	THOROLD SANDSTONE
3						MOD	1	Severely weathered, shaly parting at 47.5 ft.
3							1	Pink, swirly bedding from 50.3 to 51.6 ft.
3						SL	1	Reddish brown, fine to medium-grained, thin to
3						MOD	1	medium-bedded Sandstone, with light gray
3							1	nodding. Close to moderately close argillace-
3							1	ous partings.
3	R-6	109 98	91 82	SL	WPT3	1	GRIMSEY SANDSTONE	
3				MOD		1	*RQD based on core recovered	
3							1	Swirly bedding from 52.2 to 59.5 ft. Severely
3						SL	1	weathered partings at 50.1 and 61.6 ft.
3						MOD	1	Swirly bedding from 63.5 to 65.7 ft. Rough,
3							1	severely weathered, clayey, high angle joints
3						SL	1	from 67.5 to 67.8 ft. Severely weathered
3						MOD-SEV	1	Sandstone from 67.5 to 69.5 ft.
3							1	GRIMSEY SANDSTONE
3							1	(Note: Water return lost at 67.5 ft. and not
3	R-7	13 5	79 21	SEV		1	gained throughout boring.)	
3				MOD		1	(Note: Core barrel blocked at 69.5 ft.)	
3							1	Hard Sandstone from 69.5 to 70.2 ft. Vertical
3						SEV	1	joint from 69.5 to 69.6 ft. Irregular
3							1	vertical crack from 69.6 to 70.5 ft. Severely
3						MOD	1	weathered, shaly and clayey partings at 70.6,
3							1	72.3, 72.9, 73.7, and 74.7 ft. Rough open,
3						MOD	1	vertical joint from 70.6 to 70.8 ft. Rough
3							1	low angle joint at 72.9 ft.
3				R-8	90 65	94 69	SL	WPT2
3	MOD		1					

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
Hard - Knife can't scratch	Fresh	V. Fine V. Close < 2"	> 90%
Medium - scratches diff.	V. Slight	Thin Close 2" - 12"	75-90
Soft - scratches easily	Slight	Medium Mod. Close 12" - 36"	50-75
Very Soft - grooves	Mod. Severe	Thin Wide 36" - 120"	25-50
Very Very Soft - grooves	Complete	V. Thin V. Wide > 120"	< 25
			Excellent
			Good
			Fair
			Poor
			V. Poor

CORE BORING REPORT

MOLE NO. R604

PAGE 4 OF 4

GEOLOGIST S. C. AMOS

Core No.	RECOVERY RQD		Graphic Log	Strata Change	FIELD CLASSIFICATION AND REMARKS
	Depth Range	in.			
			MOD	75.3	<p>Reddish brown, fine to medium-grained, thin to medium-bedded Sandstone, with light gray mottling. Close to moderately close argillaceous partings.</p> <p>GRIMSBY SANDSTONE</p> <p>Swirly bedding from 71.0 to 71.7 ft. Severely weathered clayey Sandstone from 75.5 to 76.3 ft. Severely weathered shaly partings at 76.8, 77.8, 78.9, 79.6, 79.8, 81.0, 83.1, 84.5, 85.1, 86.2, 86.8, 87.3 and 87.5 ft. Severely weathered, shaly Sandstone, with vertical joint, from 83.4 to 83.6 ft. Smooth low angle joint at 87.3 ft.</p>
77.5			SEV		
			MOD		
			SL-MOD	WPT1	
R-9	120 97	100 91	SI		
			SEV		
			SL	85.3	
			MOD		
87.5					<p>Bottom of Boring at 87.5 ft.</p> <p>Completed borehole grouted to depth of 8 ft. and backfilled to surface.</p> <p>Note: From the depth of 67.5 to 87.5 ft., a steady, artesian flow was observed from the top of casing (12-in. stick-up) at a rate of approximately 5 to 7 gpm. This flow was observed at all times drilling was not in progress, and for at least 2 hours after drilling ceased. The flow resumed on the following day while preparations for water pressure tests were being made and continued until the borehole was grouted.</p>

HARDNESS	WEATHERING		BEDDING/Joint SPACING				RQD	
<ul style="list-style-type: none"> - Knife can't scratch - scratches diff. - scratches easily - grooves - Carves 	<ul style="list-style-type: none"> 1. Fresh V. slight Slight Moderate 	<ul style="list-style-type: none"> Mod. Severe Severe V. Severe Complete 	<ul style="list-style-type: none"> V. thin Thin Medium Thick V. thick 	<ul style="list-style-type: none"> V. Close Close Mod. Close Wide V. wide 	<ul style="list-style-type: none"> < 2" 2" - 12" 12" - 36" 36" - 120" > 120" 	<ul style="list-style-type: none"> > 90% 90-75 75-50 50-25 < 25 	<ul style="list-style-type: none"> Excellent Good Fair Poor V. Poor 	

TEST BORING REPORT

HOLE NO. B605

PROJECT: St. Paul Boulevard Interceptor Improvements

FILE NO. 739940

CLIENT: O'Brien & Gere Engineers

SHEET NO. 1 of 3

CONTRACTOR: Drill & Test, Inc.

LOCATION: West Bank of
Cortland River

GROUNDWATER DEPTH TO: (Ft.)

CASING SAMP. 2R CORE BARREL

ELEVATION 301.7

DATE START: 3 Aug. 1984

DATE FINISH: 9 Aug. 1984

DRILLER: W. Skura

INSPECTOR: F. Amos

DATE	TIME	WATER	SECTION OF CASING	DEPTH OF MILE	TYPE	FINISH	S.S.	NX
8/6/84	9:25AM	11.7	16.9	16.2	SIZE 10 1/2	4	1-3/8	2-1/8
8/8/84	9:20AM	13.7	16.9	72.5	NUMBER 12	---	140	---
8/8/84	9:15AM	11.6	16.9	83.0	HAMMER FALL IN	---	30	---

SCALE IN FEET	STRATA CHANGE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
5			1	S-1	0	Very soft black organic CLAY, trace to little silt. Moist. -FLOOD PLAIN DEPOSITS-
			1		1.5	
			1			
					5.0	
10			8	S-2	6.5	Medium compact brown gravelly coarse to fine SAND, trace silt. -ALLUVIUM-
			13			
			12			
					10.0	
15			8	S-3	11.5	Medium compact gray and brown coarse to fine SAND, trace gravel, trace silt, trace clay. Moist. -ALLUVIUM-
			14			
			8			
					15.0	
20			10	S-4	16.9	Compact gray and brown coarse to fine SAND, trace gravel, trace silt, trace clay. Moist. -ALLUVIUM-
			14			
			24			
			100/4			
	15.9					Top of Rock at 16.9 Ft.

BLOWS FT.	DENSITY	BLOWS FT.	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
0-4	VERY LOOSE	0-3	VERY SOFT	S - SPLIT SPOON	OVERBURDEN 16.9 Ft.
4-16	LOOSE	3-4	SOFT	T - THIN WALL TUBE	ROCK 66.1 Ft.
16-20	MEDIUM COMPACT	4-8	MEDIUM STIFF	U - UNDISTURBED PISTON	SAMPLES 4
20-25	COMPACT	8-15	STIFF	D - OPEN END ROD	HOLE NO. B605
25	VERY COMPACT	15-30	VERY STIFF	V - WASH SAMPLE	

CORE BORING REPORT

Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS	
		in.	%				
	16.9					Begin coring at 16.9 Ft.	
4	R-1 17.5	77.0	97.0	MOD		5	Greenish gray to grayish brown Shale. Trace fossils.
4						4	
4						1	LOWER SODUS SHALE
4		79	100		20.1	0	Light gray, very thin shell Limestone bed at 17.5 ft.
4		70	88	SL		1	
4	R-2					0	Low angle joint with trace slickensides at 24.0 ft.
4						1	
4					24.1		
4		41	100	SL-MOD			Light to medium gray, fine to medium-grained, crystalline, fossiliferous Limestone, interbedded with dark gray, very thin-bedded Shale. Trace pits, vugs and stylolites, closely spaced argillaceous partings.
4		30	74		WPT6		KEYNALES LIMESTONE
4	27.5						Hard, very thin, siliceous zones at 30.1, 30.5 and 30.0 ft. Chert from 35.5 to 35.8 and 36.5 to 36.8 ft.
4				SL			Severely weathered, shaly partings from 24.1 to 26.5 ft. Severely weathered clayey partings at 25.1, 26.0 and 26.5 ft. Severely weathered shaly partings at 32.6, 32.8, 33.5, 33.9, 34.5, 36.3, 39.7 and 41.6 ft.
4					30.1		
4	R-3	120	100		30.8		
4		98	82	MOD			
4							
4				SL-MOD	WPT5		
4	37.5						
4							
4		69	101	SL	40.1		40.1 Red, medium-grained, oolitic, fossiliferous hematitic Limestone.
4		40	58*		40.8		40.5 FURNACEVILLE MEMBER
4	R-4			MOD			REYNALES LIMESTONE
4				SEV			Severely weathered rough vertical joint from 42.1 to 42.5 ft.
4					43.2		*RQD based on core recovered.
4		27	78	SL		4	Light greenish-gray argillaceous Shale.
4		15	43			3	MAPLEWOOD SHALE
10	46.1			SEV	WPT4	20	Severely weathered clayey partings at 40.2 and 45.2 ft. Smooth low angle joints at 43.3 and 44.7 ft. (Note: Core barrel blocked and water return lost at 46.1 ft.) Smooth moderately dipping joint at 43.4 ft. Moderately weathered rough vertical joints from 43.6 to 44.0 and 44.8 to 45.5 ft.
4	R-5	18	107	SL		4	
4	47.5	16	89*			1	
4						6	
5						1	

FIELD HARDNESS	WEATHERING	BEDDING/JOINT SPACING	RQD
Hard - Knife can't scratch	Fresh	V. thin V. Close < 2"	> 90%
Med. Hard - scratches diff.	v. slight	Thin Close 2" - 12"	90-75
Soft - scratches easily	Slight	Medium Mod. Close 12" - 36"	75-50
Very Soft - grooves	Mod. Severe	Thick Wide 36" - 120"	50-25
Very Very Soft - carves	Severe	V. thick V. wide > 120"	< 25
	Complete		Excellent
			Good
			Fair
			Poor
			V. Poor

CORE BORING REPORT

GEOLOGIST F. AMOS

Drill Rate lin. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Wauth.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
		in.	%			
5	R-6	114 60	95 50	SL	50.1	Light greenish gray argillaceous Shale. MAPLEWOOD SHALE Smooth low angle joint at 47.1 ft. Nearly parallel, rough, moderately dipping joints at 47.9 and 48.0 ft. Smooth, low angle joints at 48.5, 48.7, 51.1, 52.3, 53.5, 53.7 and 53.8 ft. Smooth, curved, low angle joint at 52.4 ft. Rough, curved, vertical to high angle joints from 52.8 to 53.4 and 53.8 to 54.1 ft. Severely weathered, rough, vertical joints from 55.5 to 56.2 ft. and 62.0 to 62.1 ft. MAPLEWOOD SHALE Rough high angle joint from 56.6 to 56.7 ft. Moderately to severely weathered, rough, vertical joint from 59.1 to 61.1 ft. Severely weathered, broken clayey Shale from 55.5 to 55.8 ft., 57.0 to 57.5 ft. and 59.1 to 59.4 ft. Smooth, low angle joints at 54.3, 57.8, 57.9, 58.3 and 58.4 ft. Severely weathered shaly partings at 62.2 and 62.5 ft.
5				50.8		
5				6		
4				10		
4				10		
4				10		
4				10		
4	R-7	60 12	100 20	MOD-SEV	57.5	
4				60.1		
3				60.8		
3				62.5		
3				60		
3				60		
3				60		
3	R-8	124 124	103 100*	SL	67.5	
3				70.1		
3				70.8		
3				70.1		
3				70.8		
3				70.1		
3				70.8		
3	R-9	66 66	100 100	SL	77.5	
3				80.0		
3				80.0		
3				80.0		
3				80.0		
3				80.0		
2.5				83.0		
						Bottom of Boring at 83.0 ft. Completed borehole grouted to depth of 17.0 ft. and backfilled to surface.

FRACTURE FREQUENCY (Fractures/Ft.)

WPT3

WPT2

WPT1

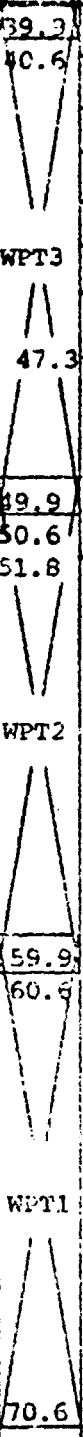
FIELD HARDNESS	WEATHERING		BEDDING/JOINT SPACING				RQD
<ul style="list-style-type: none"> - Knife can't scratch - scratches diff. - scratches easily - grooves - carves 	Fresh V. Slight Slight Moderate	Mod. Severe Severe V. Severe Complete	V. thin Thin Medium Thick V. thick	V. Close Close Mod. Close Wide V. wide	< 2" 2" - 12" 12" - 36" 36" - 120" > 120"	> 90% 90-75 75-50 50-25 < 25	Excellent Good Fair Poor V. Poor

CORE BORING REPORT

GEOLOGIST F.C. AMOS

Drill Rate lin. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS	
		in.	%				
---	R-4	45.5		SL	39.3	0	Light greenish gray, argillaceous Shale. MAPLEWOOD SHALE
40.6							
47.3							
---	R-5	54	100	SL	47.3	0	Light gray, fine to medium-grained, thick-bedded Sandstone. THOROLD SANDSTONE
49.9							
50.6							
---	R-6	55.5	95	SL	51.8	0	Reddish brown, fine to medium-grained, thin to medium-bedded Sandstone, with light gray mottling. Close to moderately close argillaceous partings. GRIMSBY SANDSTONE
59.9							
60.6							
---	R-7	65.5	100*	SL	60.6	0	Swirly bedding from 53.9 to 55.2, 55.8 to 56.1, 57.5 to 58.5, 63.5 to 64.8, 65.5 to 66.6 and 70.6 to 71.0 ft.
65.5							
70.6							
---	R-7	73.0	84	SL	70.6	0	GRIMSBY SANDSTONE Rough, high angle crack from 68.5 to 68.7 ft. (Note: Very slow drilling at 72.0 to 73.0 ft.)
76							
76							
---							*RQD based on core recovered.
---							Bottom of Boring at 73.0 Ft. Completed borehole grouted to depth of 3.0ft. and backfilled to surface.

FRACTURE FREQUENCY
(Fractures/Ft.)



FIELD HARDNESS		WEATHERING		BEDDING/JOINT SPACING			RQD	
Hard	- Knife can't scratch	Fresh	Mod. Severe	V. thin	V. Close	< 2"	> 90%	Excellent
Hard	- scratches diff.	V. Slight	Severe	Thin	Close	2" - 12"	90-75	Good
Hard	- scratches easily	Slight	V. Severe	Medium	Mod. Close	12" - 36"	75-50	Fair
Soft	- grooves	Moderate	Complete	Thick	Wide	36" - 120"	50-25	Poor
Soft	- carves			V. thick	V. wide	> 120"	< 25	V. Poor

TABLE I
WATER PRESSURE TEST SUMMARY

<u>BORING</u>	<u>DEPTH</u> (FT.)	<u>GAGE</u> <u>PRESSURE</u> (PSI)	<u>FLOW</u> <u>RATE</u> (GPM)	<u>PERMEABILITY</u> ($\times 10^{-6}$) (CM/SEC)	<u>FORMATION</u>
B602	26.7-37.3	15	11.6	1460**	Reynales
	46.7-57.3	30	6.7	428	Maplewood
B603	42.5-53.1	35	0.8	35	Reynales
	51.4-62.0	45	0.0	0	Reynales
	69.4-80.0	50	0.6	20	Maplewood
B604	11.9-22.6	11	2.6	407	Reynales
	14.6-25.3	12	0.0	0	Reynales
	24.6-35.3	22	0.0	0	Reynales/Map.
	34.6-45.3	28	0.0	0	Maplewood
	44.6-55.3	37	16.9	**	Map./Thorold/ Grimsby
	54.6-65.3	52	2.3	84	Grimsby
	64.6-75.3	15	13.9	**	Grimsby
	74.6-85.3	15	13.0	**	Grimsby
B605	20.1-30.8	9	3.4	429	Lower Sodus/ Reynales
	30.1-40.8	19	12.2	**	Reynales
	40.1-50.8	5	15.0	**	Reynales/Map.
	50.1-60.8	5	14.0	**	Maplewood
	60.1-70.8	8	13.5	**	Map./Thorold/ Grimsby
B606	70.1-80.3	59	5.6	164	Grimsby
	19.9-30.6	19	0.0	0	Reynales/Map.
	29.9-40.6	29	0.3	19	Maplewood
	39.9-50.6	39	0.0	0	Map./Thorold
	49.9-60.6	49	0.02	1	Thorold/Grimsby
	59.9-70.6	59	0.0	0	Grimsby

** Zones of significantly high water takes. Flow rates too high to permit reliable estimate of permeability. Refer to text for discussion.

APPENDIX BB

Laboratory Analyses of Soil and Water
Samples

CONFIDENTIAL

JV-290 D183

CONFIDENTIAL
Copy 3 of 7

LABORATORY REPORT ON THE ANALYSIS
OF SOIL AND WATER SAMPLES FOR THE
COMBINED SEWER OVERFLOW
ABATEMENT PROGRAM,
ROCHESTER PURE WATERS DISTRICT

September 1981

Prepared for:

LOZIER-SEELYE-TONIAS
65 West Broad Street
Rochester, New York 14614



ecology and environment, inc.

195 SUGG ROAD, P.O. BOX D, BUFFALO, NEW YORK 14225, TEL. 716-632-4491

International Specialists in the Environmental Sciences

recycled paper

CONFIDENTIAL

TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1	INTRODUCTION	1-1
2	SAMPLES	2-1
3	METHODS OF ANALYSIS	3-1
	3.1 VOLATILE ORGANICS	3-1
	3.2 SEMI-VOLATILE ORGANICS	3-3
	3.3 EXTRACTABLE ORGANICS	3-3
4	ANALYTICAL STANDARDS/QUALITY CONTROL	4-1
	4.1 QUALITY ASSURANCE	4-1
	4.2 QUALITY CONTROL	4-1
	4.2.1 Accuracy	4-1
	4.2.2 Precision	4-4
	4.2.3 Metals	4-4
	4.2.4 Cyanide	4-4
	4.2.5 Phenols	4-4
	4.2.6 Volatile Organics	4-4
	4.2.7 Extractable Organics	4-6
5	RESULTS	5-1
<u>Appendix</u>		
6	CHAIN OF CUSTODY RECORD	6-1
7	GAS CHROMATOGRAPH/MASS SPECTROMETER DATA	7-1

CONFIDENTIAL

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1-1	PRIORITY POLLUTANT ANALYSES	1-2
3-1	PERCENT SOLIDS OF SOIL SAMPLES	3-2
4-1	PERCENT RECOVERY FOR SPIKED SAMPLE ANALYSES	4-2
4-2	ACCURACY TESTING BASED ON EPA QUALITY ASSURANCE MATERIAL NO. 476	4-3
4-3	RESULTS OF DUPLICATE ANALYSES	4-5
5-1	RESULTS OF ANALYSIS OF LEACHATE SPRING #1 AND LEACHATE SEEP #1	5-2
5-2	RESULTS OF ANALYSIS OF BORE HOLE S-I-2	5-3
5-3	RESULTS OF ANALYSIS OF BORE HOLE S-I-6	5-4
5-4	RESULTS OF ANALYSIS OF BORE HOLE S-I-7	5-5
5-5	RESULTS OF ANALYSIS OF BORE HOLE S-I-8	5-6
5-6	RESULTS OF ANALYSIS OF BORE HOLES S-I-9 and S-I-9B	5-7
5-7	RESULTS OF ANALYSIS OF BORE HOLE S-I-10	5-9
5-8	RESULTS OF ANALYSIS OF BORE HOLE S-I-11	5-10
5-9	RESULTS OF ANALYSIS OF BORE HOLE S-I-12	5-11
5-10	RESULTS OF ANALYSIS OF WATER FROM WELL #12	5-13

1. INTRODUCTION

This is a laboratory report on the analysis of a series of soil and water samples collected by the hazardous materials group of Ecology and Environment, Inc., (E & E) for the Combined Sewer Overflow Abatement Program, Rochester Pure Waters District.

The samples were received by E & E's Analytical Services Center (ASC) from August 3 through August 13, 1981. They were analyzed to determine whether hazardous substances were present. The tests selected to make this determination and the samples to be analyzed were in part chosen on the basis of field observations and monitoring and included the following:

Inorganics: Cyanide, phenols, arsenic, barium, cadmium, chromium, lead, mercury, and selenium;

Organics: Priority pollutants, base/neutral extractables, and volatiles.

The chemicals included in these analyses are listed in Table 1-1.

CONFIDENTIAL

Table 1-1

PRIORITY POLLUTANT ANALYSES

<u>Base/Neutral Extractables</u>	<u>Acid Extractables</u>
Acenaphthene	4-Chloro-3-methylphenol
Acenaphthylene	2-Chlorophenol
Anthracene	2,4-Dichlorophenol
Benzo(a)anthracene	2,4-Dimethylphenol
Benzo(b)fluoranthene	2-Methyl-4,6-dinitrophenol
Benzo(k)fluoranthene	2-Nitrophenol
Benzo(a)pyrene	4-Nitrophenol
Benzo(g,h,i)perylene	Pentachlorophenol
Benzidine	Phenol
Bis(2-chloroethyl)ether	2,4,6-Trichlorophenol
Bis(2-chloroethoxy)methane	
Bis(2-ethylhexyl)phthalate	
Bis(2-chloroisopropyl)ether	<u>Volatile Organics</u>
4-Bromophenyl phenyl ether	Acrolein
Butyl benzyl phthalate	Acrylonitrile
2-Chloronaphthalene	Benzene
4-Chlorophenyl phenyl ether	Bromomethane
Chrysene	Bromodichloromethane
Dibenzo(a,h)anthracene	Bromoform
Di-n-butylphthalate	Carbon tetrachloride
1,3-Dichlorobenzene	Chlorobenzene
1,4-Dichlorobenzene	Chloroethane
1,2-Dichlorobenzene	2-Chloroethyl vinyl ether
3,3'-Dichlorobenzidine	Chloroform
Diethylphthalate	Chloromethane
Dimethylphthalate	Dibromochloromethane
2,4-Dinitrotoluene	1,1-Dichloroethane
2,6-Dinitrotoluene	1,2-Dichloroethane
Dioctylphthalate	1,1-Dichloroethene
1,2-Diphenylhydrazine	trans-1,2-Dichloroethene
Fluoranthene	1,2-Dichloropropane
Fluorene	cis-1,3-Dichloropropene
Hexachlorobenzene	trans-1,3-Dichloropropene
Hexachlorobutadiene	Ethyl benzene
Hexachloroethane	Methylene chloride
Hexachlorocyclopentadiene	1,1,2,2-Tetrachloroethane
Indeno(1,2,3-cd)pyrene	Tetrachloroethene
Isophorone	1,1,1-Trichloroethane
Naphthalene	1,1,2-Trichloroethane
Nitrobenzene	Trichloroethene
N-Nitrosodimethylamine	Trichlorofluoromethane
N-Nitrosodi-n-propylamine	Toluene
N-Nitrosodiphenylamine	Vinyl chloride
Phenanthrene	
Pyrene	
2,3,7,8-Tetrachlorodibenzo-p-dioxin	
1,2,4-Trichlorobenzene	

state or promulgated by the Environmental Protection Agency (EPA) under Section 303 of the Clean Water Act. They are presented merely to provide guidelines against which on-site conditions may be compared, as well as to provide a measure by which relative degrees of potential hazards may be determined.

It must be kept in mind that the following interpretation of the sample analysis applies only to the current proposed location of the tunnels and structures as indicated on Figure 1-1. In the event that they are relocated, additional investigations may be required.

2. SAMPLES

The samples were taken from eight bore holes on the Rochester Gas and Electric Corporation's Property No. 29, the Lake Avenue Storage Yard. The samples were gathered by E & E field investigators Michael Benner, George Gartseff, and Samuel Mason during the installation of monitoring wells, and were delivered to the ASC in the evening of the date of collection. Soil samples were collected in pre-cleaned, 8-ounce, wide-mouth glass jars. Aqueous samples were collected in pre-cleaned containers and preserved in accordance with EPA protocol.

A chain of custody record was maintained for all samples. Copies of these documents are included as Appendix A of this report.

All samples were stored at 4°C until they were removed for analysis.

3. METHODS OF ANALYSIS

Before inorganic analysis was performed, the samples were dried to a constant weight. The percent solids obtained for all samples are given in Table 3-1.

3.1 INORGANICS

The analyses for inorganic parameters were performed according to the procedures described in the EPA manual, "Methods for Chemical Analysis of Water and Wastes (EPA 600/4-79-020, March 1979)." Given below are the parameters tested for and the identification of the method used. The results are presented in Section 5.

Parameter	Method Number
Arsenic	206.2
Barium	208.1
Cadmium	213.2
Chromium	218.2
Cyanide	335.2
Lead	239.1
Mercury	245.5
Phenols	420.1
Selenium	270.2

The metals analyses (except for mercury) were performed after hot-acid digestion of 1 gram of sample in an acidic aqueous solution consisting of 2.5% hydrochloric acid and 2.5% nitric acid. The digest was filtered through Whatman #40 filter paper prior to analysis. For mercury, 0.5 grams of sample were digested.

CONFIDENTIAL

Table 3-1
PERCENT SOLIDS OF SOIL SAMPLES

Lab No.	Identification	Percent Solids
1183	Leachate, Seep #1	76.0
1237	S-I-2, S-15, 70-71.5'	78.2
1238	S-I-2, S-16, 75-76.5'	80.7
1333	S-I-6, S-3, 10-11.5'	86.1
1334	S-I-6, S-17, 75-76.5'	79.7
1335	S-I-6, S-18, 84-84.5'	78.0
1230	S-I-7, S-10, 44.5-46.0'	83.8
1231	S-I-7, S-12, 54.5-56.0'	80.6
1232	S-I-7, S-14, 66-67.5'	82.6
1187	S-I-8, S-1, 0-1.5'	82.7
1188	S-I-8, S-5, 20-21.5'	81.4
1189	S-I-9, S-2, 5-6.5'	80.5
1210	S-I-9, S-5, 20-21.5'	73.3
1211	S-I-9, S-9, 40-41.5'	85.3
1212	S-I-9B, S-4, 15-16.5'	84.5
1213	S-I-9B, S-6B, Auger Flight 30'	77.9
1233	S-I-10, S-3, 9.5-11.0'	83.8
1234	S-I-10, S-9, 39.5-41.0'	80.5
1214	S-I-11, S-3, 10-11.5'	84.9
1187	S-I-12, S-1, 0-1.5'	93.5
1188	S-I-12, S-4, 15-16.5'	85.9
1189	S-I-12, S-8, 35-36.5'	80.3
1190	S-I-12, S-10, 45-46.5'	84.9
1191	S-I-12, S-13, 60-61.5'	71.0

All soil samples to be analyzed for metals were first dried to a constant weight. Given here is the percent of the dried samples compared to the original moist sample.

CONFIDENTIAL

Lead and mercury levels were determined by the extraction procedure (EP Toxicity Test), using 100 g. of sample, as described in the Federal Register, 43 FR 58956, December 18, 1978.

3.2 VOLATILE ORGANICS

Aqueous samples, which were collected in 40 mL glass vials with Teflon-lined seals, were analyzed by the gas chromatography/mass spectrometry (GC/MS) purge and trap method described in 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants," Method 624, 44 FR 69464, December 3, 1979.

The soil samples were analyzed for volatile organics by GC/MS, using the headspace methods (8.82 and 8.24) described in "Test Methods for Evaluating Solid Waste (USEPA, SW-846, 1980)."

The results are presented in Section 5.

3.3 EXTRACTABLE ORGANICS

The aqueous samples were extracted and analyzed according to Method 625, 44 FR 69464. The soil samples (25 g) were Soxhlet extracted using 1:1 acetone/hexane, Method 8.86, and analyzed according to Method 8.24, of "Test Methods for Evaluating Solid Waste."

The results are shown in Section 5.

GC/MS operating conditions are described and chromatograms for all analyses are included as Appendix B.

CONFIDENTIAL

4. QUALITY ASSURANCE/QUALITY CONTROL

4.1 QUALITY ASSURANCE

Quality assurance is the determination and control of quality. The reliability of results was assured by verification of the methods used in sample analyses and by routine testing procedures. Documentation of periodic testing and daily standard and spike data is maintained at the ASC.

This report meets all the requirements for quality assurance and control.

4.2 QUALITY CONTROL

Duplicate samples and samples fortified with known amounts of material (spikes) are analyzed along with the samples.

For the purposes of these analyses, 10% of the samples were run in duplicate. An additional 10% of the samples were spiked with appropriate standards for the test being performed and re-analyzed.

4.2.1 Accuracy

Spiked samples determine the accuracy of analytical methods. A known amount of material is added to a sample and the sample is re-analyzed. The accuracy is determined by calculating the percent recovery of the added material.

Recoveries obtained with these samples are found in Table 4-1. In addition, percent recovery determinations were performed on EPA-supplied samples. These results appear in Table 4-2.

CONFIDENTIAL

Table 4-1
PERCENT RECOVERY FOR SPIKED SAMPLE ANALYSES

Element	Lab No.	Original Value	Amount Added	Amount Found	Percent Recovery
Barium	1197	0.55 mg/kg	1.0 mg/kg	1.48 mg/kg	93
	1212	0.83 mg/kg	1.0 mg/kg	1.76 mg/kg	93
Arsenic	1200	0.105 mg/kg	0.050 mg/kg	0.153 mg/kg	96
Cadmium	1234	0.004 mg/kg	0.010 mg/kg	0.014 mg/kg	100
Chromium	1187	0.047 mg/kg	0.050 mg/kg	0.102 mg/kg	110
	1214	0.012 mg/kg	0.050 mg/kg	0.060 mg/kg	96
Lead	1198	0.77 mg/kg	1.0 mg/kg	1.78 mg/kg	101
	1234	0.724 mg/kg	1.0 mg/kg	1.84 mg/kg	112
Selenium	1333	ND*	0.020 mg/kg	0.016 mg/kg	80
Dichlorobenzene	1211	ND	200 ug	224 ug	112
Naphthalene	1211	ND	200 ug	202 ug	101
Fluorene	1211	ND	200 ug	222 ug	111
Pyrene	1211	ND	200 ug	215 ug	108
Phenol	1211	ND	200 ug	164 ug	82
2,4-Dichlorophenol	1211	ND	200 ug	98 ug	49

*ND = None detected

All spike results fall within an acceptable range. The low recovery for 2,4-dichlorophenol is due to the complexity of the sample matrix and to the fact that a second extraction must be performed on the sample to recover it and other acidic compounds.

CONFIDENTIAL

Table 4-2

ACCURACY TESTING BASED ON
EPA QUALITY ASSURANCE MATERIAL NO. 476

Element	Concentrations in ug/L		Percent Difference
	Known	Found	
Arsenic	182	179	1.65
Cadmium	6.5	6.55	0.77
Chromium	65	63.3	2.60
Selenium	16.0	16.7	4.40

Comments:

These results are within the 95% confidence interval for these parameters.

4.2.2 Precision

Duplicate samples were analyzed to determine the precision of testing procedures. One sample was taken and sub-sampled and re-analyzed. The range of analytical results measured the precision of the analytical procedure.

The results of duplicate analyses are shown in Table 4-3.

4.2.3 Metals

Metals analyses were performed using an atomic absorption spectrophotometer. Standard curves were prepared for each element. Accuracy was further insured by the analysis of an EPA Quality Assurance test mixture for arsenic, cadmium, and chromium along with the samples. These values are reported in Table 4-3.

All glassware used in the metals analyses was washed with acid and rinsed with deionized water.

4.2.4 Cyanide

Distillation followed by a colorimetric determination for cyanide was made utilizing a spectrophotometer. A calibration curve was prepared by analyzing a series of standards containing cyanide along with the samples. A blank was run to assure the purity of the reagents; cyanide was not detected in the blank.

4.2.5 Phenols

Colorimetric determination for phenols was made utilizing a spectrophotometer. A 20.0 ug standard was analyzed along with the samples and yielded 20.0 ug of phenol. A blank was run to assure the purity of the reagents; phenol was not detected in the blank.

4.2.6 Volatile Organics

The GC/MS was tuned daily, according to EPA guidelines. A blank was analyzed to determine the cleanliness of the glassware; contamination was not found. Standards were prepared in the same manner as were the samples and were run daily to verify response factors and retention times.

CONFIDENTIAL

Table 4-3
RESULTS OF DUPLICATE ANALYSES

Element	Lab No.	Original Analysis (mg/kg)	Duplicate Analysis (mg/kg)	Percent Difference
Barium	1189	191	187	2.10
	1214	93.0	97.0	4.30
Arsenic	1188	14.7	15.0	2.00
Cadmium	1183	0.925	0.973	5.20
Chromium	1190	6.37	5.73	10.05
	1197	10.1	10.4	2.97
Mercury	1198	2.94	2.97	1.02
		18.1	17.1	5.52
Lead	1183	150	167	11.33
	1214	74.0	81.0	9.46
Selenium	1334	<0.2	<0.2	0
Anthracene/ Phenanthrene	1200	6.28	8.70	38.54
Fluoranthene	1200	6.96	8.09	16.24
Pyrene	1200	6.13	7.37	20.23
Chrysene	1200	10.46	12.10	15.68

4.2.7 Extractable Organics

The GC/MS system was tuned daily, according to EPA guidelines. Standards containing priority pollutants were run daily to assure acceptable GC/MS operating conditions. Blanks were analyzed to check for contamination from glassware and reagents; contamination was not evident.

5. RESULTS

The results of the laboratory analysis of soil and water samples are presented, by bore hole and depth, in this section in tables 5-1 through 5-10. Results of the analysis of aqueous samples are given in ug/L. Those from the soil samples are in mg/kg dry-weight basis for metals analyses.

Results of organics analyses are reported in mg/kg. These samples were tested in their original (moist) condition.

Not all samples were analyzed for all parameters. This is indicated by "NA" (not analyzed).

All results are reported to three significant figures.

Table 5-1
RESULTS OF ANALYSIS OF
LEACHATE SPRING #1 AND LEACHATE SEEP #1

(Spring given in ug/L; Seep given in mg/kg on a Dry-Weight Basis)

	E & E Lab No. 81-	Sample Description	Ba	Cd	Cr	Pb	As	Se	Hg	Compounds	Detection Limit (ug/L)
1. Metals	1182	Leachate Spring #1	908	6.26	5.5	40.2	22.9	<2	0.47	--	--
	1183	Leachate Seep #1	142	0.92	16.7	150	25.5	0.227	5.83	--	--
2. EP Toxicity (ug/L)	1183	Leachate Seep #1	--	--	--	<10	--	--	10.8	--	--
3. Volatile Organics	1211	Leachate Spring #1	--	--	--	--	--	--	--	ND*	10
4. Base/Neutrals	1211	Leachate Spring #1	--	--	--	--	--	--	--	ND	10
5. Acids Extractable	1211	Leachate Spring #1	--	--	--	--	--	--	--	ND	50

*ND - None detected

Table 5-2
RESULTS OF ANALYSIS OF BORE HOLE S-I-2

	E & E Lab No. 81-	Sample Ident./Depth	Ba	Cd	Cr	Pb	As	Se	Hg	Compounds	Detection Limit (mg/kg)
1. Metals (Dry- Weight Basis [mg/kg])	1237	S-15, 70- 71.5'	121	1.21	7.61	186	13.6	<0.2	1.10	--	--
	1238	S-16, 75- 76.5'	128	1.32	21.0	612	18.1	<0.2	3.17	--	--
2. Volatile Organics	1237	S-15, 70- 71.5'	--	--	--	--	--	--	--	ND*	5
	1238	S-16, 75- 76.5'	--	--	--	--	--	--	--	ND	5
3. Base/Neutrals	1237	S-15, 70- 71.5'	--	--	--	--	--	--	--	Naphthalene	80
										Anthracene/ Phenanthrene†	186
										Fluorene	66
										Fluoranthene	111
										Pyrene	109
	1238	S-16, 75 76.5'	--	--	--	--	--	--	--	Naphthalene	16
										Anthracene/ Phenanthrene†	37
										Fluorene	8.6
										Fluoranthene	24
										Pyrene	38

*ND - None detected

**Detection limit 5 mg/kg

†Anthracene and Phenanthrene are an isomeric pair which cannot be separated by GC/MS. The resulting concentration is based on Anthracene standard values.

Table 5-3

RESULTS OF ANALYSIS OF BORE HOLE 5-1-6

	E & E Lab No. 01-	Sample Ident./Depth	Ba	Cd	Cr	Pb	As	Se	Hg	Compounds	Detection Limit (mg/kg)
1. Metals (Dry- Weight Basis [mg/kg])	1333	S-3, 10- 11.5'	127	0.299	11.4	119	12.3	<0.2	<1.0	--	--
	1334	S-17, 75- 76.5'	165	0.393	10.6	249	23.6	<0.2	6.49	--	--
	1335	S-18, 84- 84.5'	157	0.295	11.7	187	21.7	<0.2	15.3	--	--
2. EP Toxicity (ug/L)	1334	S-17, 75- 76.5'	--	--	--	<10	--	--	<1.0	--	--
	1335	S-18, 84- 84.5'	--	--	--	<10	--	--	<1.0	--	--
3. Volatile Organics	1333	S-3, 10- 11.5'	--	--	--	--	--	--	--	ND*	5
	1334	S-17, 75- 76.5'	--	--	--	--	--	--	--	ND	5
	1335	S-18, 84- 84.5'	--	--	--	--	--	--	--	ND	5
4. Base/Neutrals	NA**	--	--	--	--	--	--	--	--	--	--

*ND - None detected

**NA - Not analyzed

5-4

CONFIDENTIAL

Table 5-4

RESULTS OF ANALYSIS OF BORE HOLE S-1-7

	E & E Lab No. 81-	Sample Ident./Depth	Ba	Cd	Cr	Pb	As	Se	Hg	Compounds	Priority Pollutant Concentration* (mq/kg)
1. Metals (Dry- Weight Basis [mq/kg])	1230	S-10, 44.5- 46.0'	91.0	1.19	11.2	349	19.1	<0.2	2.81	--	--
	1231	S-12, 54.5- 56.0'	NA**	NA	NA	NA	NA	<0.2	NA	--	--
	1232	S-14, 66- 67.5'	536	5.17	10.3	596	10.9	<0.2	3.05	--	--
2. Volatile Organics	NA	--	--	--	--	--	--	--	--	--	--
3. Base/Neutrals	1230	S-10, 44.5- 46'	--	--	--	--	--	--	--	Anthracene/ Phenanthrene Fluoranthene Pyrene	<5 <5 <5

*Detection limit 5 mg/kg

**NA - Not analyzed

5-5

CONFIDENTIAL

Table 5-5
RESULTS OF ANALYSIS OF BORE HOLE S-I-8

	E & E Lab No. 81-	Sample Ident./Depth	Ba	Cd	Cr	Pb	As	Se	Hg	Compounds	Priority Pollutant Concentration* (mg/kg)
1. Metals (Dry- Weight Basis [mg/kg])	1197	S-1, 0-1.5'	60.0	0.218	10.1	64.0	19.8	<0.2	17.6	--	--
	1198	S-5, 20- 21.5'	87.0	0.102	18.4	61.0	7.14	<0.2	2.96	--	--
2. Volatile Organics	NA**	--	--	--	--	--	--	--	--	--	--
3. Base/Neutrals	1197	S-1, 0-1.5'	--	--	--	--	--	--	--	Anthracene/ Phenanthrene	<5
	1198	S-5, 20- 21.5'	--	--	--	--	--	--	--	Anthracene/ Phenanthrene Fluoranthene Pyrene	<5 <5 <5

*Detection limit 5 mg/kg
**NA - Not analyzed

Table 5-6

RESULTS OF ANALYSIS OF BORE HOLES S-1-9 and S-1-9B

	E & E Lab No. 81-	Sample Ident./Depth	Ba	Cd	Cr	Pb	As	Se	Hg	Compounds	Priority Pollutant Concentration* (mg/kg)
1. Metals (Dry- Weight Basis [mg/kg])	1199	S-2, 5-6.5'	143	0.737	18.3	1101	36.6	<0.2	5.28	--	--
	1200	S-5, 20- 21.5'	136	6.36	18.2	530	13.1	<0.2	12.2	--	--
	1201	S-9, 40- 41.5'	88.0	1.05	14.1	148	6.19	<0.2	3.04	--	--
	1212	S-4B, 15- 16.5'	93.0	1.62	31.6	3627	17.0	<0.2	2.33	--	--
	1213	S-6B, Grab from Auger Flight 30'	213	1.90	42.9	1080	17.9	<0.2	4.76	--	--
2. EP Toxicity (ug/L)	1199	S-2, 5-6.5'	--	--	--	<10	--	--	<1.0	--	--
	1200	S-5, 20- 21.5'	--	--	--	<10	--	--	<1.0	--	--
	1212	S-4B, 15- 16.5'	--	--	--	17.4	--	--	--	--	--
	1213	S-6B, Grab from Auger Flight 30'	--	--	--	<10	--	--	<1.0	--	--

*Detection limit 5 mg/kg

Sheet 1 of 2

CONFIDENTIAL

Table 5-6 (Cont.)

	E & E Lab No. 81-	Sample Ident./Depth	Ba	Cd	Cr	Pb	As	Se	Hg	Compounds	Priority Pollutant Concentration* (mg/kg)
3. Volatile Organics	NA**	--	--	--	--	--	--	--	--	--	--
4. Base/Neutrals	1199	S-2, 5-6.5'	--	--	--	--	--	--	--	Anthracene/ Phenanthrene	<5
	1200	S-5, 20- 21.5'	--	--	--	--	--	--	--	Anthracene/ Phenanthrene Fluoranthene Pyrene Chrysene	6.28 6.96 6.13 10.46
	1201	S-9, 40- 41.5'	--	--	--	--	--	--	--	Anthracene/ Phenanthrene Fluoranthene Pyrene	<5 <5 <5
	1212	S-4B, 15- 16.5'	--	--	--	--	--	--	--	Anthracene/ Phenanthrene Fluoranthene Pyrene Chrysene	11.43 7.22 6.42 8.40
	1213	S-6B, Grab from Auger Flight 30'	--	--	--	--	--	--	--	Anthracene/ Phenanthrene Fluoranthene Pyrene	<5 <5 <5

*Detection limit 5 mg/kg
**NA - Not analyzed

CONFIDENTIAL

Table 5-7
RESULTS OF ANALYSIS OF BORE HOLE S-1-10

	E & E Lab No. 81-	Sample Ident./Depth	Ba	Cd	Cr	Pb	As	Se	Hg
1. Metals (Dry- Weight Basis [mg/kg])	1233	S-3, 9.5- 11.0'	NA*	NA	NA	NA	NA	<0.2	NA
	1234	S-9, 39.5- 41.0'	98.0	0.385	9.55	79.0	10.3	<0.2	1.30
2. Volatile Organics	NA	--	--	--	--	--	--	--	--
3. Base/Neutrals	NA	--	--	--	--	--	--	--	--

*NA - Not analyzed

5-10

Table 5-8
RESULTS OF ANALYSIS OF BORE HOLE 5-1-11

	E & E Lab No. 81-	Sample Ident./Depth	Ba	Cd	Cr	Pb	As	Se	Hg	Compounds	Priority Pollutant Concentration ^a (mg/kg)
1. Metals (Dry- Weight Basis (mg/kg))	1214	S-3, 10-11.5'	93.0	0.452	1.10	81.0	2.86	<0.2	3.26	--	--
2. Volatile Organics	NA**	--	--	--	--	--	--	--	--	--	--
3. Base/Neutrals	1214	S-3, 10-11.5'	--	--	--	--	--	--	--	Anthracene/ Phenanthrene Fluoranthene Pyrene	<5 <5 <5

^aDetection limit 5 mg/kg

**NA - Not analyzed

CONFIDENTIAL

Table 5-9
RESULTS OF ANALYSIS OF BORE HOLE S-1-12

	E & E Lab No. 01-	Sample Ident./Depth	Ba	Cd	Cr	Pb	As	Se	Hg	Compounds	Priority Pollutant Concentra- tion* (mg/kg)
1. Metals (Dry- Weight Basis [mg/kg])	1187	S-1, 0-1.5'	111	0.576	4.73	72.0	14.1	<0.2	<1.0	--	--
	1188	S-4, 15- 16.5'	133	5.17	20.1	371	14.7	<0.2	3.92	--	--
	1189	S-8, 35- 36.5'	191	1.51	22.5	6571	30.7	<0.2	14.1	--	--
	1190	S-10, 45- 46.5'	163	1.37	6.37	119	6.32	0.252	1.71	--	--
	1191	S-13, 60- 61.5'	128	0.563	10.3	234	10.4	<0.2	6.53	--	--
2. EP Toxicity (ug/L)	1189	S-8, 35- 36.5'	--	--	--	14.9	--	--	1.8	--	--
	1191	S-13, 60- 61.5'	--	--	--	<10	--	--	2.8	--	--
3. Volatile Organics	NA**	--	--	--	--	--	--	--	--	--	--

*Detection limit 5 mg/kg
**NA - Not analyzed

Sheet 1 of 2

S-11

CONFIDENTIAL

Table 5-9 (Cont.)

	E & E Lab No. 01-	Sample Ident./Depth	Ba	Cd	Cr	Pb	As	Se	Hg	Compounds	Priority Pollutant Concentration* (mg/kg)
4. None/Neutral	1107	S-1, 0-1.5'	--	--	--	--	--	--	--	Naphthalene Methyl naphthalene Anthracene/ Phenanthrene Fluoranthene Pyrene	<5 -- <5 <5 <5
	1188	S-4, 15- 16.5'	--	--	--	--	--	--	--	Methyl naphthalene Heptadecane Anthracene/ Phenanthrene Fluoranthene Pyrene	-- -- <5 <5 <5
	1189	S-8, 35- 36.5'	--	--	--	--	--	--	--	Long chain hydrocarbons such as Heptadecane Octadecane Eicosane Anthracene/ Phenanthrene	-- -- -- <5
	1190	S-10, 45- 46.5'	--	--	--	--	--	--	--	None	
	1191	S-13, 60- 61.5'	--	--	--	--	--	--	--	Anthracene/ Phenanthrene Fluoranthene Pyrene	<5 <5 <5

* Detection limit 5 mg/kg
 **NA=Not analyzed

5-12

CONFIDENTIAL

APPENDIX A

CHAIN OF CUSTODY RECORD

CONFIDENTIAL

APPENDIX A

CHAIN OF CUSTODY RECORD



ecology and environment, inc.

International Specialists in the Environmental Sciences

CHAIN OF CUSTODY RECORD

recycled paper

recycled paper

Proj. No. SU 2790		Project Name R688 Property Lab Air Speciation				NO. OF CON- TAINERS	REMARKS				
SAMPLES: (Signature) <i>[Signature]</i>											
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION						
SE-12 S-1	8-4-81	9:30A	✓		0-15 ft Hole SE-12	1	<i>See Organics & metals 1187</i> <i>" " " 1188</i> <i>" " " 1189</i> <i>" " " 1190</i> <i>" " " 1191</i> <i>Analyzed per instruction</i> <i>of Dr. Sherman & R. Enos</i> <i>* Samples delivered to</i> <i>E&E's lab. & locked</i> <i>in lab air refrigerator</i> <i>#3 7:10 P.M. 8-4-81</i> <i>MEB</i>				
SE-12 S-4	"	10:24A	✓		15-16.5 ft "	1					
SE-12 S-5	"	10:44A	✓		35-36.5 ft "	1					
SE-12 S-10	"	11:05A	✓		45-46.5 ft "	1					
SE-12 S-13	"	1:23P	✓		60-61.5 ft "	1					
Relinquished by: (Signature) <i>[Signature]</i>		Date/Time 8-4-81 7:10P		Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)		Date/Time		Received by: (Signature)	
Relinquished by: (Signature)		Date/Time		Received by: (Signature)		Relinquished by: (Signature)		Date/Time		Received by: (Signature)	
Relinquished by: (Signature)		Date/Time		Received for Laboratory by: (Signature)		Date/Time		Remarks			

A-3

ecology and environment, inc.

ecology and environment, inc.

CONFIDENTIAL



ecology and environment, inc.

International Specialists in the Environmental Sciences

CHAIN OF CUSTODY RECORD

Proj. No. <i>JV-290</i>		Project Name <i>RGE Property Lab Env Rochester</i>				NO. OF CON- TAINERS	REMARKS					
SAMPLES: (Signature) <i>[Signature]</i>												
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION							
<i>SI-8 S-1</i>	<i>8-5-81</i>	<i>9:15A</i>	<input checked="" type="checkbox"/>		<i>0-1.5 ft. Hole SI-8</i>	<i>1</i>						
<i>SI-8 S-5</i>	<i>"</i>	<i>10:52A</i>	<input checked="" type="checkbox"/>		<i>20-21.5 ft "</i>	<i>1</i>						
<i>SI-9 S-2</i>	<i>"</i>	<i>1:51P</i>	<input checked="" type="checkbox"/>		<i>5-6.5 ft. Hole SI-9</i>	<i>1</i>						
<i>SI-9 S-5</i>	<i>"</i>	<i>7:11P</i>	<input checked="" type="checkbox"/>		<i>20-21.5 ft "</i>	<i>1</i>						
<i>SI-9 S-9</i>	<i>"</i>	<i>7:51P</i>	<input checked="" type="checkbox"/>		<i>40-41.5 ft "</i>	<i>1</i>						
						<p><i>Analyze per instruction of R. Enos, L. Sheenway</i></p> <p><i>*Samples delivered and held in ETC's lab</i></p> <p><i>Buffalo NY. Samples placed in receptacles at 7:50P.</i></p> <p><i>8-5-81 [Signature]</i></p>						
Relinquished by: (Signature) <i>[Signature]</i>		Date/Time <i>8-5-81 7:50P</i>		Received by: (Signature) <i>Kevin Y. Stone</i>		Relinquished by: (Signature)		Date/Time		Received by: (Signature)		
Relinquished by: (Signature)		Date/Time		Received by: (Signature)		Relinquished by: (Signature)		Date/Time		Received by: (Signature)		
Relinquished by: (Signature)		Date/Time		Received for Laboratory by: (Signature)		Date/Time		Remarks				

recycled paper

A-4

printing and environment, inc.

Page #
1197
1198
1199
1200
1201

CONFIDENTIAL



ecology and environment, inc.

International Specialists in the Environmental Sciences

CHAIN OF CUSTODY RECORD

Proj. No.		Project Name					NO. OF CONTAINERS	ANALYSIS TYPE				REMARKS
JV 290		RGE LAKE AVI SITE, ROCHESTER NY						EXTRACTABLE ORG.	VOLATILE ORG.	METALS	INORGANIC	
SAMPLES: (Signature)												E+E # 1211
STA. NO.	DATE	TIME	COMP.	BRAB	STATION LOCATION							
1	8/6/81	2:50		X	LEACHATE SPRING # 1		2	X				1/2 GAL. PA.
11	"	"		X	" " "		2		X			40 ML FA.
"	"	"		X	" " "		21			X		1 LITER, PRESERVED WITH HNO ₃
"	"	"		X	" " "		1					1 LITER, UNPRESERVED
<p>Samples delivered to E+E lab for analysis and preserved in refrigerator and sent to lab 8/6/81 7:25 P.M. M/S</p>												

Relinquished by: (Signature) <i>Dev V. Dattaj</i>	Date/Time 8/6/81 5:35	Received by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature) <i>[Signature]</i>	Date/Time 8/6/81 8:27	Received by: (Signature) <i>[Signature]</i>
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	Remarks	

recycled paper

recycled paper

A-5

ecology and environment, inc.

ecology and environment, inc.

CONFIDENTIAL

CONFIDENTIAL

Sample delivered to
EPE's Lab Buffalo NY
and placed in refrigerator
#3 and lot labeled
8/6/81 7:25 pm NGB

Relinquished by: (Signature) <i>[Signature]</i>	Date/Time 8/6/81 7:25	Received by: (Signature) <i>Kevin J. Slawson</i>	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	Remarks	

ecology and environment, inc.

CONFIDENTIAL

Sample delivered to
EPE's Laboratory Buffalo
New York and placed in
refrigerator #3 and
lot labeled 7:35

Relinquished by: (Signature) <i>[Signature]</i>	Date/Time 8/6/81 7:35	Received by: (Signature) <i>Kevin J. Slawson</i>	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	Remarks	

ecology and environment, inc.

ecology and environment, inc.

CORE BORING REPORT

Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS	
		in.	%				
						(Note: First 0.4 ft. of rock lost in river, due in part to bad lifter. Lifter replaced before R-2.) Begin coring at 18.6 ft.	
3	18.6			MOD-	21.0	FRACTURE FREQUENCY (FRACT./FT.)	Grayish brown to greenish gray shale. LOWER SODUS SHALE
6	R-1	37/12	70/23	SEV	4		Irregular low angle joint at 21.4 ft.
6					20		Severely weathered low angle joints at 21.5 and 22.0 ft.
5				SEV	21.0		
4	24.0	9/5	75/42		23.0		
3				MOD-			Light to medium gray fine to medium-grained crystalline, fossiliferous Limestone, interbedded with dark gray, very thin-bedded Shale. Trace pits, vugs and stylolites. Closely spaced argillaceous partings.
3				SEV			REYNALES LIMESTONE
2							Rough, vertical joint from 24.2 to 24.3 ft. Rough, short, high angle joint at 24.5 ft. Short vertical joint at 25.3 ft. Hard, very thin siliceous zones at 29.4, 30.7, 31.8 and 33.0 ft. Pitted chert, with irregular, tight, vertical cracks, from 35.3 to 35.7 ft.
2	R-2	84/51	100/61	SL-			
3				MOD			
3	31.0						REYNALES LIMESTONE
3				MOD			
3							
4							
5							
4	R-3	104/68	96/63	SL-			
5				MOD			
4							
4	40.0						39.9 Red, medium-grained, oolitic, fossiliferous, hematitic Limestone. 39.4 FURNACEVILLE MEMBER
6		28/4	123/14*	MOD			REYNALES LIMESTONE
6					41.9		*RQD based on core recovered.
6					6	FRACTURE FREQUENCY (FRACT./FT.)	Light greenish gray, argillaceous Shale.
7					7		MAPLEWOOD SHALE
6					7		Smooth, low angle joints at 43.0, 45.6, 45.7, 46.4 and 47.4 ft.
7	R-4	91/0	94/0**	MOD	6		
7					6		
7					7		
7					8		** Quality of rock core reduced due to drilling problems.
7	50.0			SEV	21.0		

FIELD HARDNESS	WEATHERING		BEDDING/JOINT SPACING			RQD	
- Knife can't scratch - scratches diff. - scratches easily - grooves - carves	Fresh V. slight Slight Moderate	Mod. Severe Severe V. Severe Complete	V. thin Thin Medium Thick V. thick	V. Close Close Mod. Close Wide V. wide	< 2" 2" - 12" 12" - 35" 36" - 120" > 120"	> 90% 90-75 75-50 50-25 < 25	Excellent Good Fair Poor V. Poor

CORE BORING REPORT

Drill Rate Min. per Foot	Core No. Depth Range	RECOVERY RQD		Graphic Log Weath.	Strata Change Tests	FIELD CLASSIFICATION AND REMARKS
		in.	%			
4	50.0					<p>Light greenish gray, argillaceous Shale. MAPLEWOOD SHALE</p> <p>Smooth, low angle joints at 52.3, 52.4, 52.6, 53.4, 53.5, 55.2, 56.4, 56.5 and 58.0 ft. Smooth, high angle joint from 52.3 to 52.8 ft. Smooth, tight, high angle joint from 53.6 to 53.8 ft. Rough, moderately dipping joints at 55.6 ft. and from 58.1 to 58.2 ft. Rough, moderately to severely weathered, vertical joint from 58.2 to 60.0 ft.</p> <p>** Quality of rock core reduced due to drilling problems.</p>
5				SL-	4	
5				MOD	2	
6				SEV	4	
6		95	79		>10	
6	R-5	48	40**		2	
5				SL-	6	
5				MOD	4	
6					>10	
6				SEV	>10	
6	60.0				>10	
6					60.0	<p>Light greenish gray, fine to medium-grained, medium-bedded Sandstone. THOROLD SANDSTONE</p> <p>Thin, reddish mottled zone at 62.8 ft.</p>
4	R-6	44	92	SL-		
4		34	71	MOD		
4	64.0					<p>Thin, reddish mottled zone at 62.8 ft.</p> <p>BOTTOM OF BORING AT 64.0 FT.</p> <p>NOTE: After completion, casing was damaged and borehole lost. No water pressure tests were completed and borehole was not grouted.</p>

FRACTURE FREQUENCY
(FRACTURES/FT.)

FIELD HARDNESS	WEATHERING		BEDDING/JOINT SPACING			RQD	
<ul style="list-style-type: none"> - Knife can't scratch - scratches diff. - scratches easily - grooves - carves 	<ul style="list-style-type: none"> Fresh V. slight Slight Moderate 	<ul style="list-style-type: none"> Mod. Severe Severe V. Severe Complete 	<ul style="list-style-type: none"> V. thin Thin Medium Thick V. thick 	<ul style="list-style-type: none"> V. Close Close Mod. Close Wide V. wide 	<ul style="list-style-type: none"> < 2" 2" - 12" 12" - 36" 36" - 120" > 120" 	<ul style="list-style-type: none"> > 90% 90-75 75-50 50-25 < 25 	<ul style="list-style-type: none"> Excellent Good Fair Poor V. Poor

TEST BORING REPORT

HOLE NO. B402

St. Paul Boulevard Interceptor Improvements

FILE NO. 739940

O'Brien & Gere Engineers, Inc.

SHEET NO. 1 of 3

OR Drill & Test, Inc.

LOCATION: E. Side of River

ELEVATION 390.0 NCD

DATE START 16 May 84

DATE FINISH 17 May 84

DRILLER: W. Skura

INSPECTOR: F. Amos

TIME	WATER	DEPTH TO: (Ft.)		TYPE	HW	S/S	CORE BARREL NX
		BOTTOM OF CASING	BOTTOM OF HOLE				
0830	0	19.5	19.5	SIEGE in.	4	1-3/8	2-1/8
0820	0	19.5	58.5	HAMMER WT lb.	--	140	--
				HAMMER FALL in.	--	30	--

DATE	CASING BLOWS PER FOOT	SAMPLER BLOWS PER 6 INCHES	SAMPLE NUMBER	SAMPLE DEPTH RANGE	FIELD CLASSIFICATION AND REMARKS
					NOTE: This borehole was drilled in the Genesee River using barge-mounted equipment. All depths were measured from the water surface on the date the borehole was started. The river elevation at that time is given above.
					MUDLINE AT 6.0 FT.
					SOIL OVERBURDEN (No Soil Samples Obtained)
					CASING REFUSAL AT 19.5 FT.

TEST	DENSITY	BLOWS FT	CONSISTENCY	SAMPLE IDENTIFICATION	SUMMARY
	VERY LOOSE	0-2	VERY SOFT	S - SPLIT SPOON	OVERBURDEN 19.5
	LOOSE	2-4	SOFT	T - THIN WALL TUBE	ROCK 34.0
	MEDIUM COMPACT	4-8	MEDIUM STIFF	U - UNDISTURBED PISTON	SAMPLES ---
	COMPACT	8-15	STIFF	C - OPEN END ROD	HOLE NO. B402
	VERY COMPACT	15-30	VERY STIFF	V - WASH SAMPLE	

CHAIN OF CUSTODY RECORD

recycled paper

A-8

ecology and environment, inc.

Proj. No.		Project Name				NO. OF CONTAINERS							REMARKS
JV 290		RGE LAKE AVE. SITE, ROCHESTER NY					EXTRACTABLE ORGANICS VOLATILE ORGANICS METALS CYANIDE PESTICIDES GASEOUS CHLORIDES						
SAMPLES: (Signature)													
STA. NO.	DATE	TIME	COMP.	GPS	STATION LOCATION								
12	7/13/91	1:20		X	WELL # 12 LAB NO. 1332	1	X						1/2 GAL.
"	"	"		X	" " "	2	X						40 ml
"	"	"		X	" " "	1		X					1 LITON
"	"	"		X	" " "	1			X				500 ml
"	"	"		X	" " "	1				X			500 ml
"	"	"		X	" " "	1					X		500 ml
													Samples delivered to EPC lab and placed in refrigerator #3 per lab sheet
Relinquished by: (Signature)		Date/Time		Received by: (Signature)		Relinquished by: (Signature)		Date/Time		Received by: (Signature)			
<i>[Signature]</i>		7/13/91 8:05		<i>[Signature]</i>									
Relinquished by: (Signature)		Date/Time		Received by: (Signature)		Relinquished by: (Signature)		Date/Time		Received by: (Signature)			
Relinquished by: (Signature)		Date/Time		Received for Laboratory by: (Signature)		Date/Time		Remarks					

CONFIDENTIAL



ecology and environment, inc.

International Specialists in the Environmental Sciences

CHAIN OF CUSTODY RECORD

recycled paper

A-10

Ecology and Environment, Inc.

Proj. No. JV-290		Project Name K68E Lake Co Property Rochester				NO. OF CONTAINERS	EXTRACTABLE ORGANICS Volatile Organics METALS					REMARKS
SAMPLES: (Signature) <i>[Signature]</i>												
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION							
SE-6 S-3	8/18/81	2:04	✓		10-11.5 ft. HOLE SE-6	1	X	X	X		LAB 470. 1333	
SE-6 S-17	"	4:37	✓		75-76.5 ft. "	1	X	X	X		1334	
SE-6 S-18	"	4:58	✓		84-84.5 ft. "	1	X	X	X		1335	
Samples delivered to Ed E. Lot and placed in Refrigerator #3 at 8:00 P.M. and lot locked												
Relinquished by: (Signature) <i>[Signature]</i>		Date/Time 8/18/81 8:00 AM		Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)		Date/Time		Received by: (Signature)		
Relinquished by: (Signature)		Date/Time		Received by: (Signature)		Relinquished by: (Signature)		Date/Time		Received by: (Signature)		
Relinquished by: (Signature)		Date/Time		Received for Laboratory by: (Signature)		Date/Time		Remarks				

CONFIDENTIAL

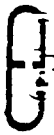
CONFIDENTIAL

APPENDIX B

GAS CHROMATOGRAPH/MASS SPECTROMETER DATA

Table of Contents Appendix B

<u>Description</u>	<u>Page</u>
Description of GC-MS Operating Conditions, Volatiles	
Analysis (VOA)	B-3
Chromatogram of VOA Standard, Sample #1130, Spike #1	B-4
Chromatogram of VOA Sample #1211, Leachate Spring #1;	
Chromatogram of VOA Sample #1332, Well #12	B-5
Chromatogram of VOA Sample #1237 (S-I-2, S-15, 70-71.5');;	
Chromatogram of VOA Sample #1238 (S-I-2, S-16, 75-76.5') ...	B-6
Chromatogram of VOA Sample #1333 (S-I-6, S-3, 10-11.5');;	
Chromatogram of VOA Sample #1334 (S-I-6, S-17, 75-76.5') ...	B-7
Chromatogram of VOA Sample #1335 (S-I-6, S-18, 84-84.5')	B-8
Chromatogram of VOA Sample #1232 (S-I-7, S-14, 66-67.5');;	
Chromatogram of VOA Sample #1234 (S-I-10, S-9, 39.5-41') ...	B-9
Description of GC-MS Operating Conditions Base/Neutral	
(B/N) Analysis	B-10
Chromatogram of B/N Spiking Standard;	
Chromatogram of B/N Sample Blank	B-11
Chromatogram of B/N Extract Sample #1211;	
Chromatogram of B/N Sample #1332 (Well)	B-12
Chromatogram of B/N Sample #1237;	
Chromatogram of B/N Sample #1238	B-13
Chromatogram of B/N Sample #1230;	
Chromatogram of B/N Sample #1197	B-14
Chromatogram of B/N Sample #1198;	
Chromatogram of B/N Sample #1199	B-15
Chromatogram of B/N Sample #1200;	
Duplicate Chromatogram of B/N Sample #1200	B-16
Chromatogram of B/N Sample #1201;	
Chromatogram of B/N Sample #1212	B-17
Chromatogram of B/N Sample #1213;	
Chromatogram of B/N Sample #1214	B-18
Chromatogram of B/N Sample #1187;	
Chromatogram of B/N Sample #1188	B-19
Chromatogram of B/N Sample #1189 (S-I-12, S-8);	
Chromatogram of B/N Sample #1190	B-20
Chromatogram of B/N Sample #1191	B-21
Description of GC/MS Conditions, Acid Fraction Analysis;	
Chromatogram of Acid Fraction Standard	B-22
Chromatogram of Acid Fraction Sample #1211;	
Chromatogram of Acid Fraction Sample #1332	B-23



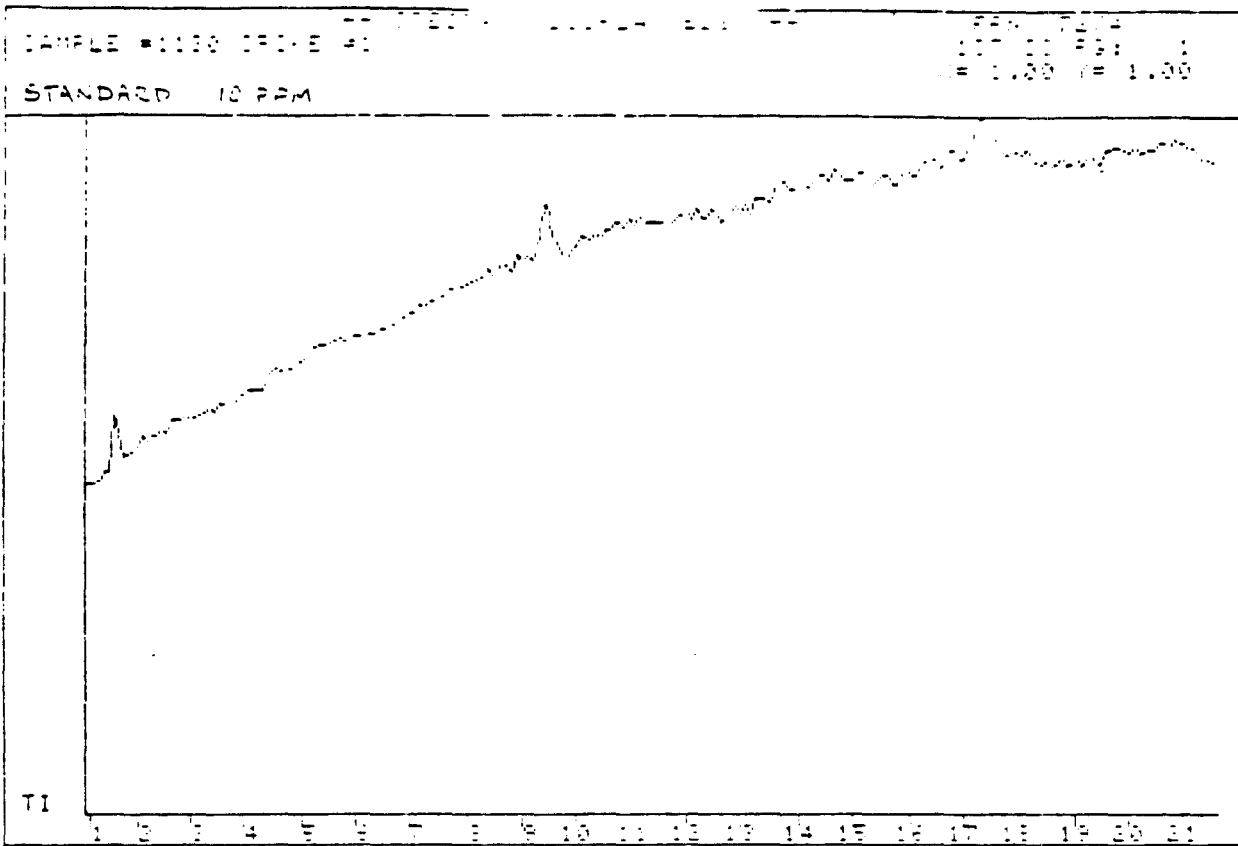
ecology and environment, inc.
International Specialists in the Environmental Sciences

LABORATORY REPORT GC-MS OPERATING CONDITIONS VOLATILES ANALYSIS

Operator <u>W. J. ...</u>	Date <u>...</u>
Column <u>...</u>	Detector <u>...</u>
Length <u>...</u>	Range <u>...</u>
Dia. <u>...</u>	Atten. <u>...</u>
Liquid Phase <u>...</u>	Flow Rates, ml/min.
Wt. % <u>...</u>	Hydrogen <u>...</u> Air <u>...</u>
Support <u>...</u>	Scavenge <u>...</u>
Mesh <u>...</u>	Split <u>...</u>
Carrier Gas <u>...</u>	Temperature, °C
Rotameter <u>...</u>	Det. <u>...</u> Inj. <u>...</u>
Inlet Press <u>...</u> psig	Column Initial <u>...</u>
Rate <u>...</u> ml/min	Final <u>...</u>
CHART SPEED <u>...</u>	Rate <u>...</u>
SAMPLE <u>WATER SMP</u>	Solvent <u>...</u>
Size <u>...</u>	Concn. <u>...</u>

Operator <u>W. J. ...</u>	Date <u>...</u>
Column <u>...</u>	Detector <u>...</u>
Length <u>...</u>	Range <u>...</u>
Dia. <u>...</u>	Atten. <u>...</u>
Liquid Phase <u>...</u>	Flow Rates, ml/min.
Wt. % <u>...</u>	Hydrogen <u>...</u> Air <u>...</u>
Support <u>...</u>	Scavenge <u>...</u>
Mesh <u>...</u>	Split <u>...</u>
Carrier Gas <u>...</u>	Temperature, °C
Rotameter <u>...</u>	Det. <u>...</u> Inj. <u>...</u>
Inlet Press <u>...</u> psig	Column Initial <u>...</u>
Rate <u>...</u> ml/min	Final <u>...</u>
CHART SPEED <u>...</u>	Rate <u>...</u>
SAMPLE <u>...</u>	Solvent <u>...</u>
Size <u>...</u>	Concn. <u>...</u>

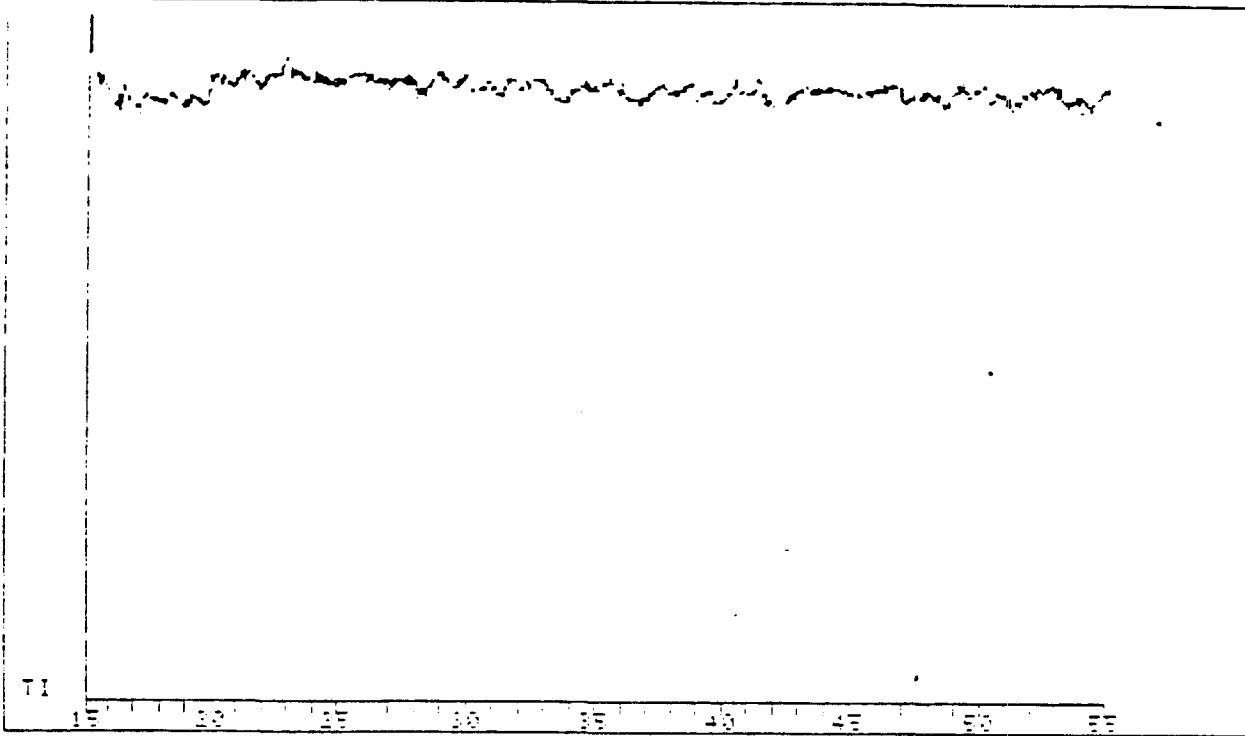
CONFIDENTIAL



DAMPLE #1321: WELLSITE OFFSHORE #1

DATE: 01/25/88
TIME: 11:00

V04

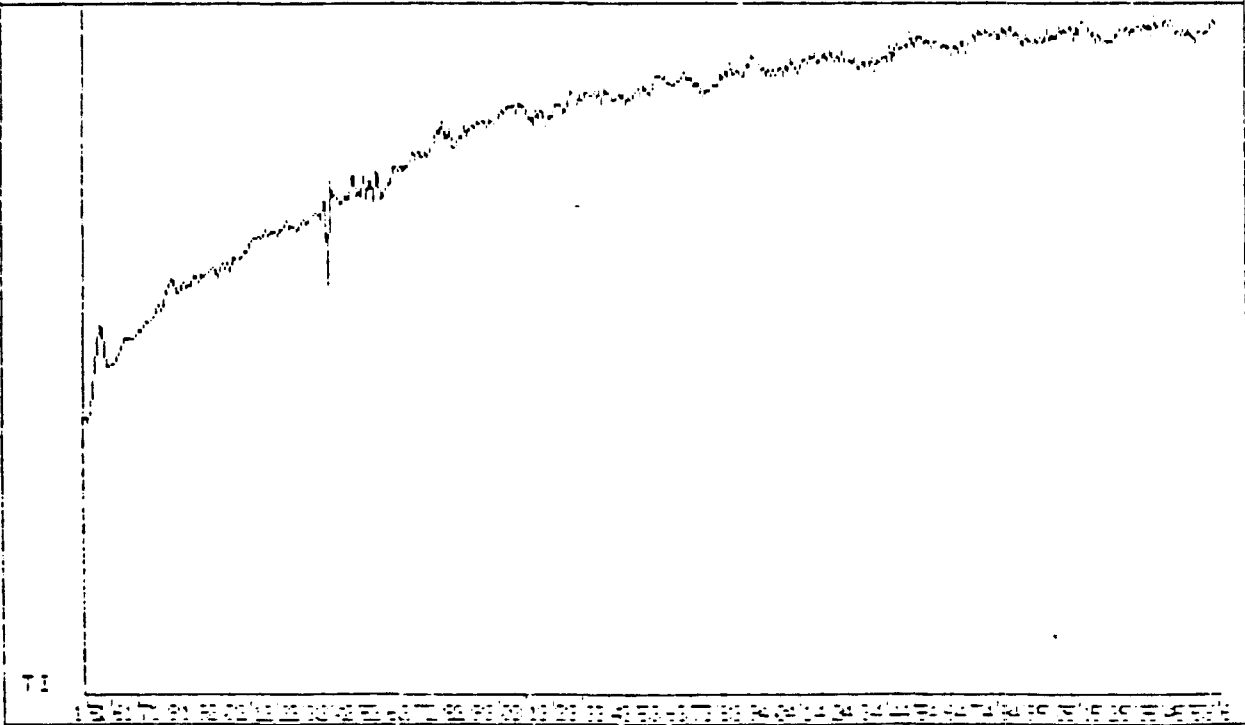


DAMPLE #1322 V09

-- SPECTRUM DISPLAY EDIT --

FRQ: 7312
1CT 30/FG: 1
X= 1.50 Y= 1.00

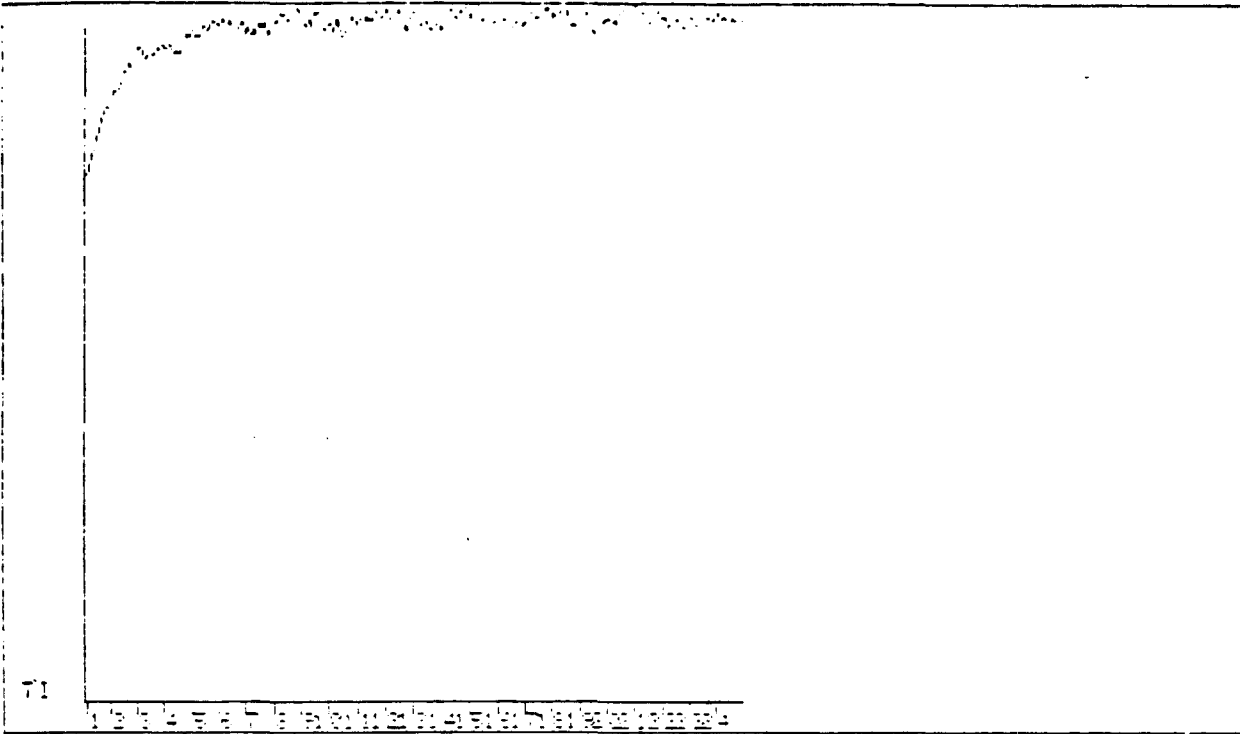
WELL # 12



CONFIDENTIAL

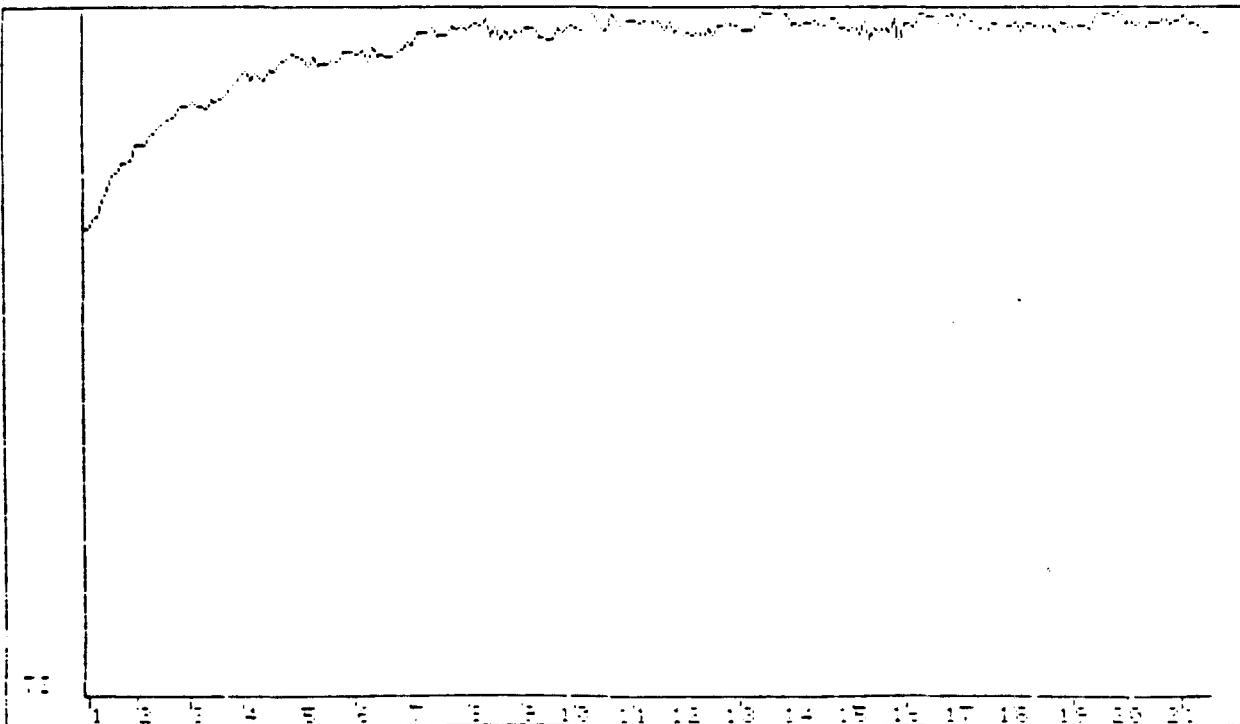
SAMPLE #1237 VOA
S-I-2, S-15, 74-76.5'

FRF: 7379
1ST PERIOD: 1
N= 1.00 Y= 1.00

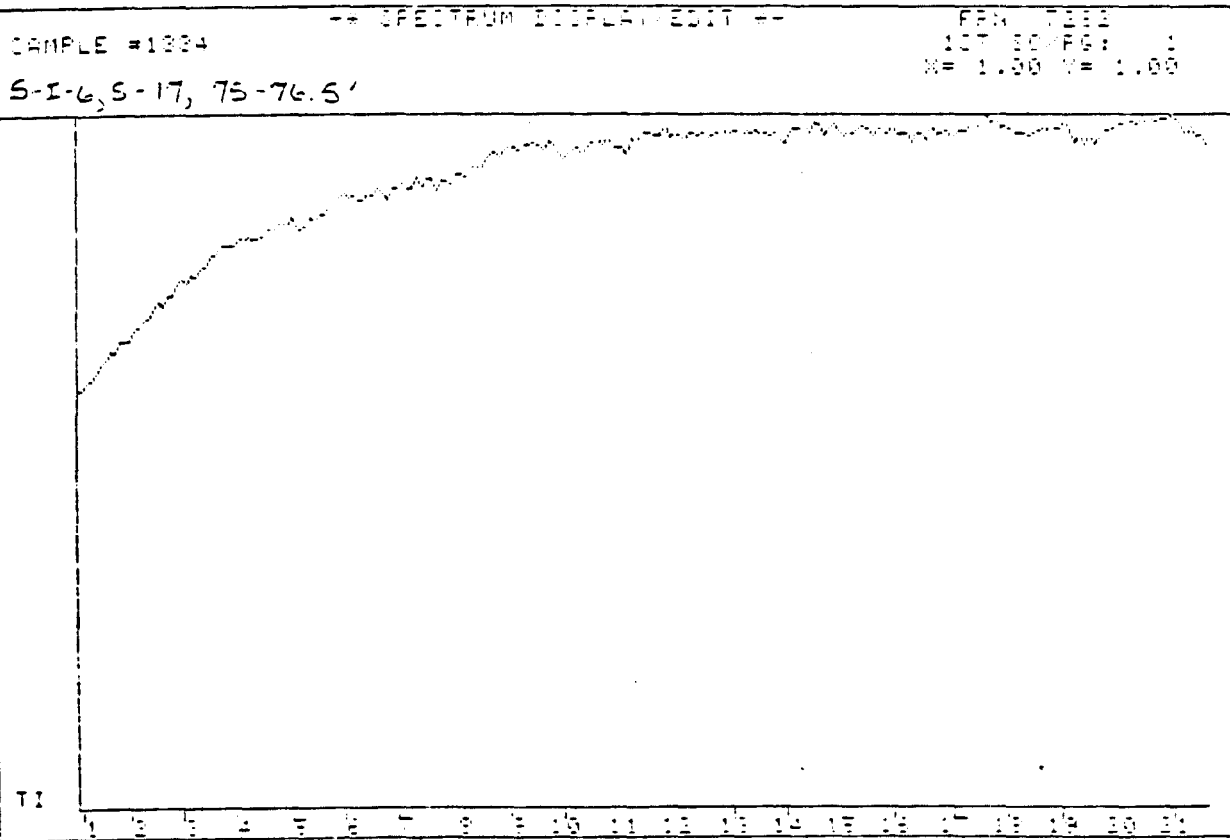
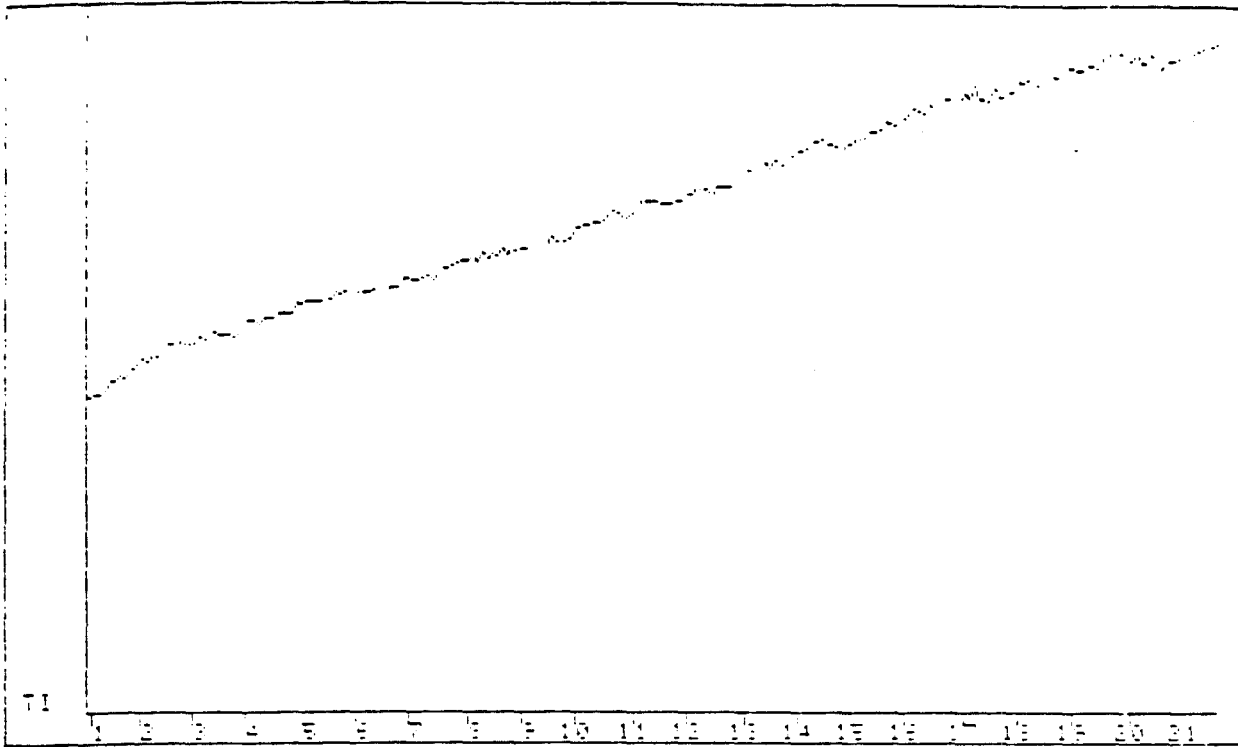


SAMPLE #1239 VOA
S-I-2, S-16, 75-76.5'

FRF: 7379
1ST PERIOD: 1
N= 1.00 Y= 1.00

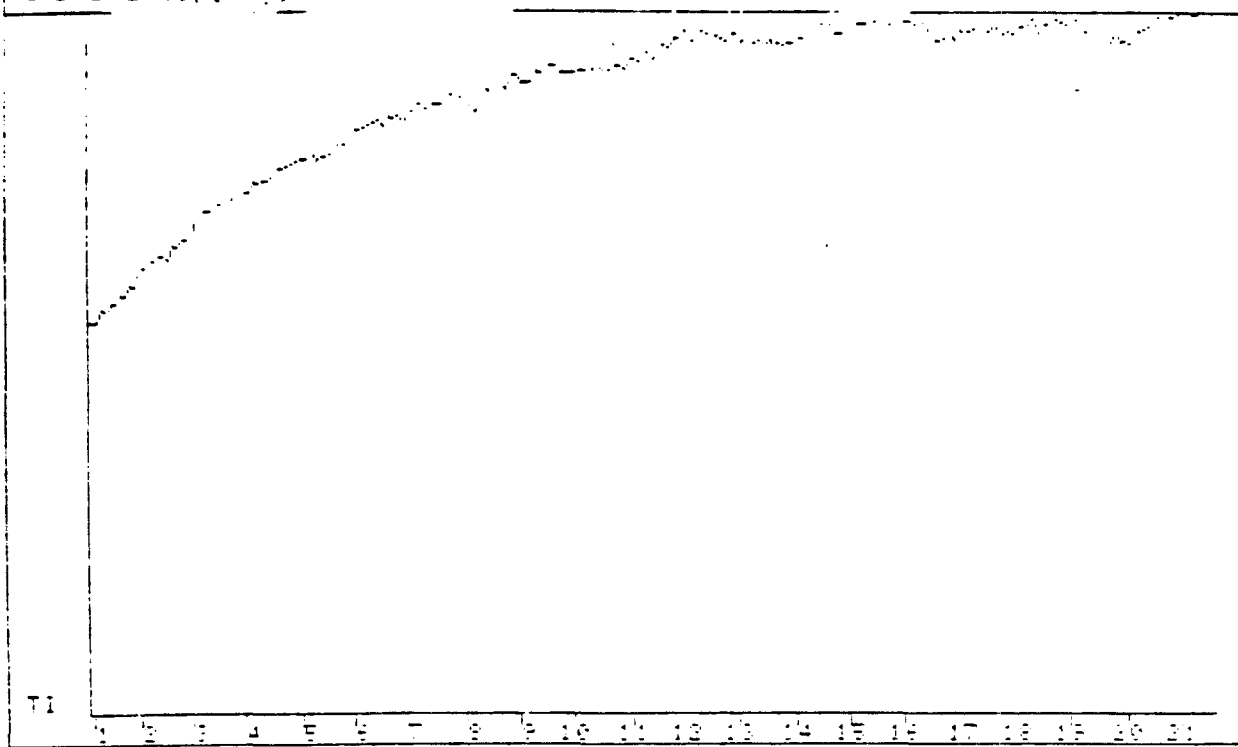


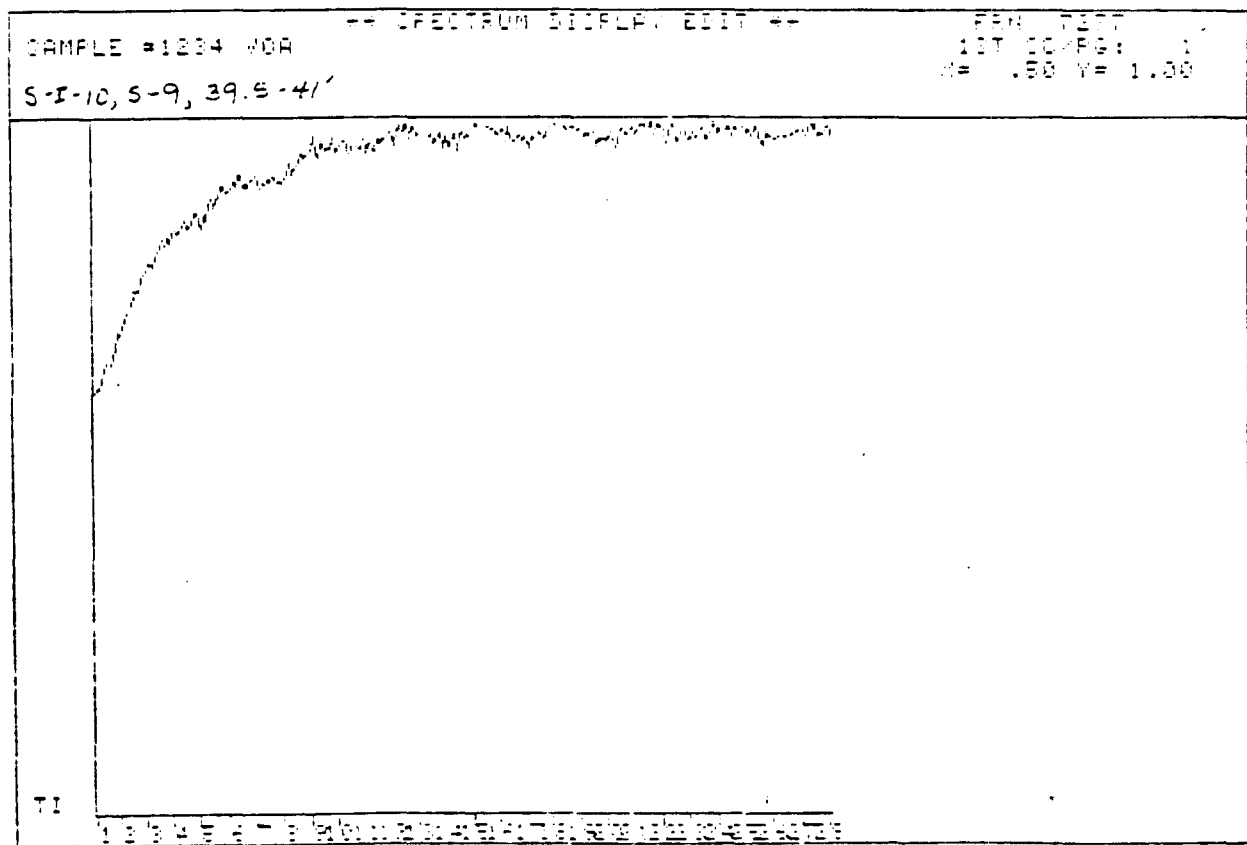
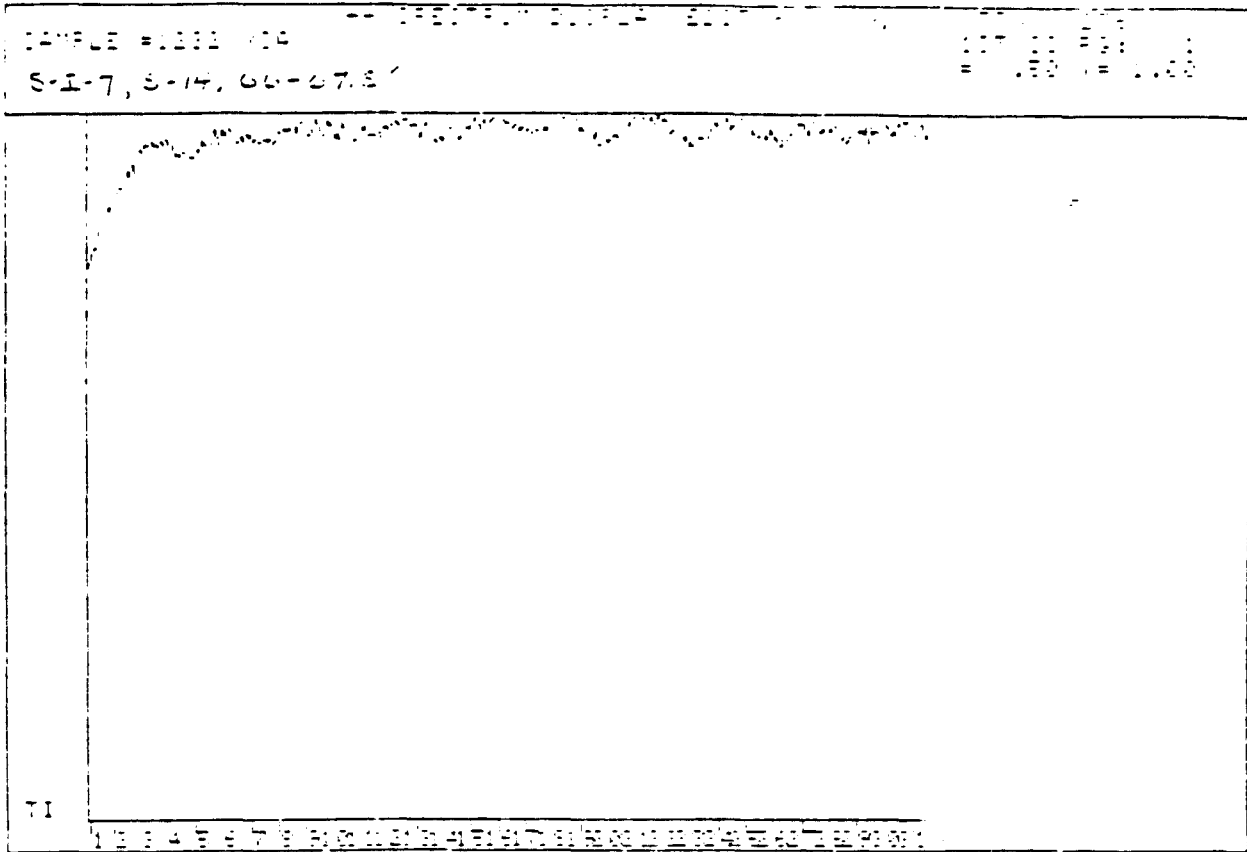
CAMPLE #1333 14
S-6, S-8, 10-115

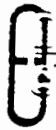


•1385 704

S-1-6 S-15, S-34 5'







ecology and environment, inc.

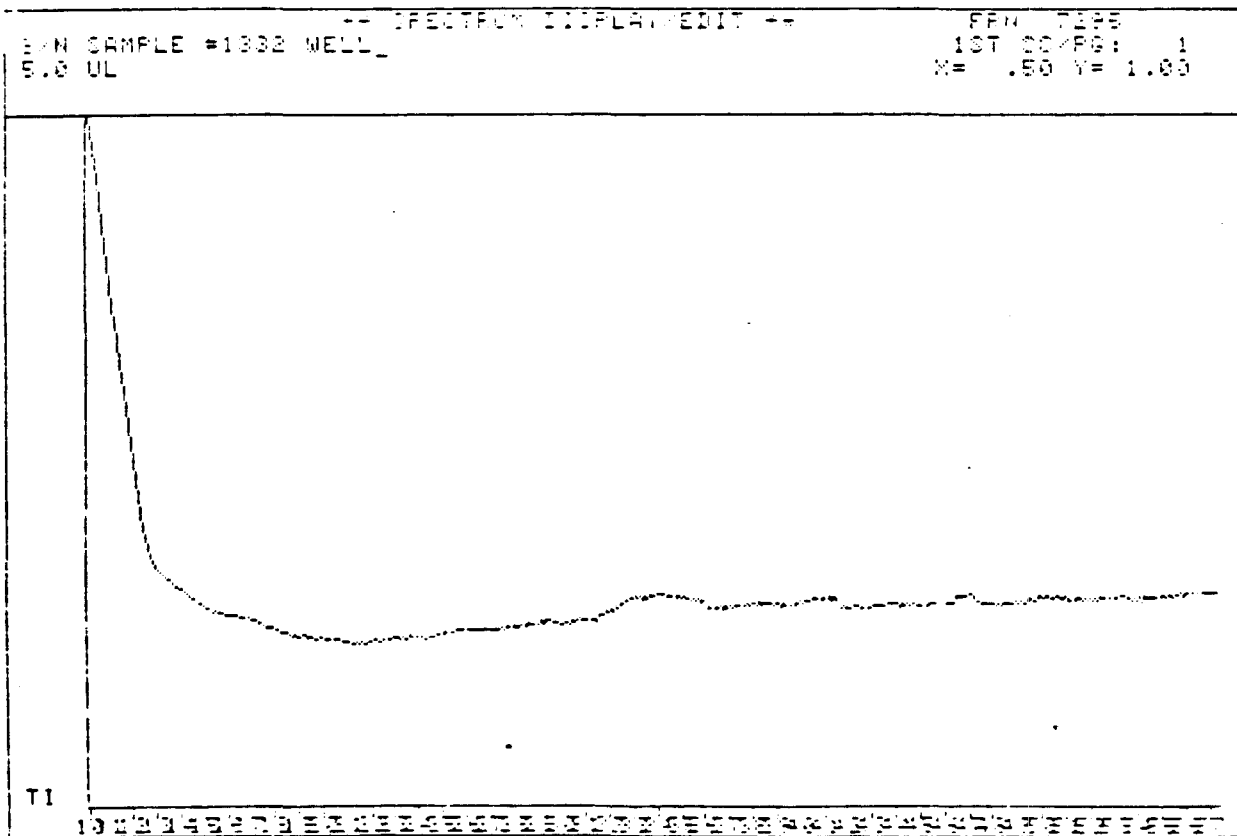
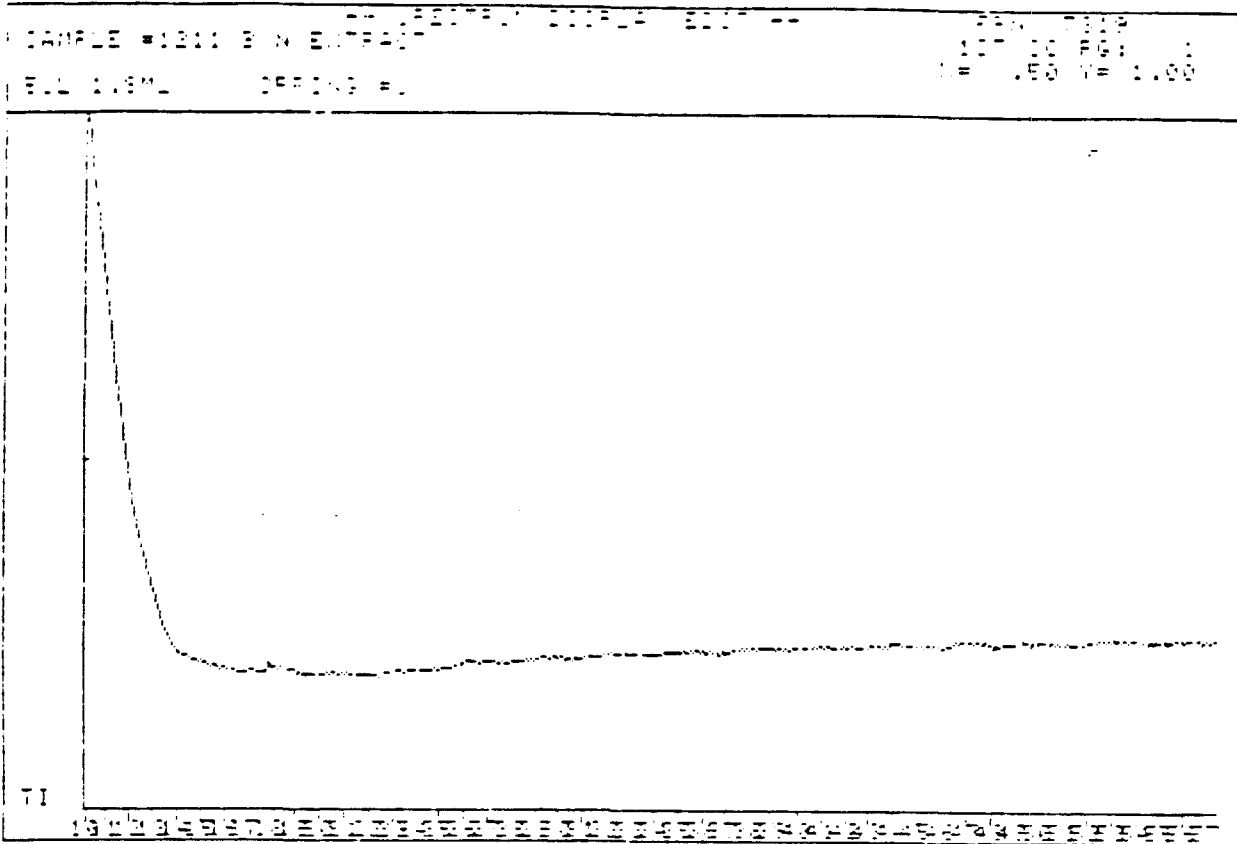
International Specialists in the Environmental Sciences

LABORATORY REPORT GC-MS OPERATING CONDITIONS BASE/NEUTRAL ANALYSIS

Operator <u>S. WOOTEN/102</u>	Date <u>8/10 - 8/11/81</u>
Column	Detector <u>Mass Spec</u>
Length <u>5'</u>	Range <u>50-250 amu</u>
Dia. <u>1/8" O.D.</u>	Atten. _____
Liquid Phase <u>SP 2250</u>	Flow Rates ml/min.
Wt. % <u>1%</u>	Hydrogen _____ Air _____
Support <u>Supelcoport</u>	Scavenge _____
Mesh <u>100/120</u>	Split _____
Carrier Gas <u>Helium</u>	Temperature, °C
Rotameter _____	Det. _____ Inj <u>222°C</u>
Inlet Press <u>10</u> psig	Column Initial <u>70°C</u>
Rate <u>3.3</u> ml/min	Final <u>270°C</u>
CHART SPEED _____	Rate <u>1000/min</u>
SAMPLE <u>Soil Extracts</u>	Solvent <u>Toluene - Hexane</u>
Size <u>5 ul injection</u>	Concn. <u>10 mg/g soil</u>

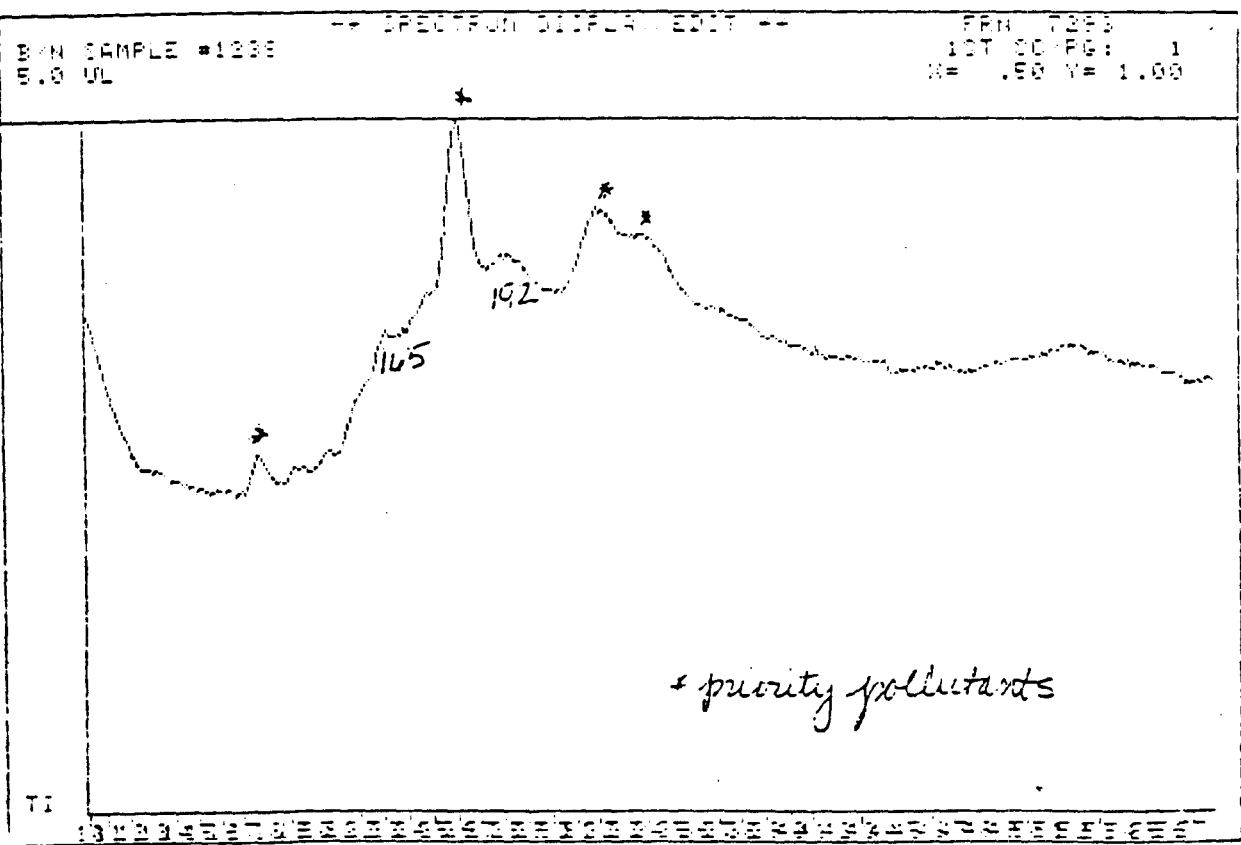
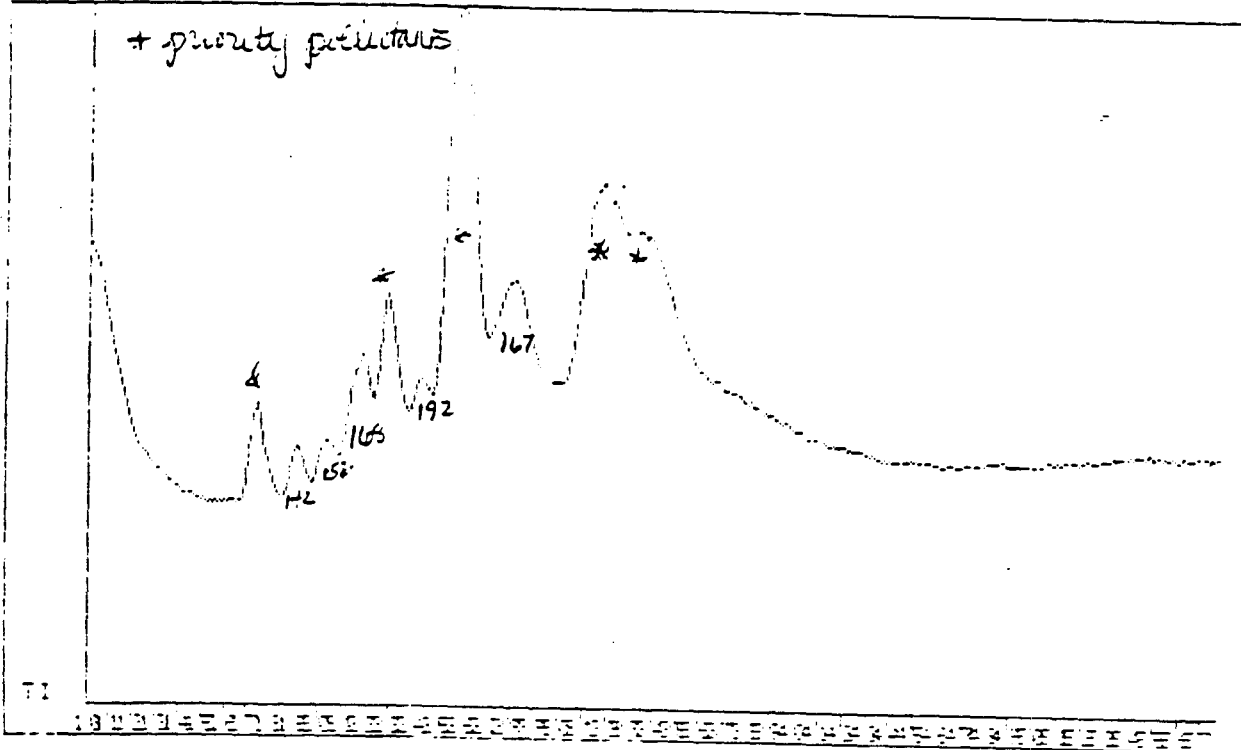
Operator <u>S. WOOTEN/102</u>	Date <u>8/10 - 8/11/81</u>
Column	Detector <u>Mass Spec</u>
Length <u>6'</u>	Range <u>50-250 amu</u>
Dia. <u>1/8" O.D.</u>	Atten. _____
Liquid Phase <u>SP 2250</u>	Flow Rates ml/min.
Wt. % <u>1%</u>	Hydrogen _____ Air _____
Support <u>Supelcoport</u>	Scavenge _____
Mesh <u>100/120</u>	Split _____
Carrier Gas <u>Helium</u>	Temperature, °C
Rotameter _____	Det. _____ Inj <u>222°C</u>
Inlet Press <u>10</u> psig	Column Initial <u>70°C</u>
Rate <u>3.3</u> ml/min	Final <u>270°C</u>
CHART SPEED _____	Rate <u>1000/min</u>
SAMPLE <u>Amoxicillin Smc</u>	Solvent <u>Methanol/Water</u>
Size <u>5 ul injection</u>	Concn. <u>5.0 mg/ml</u>

CONFIDENTIAL

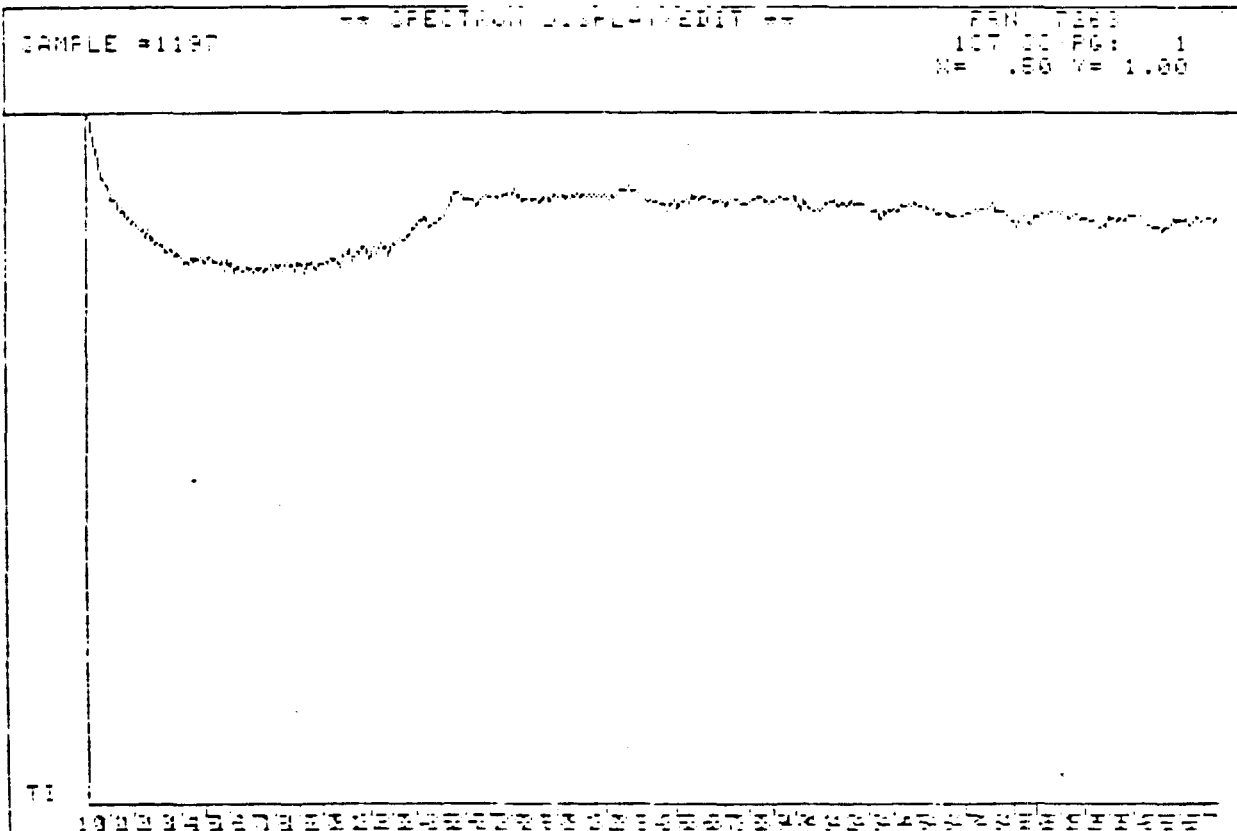
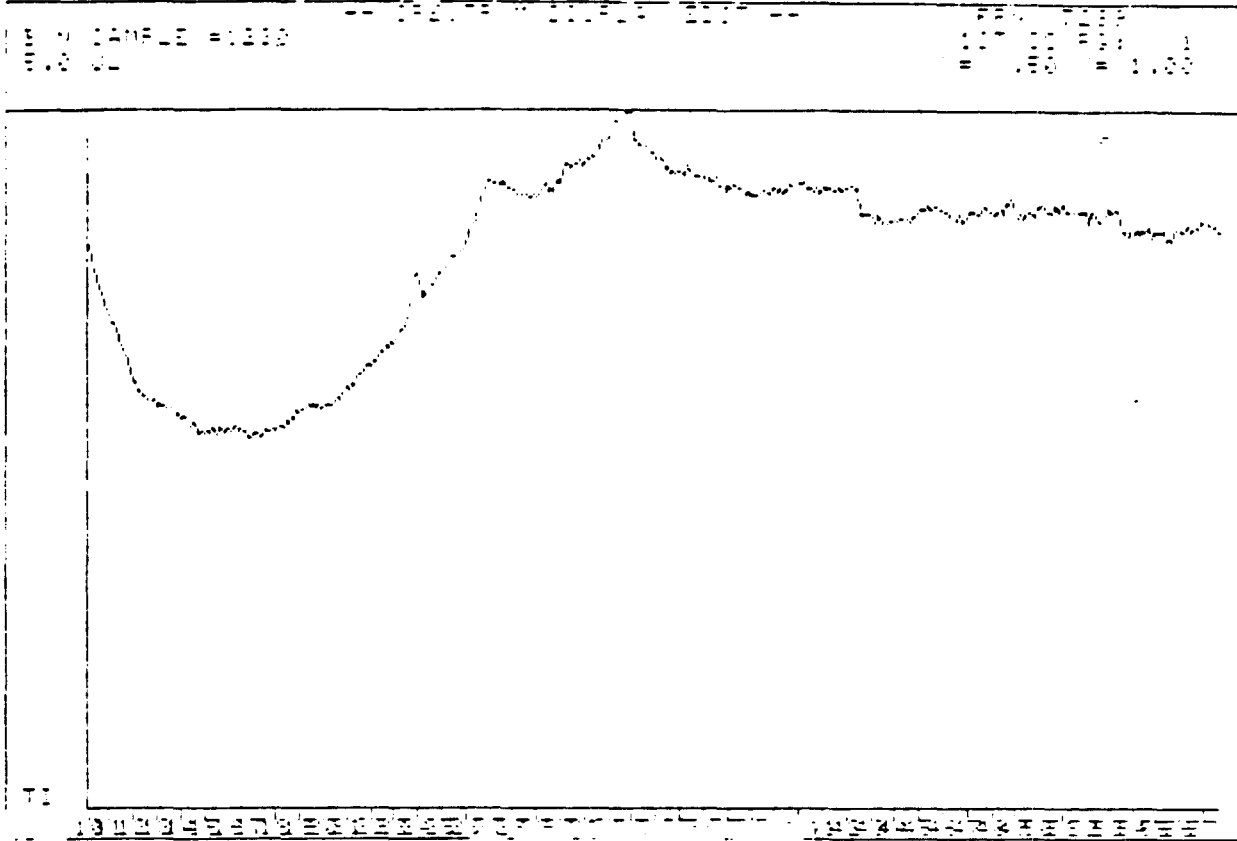


B/N SAMPLE #1237
5.0 UL

FRN 7293
10T 00 PG: 1
X= 1.00 Y= 1.00

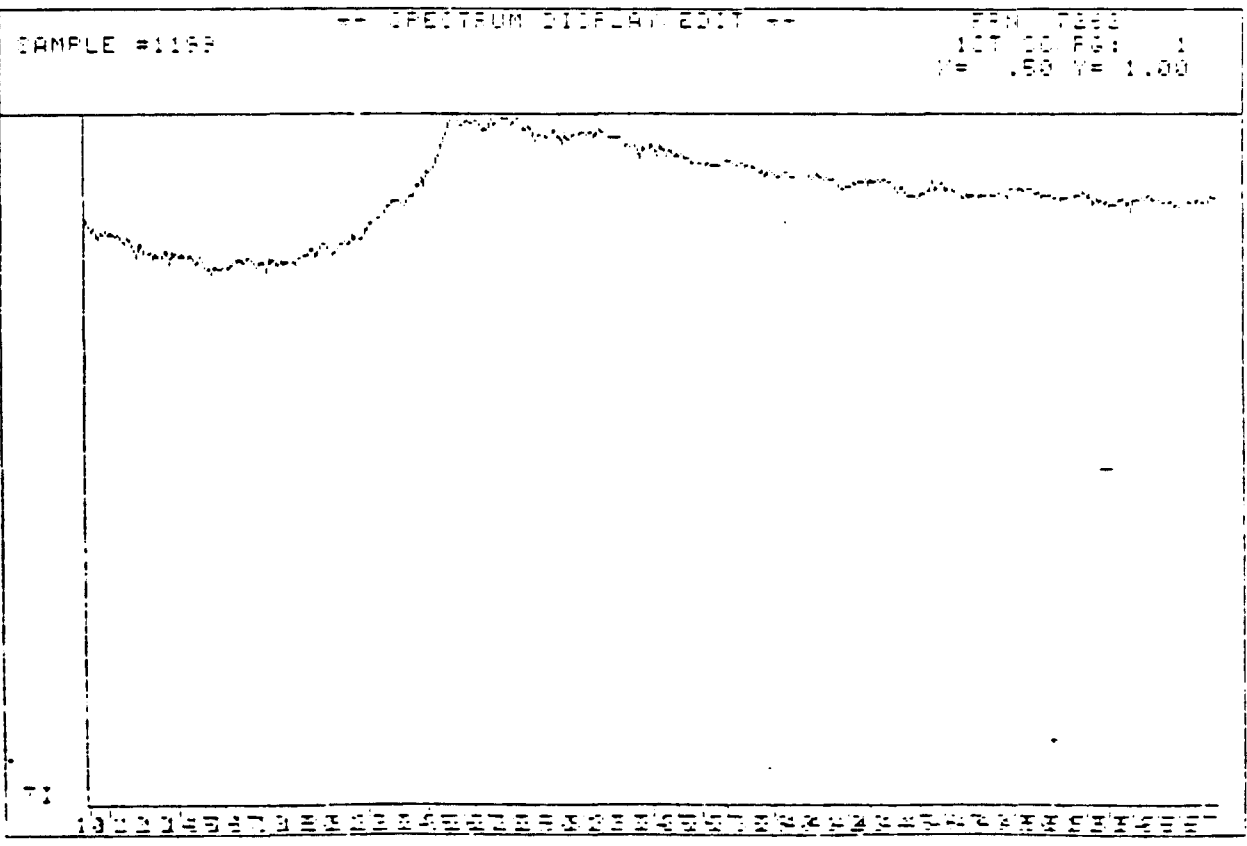
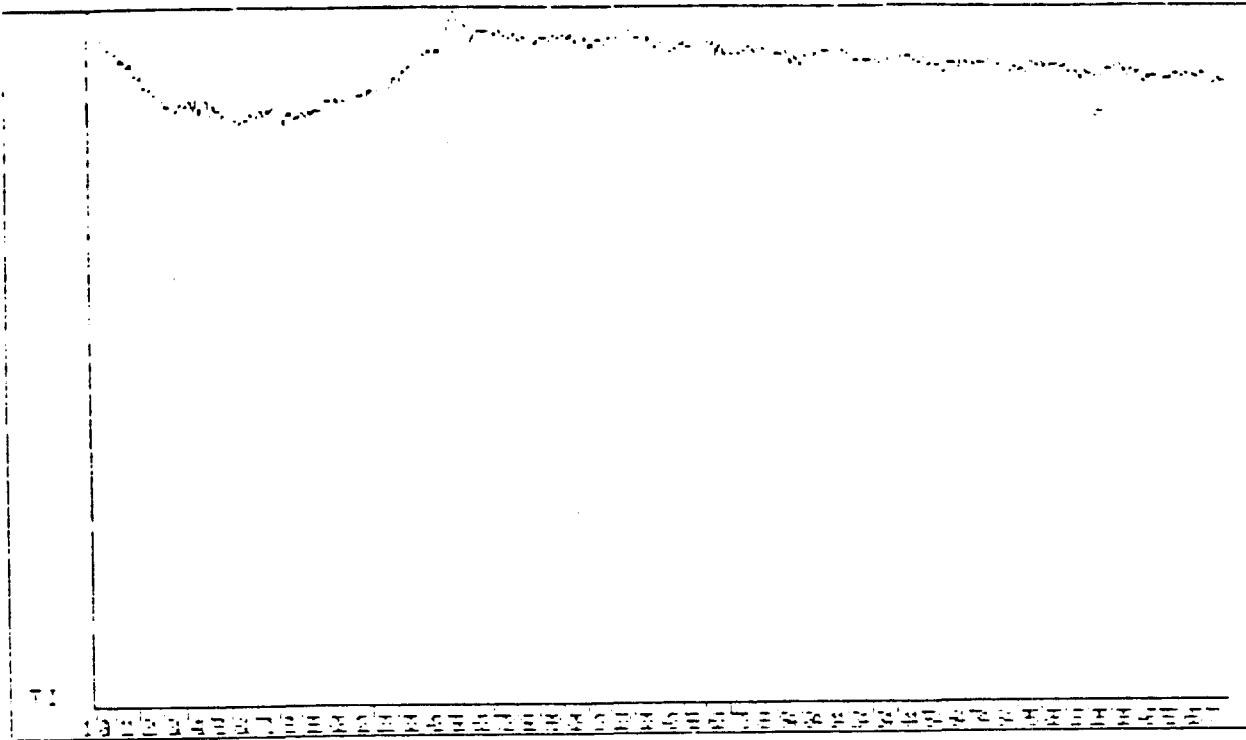


CONFIDENTIAL

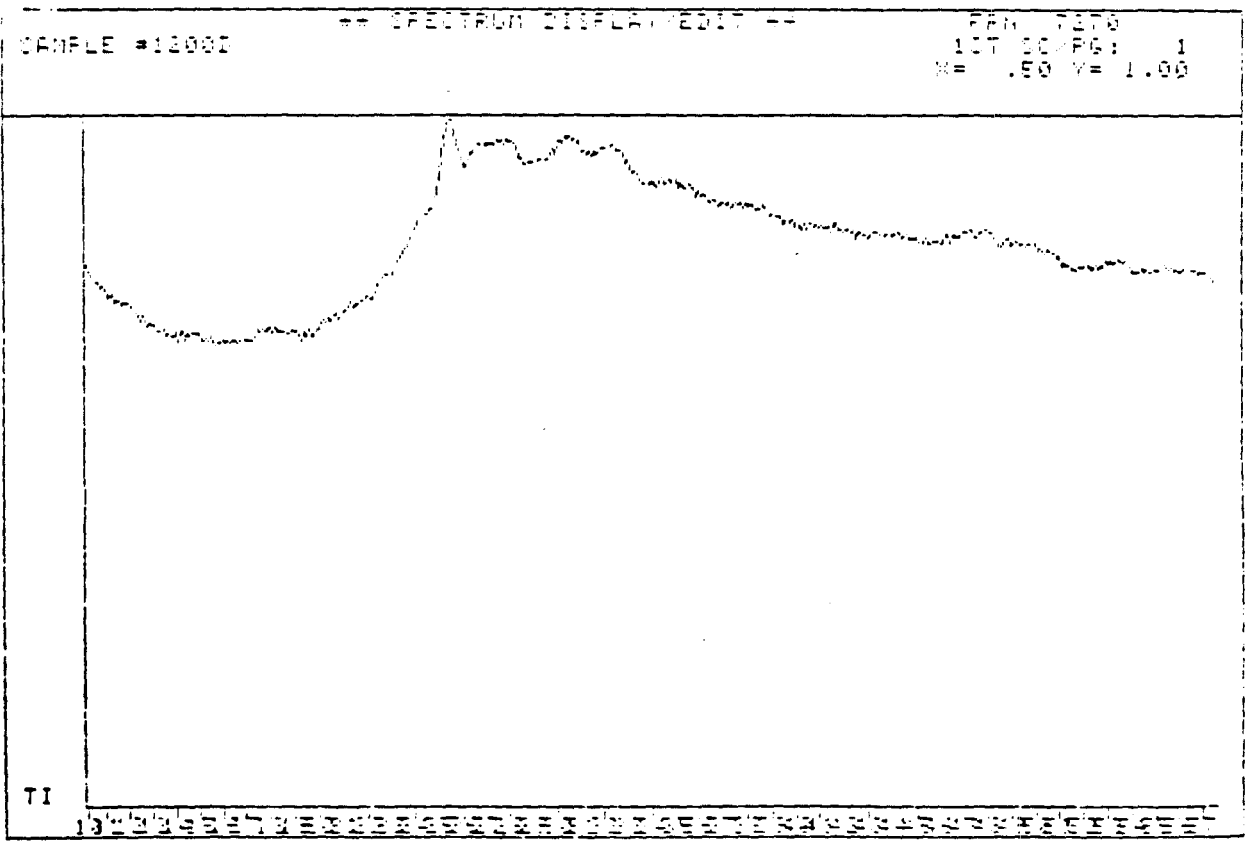
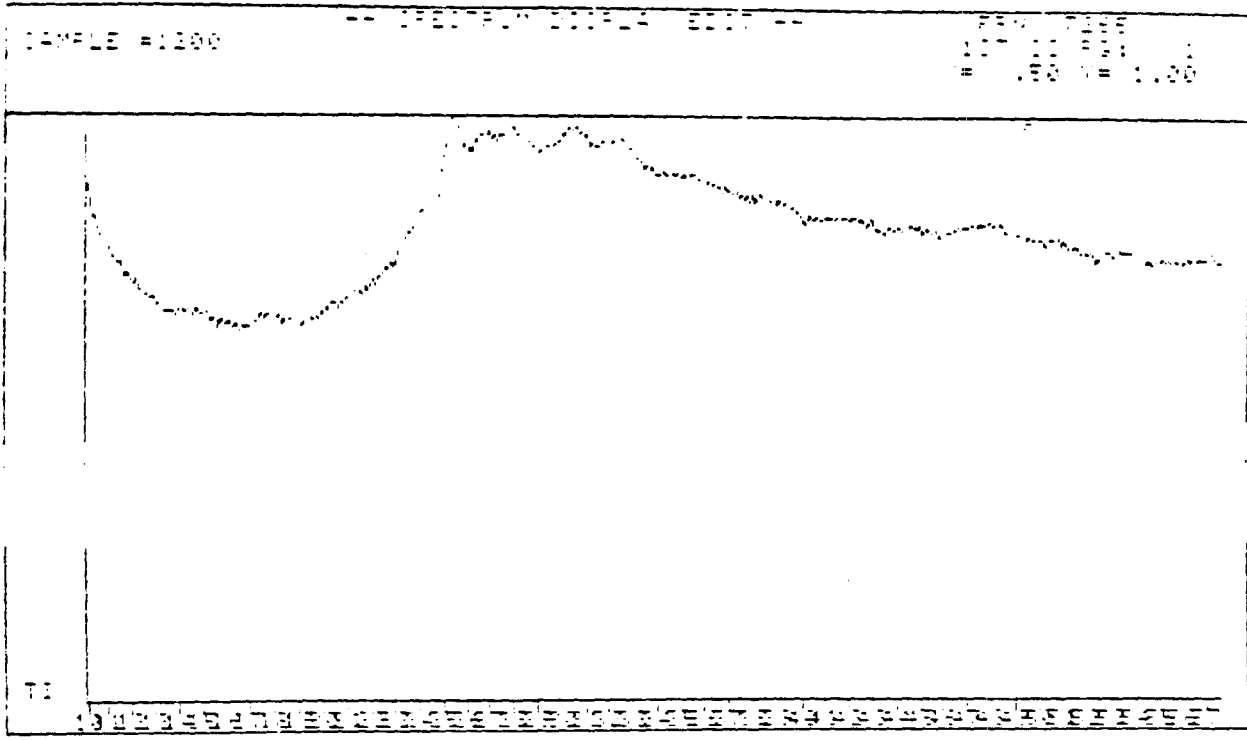


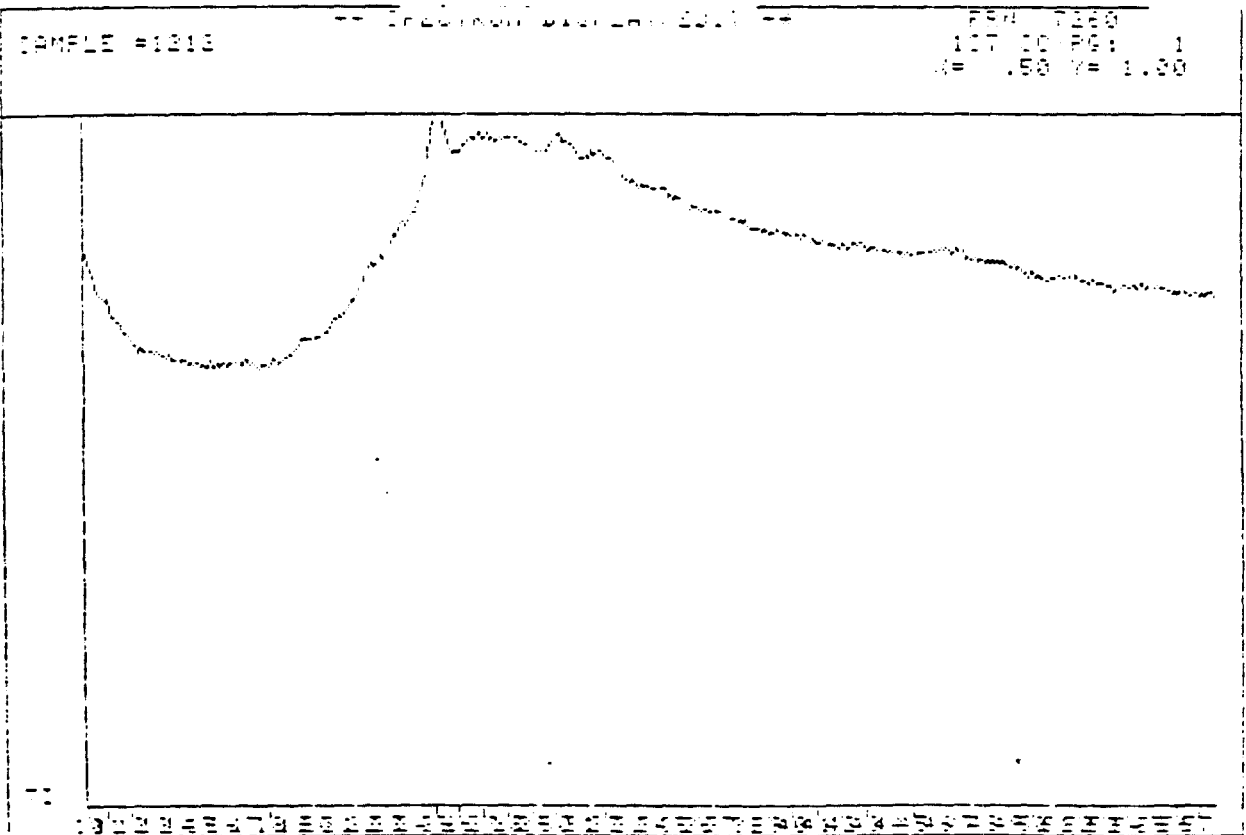
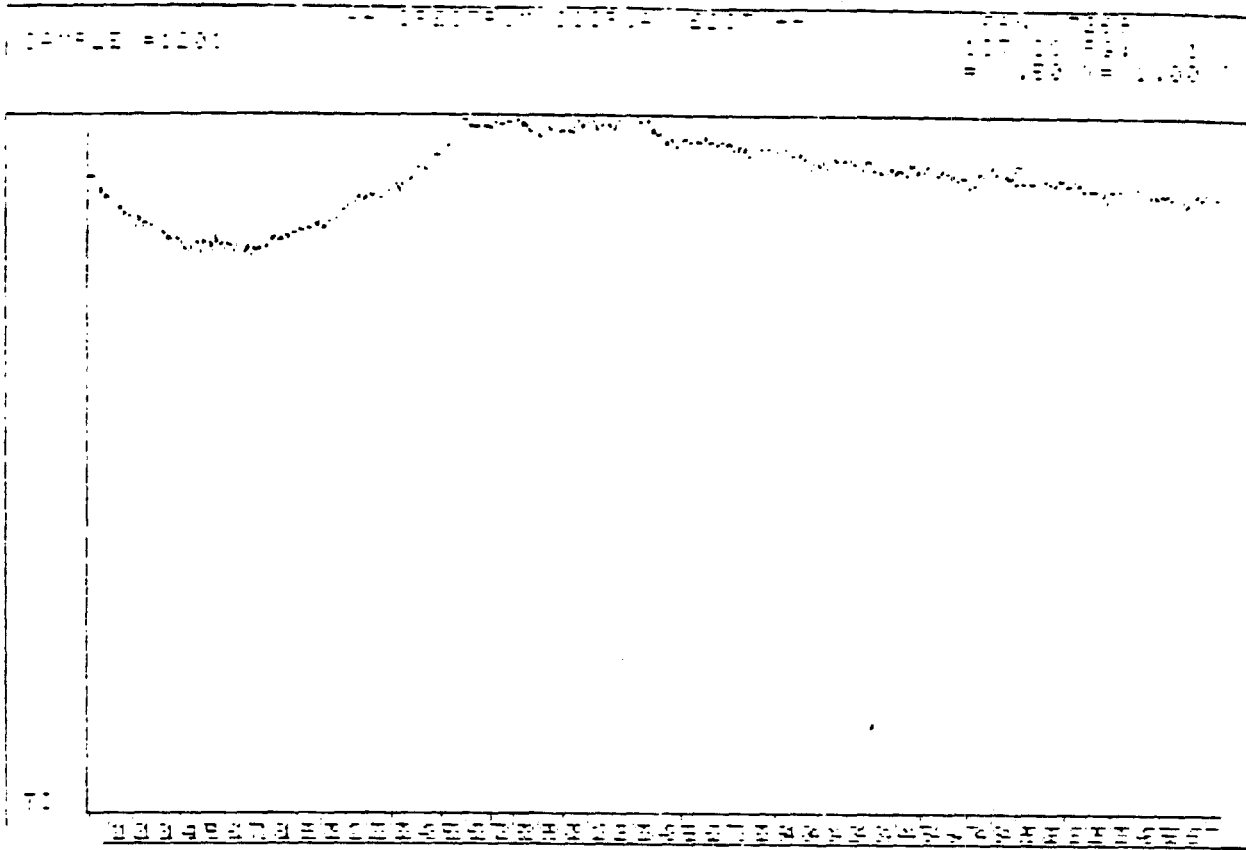
SAMPLE #1199

FRN 7890
10T COMP: 1
X= 1.50 Y= 1.00

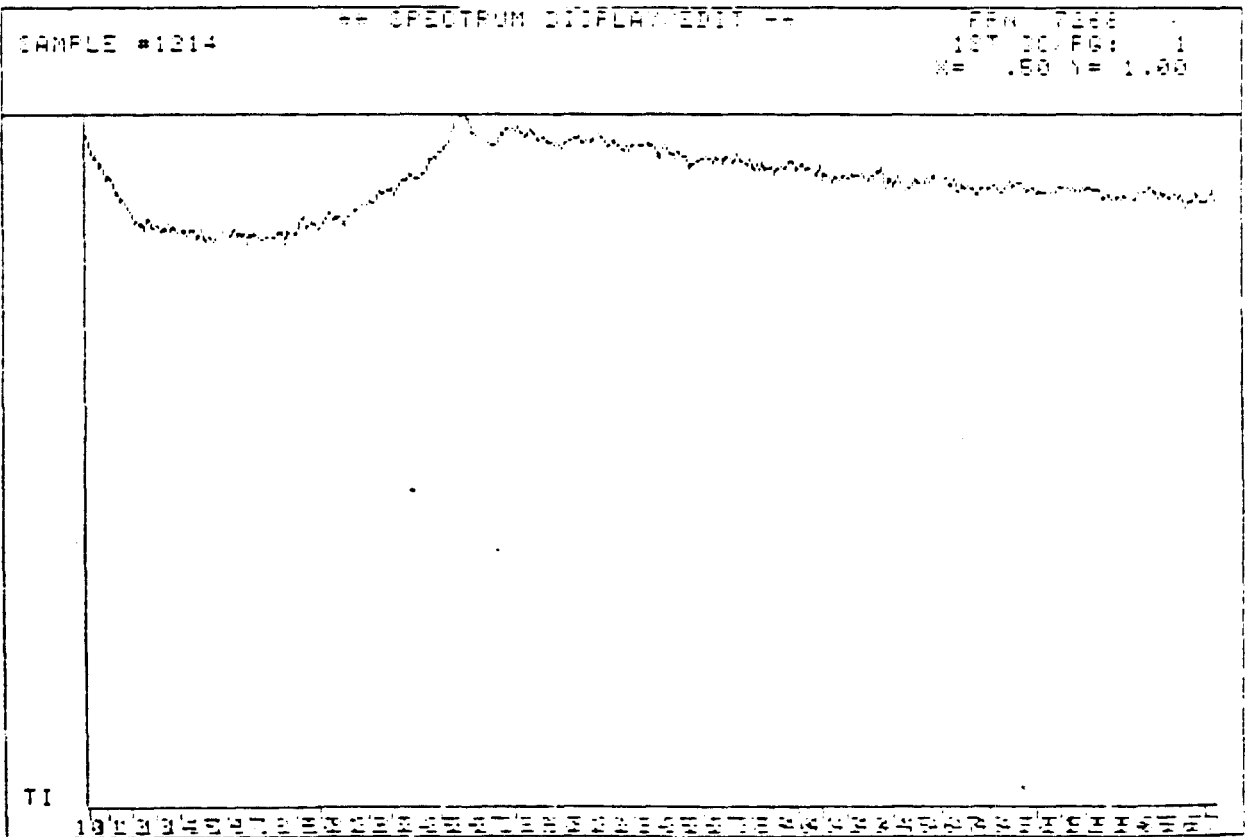
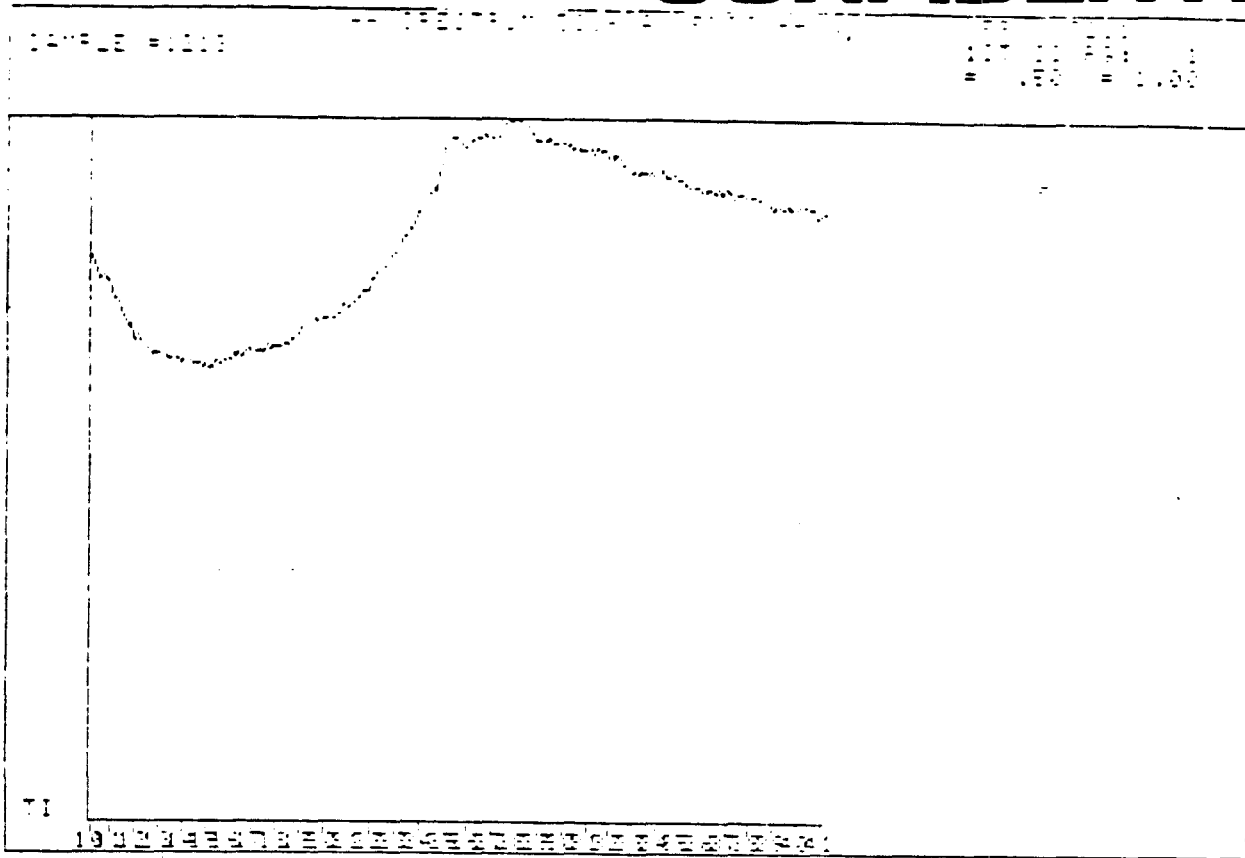


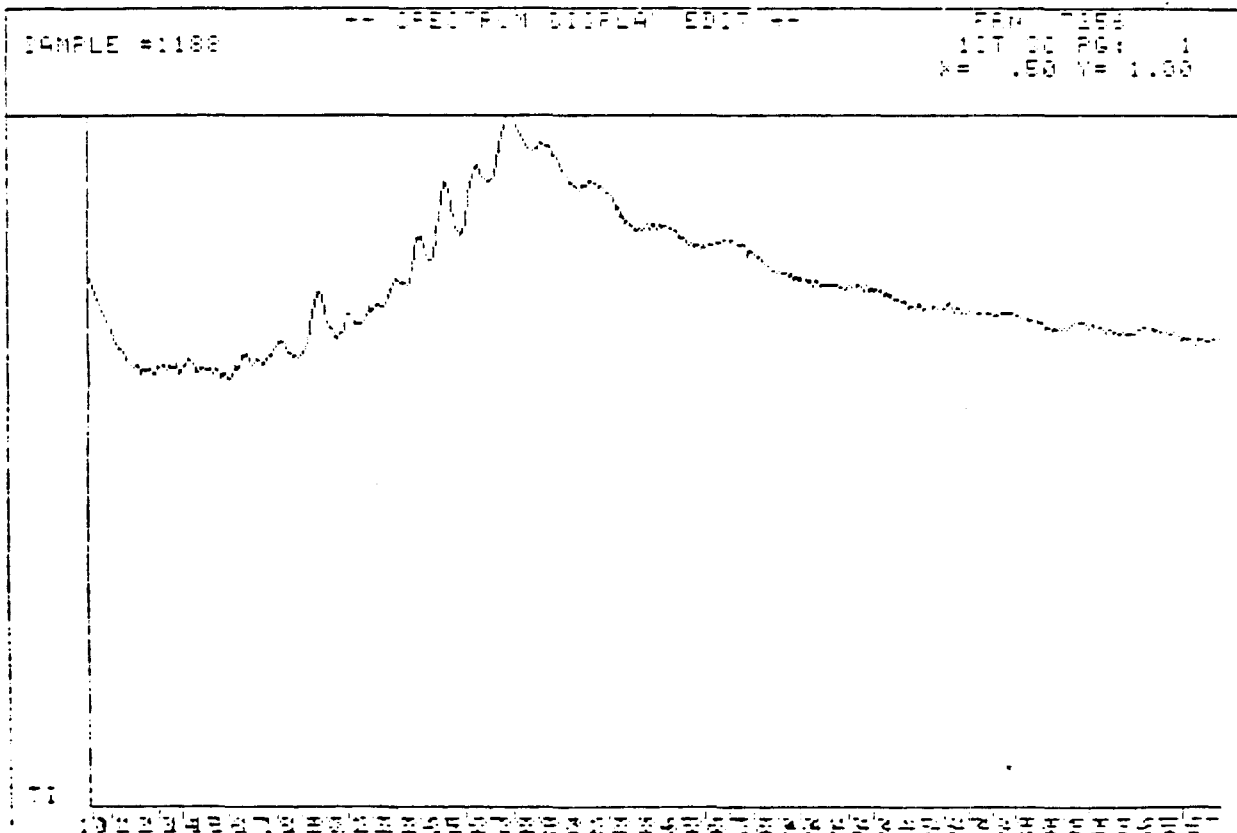
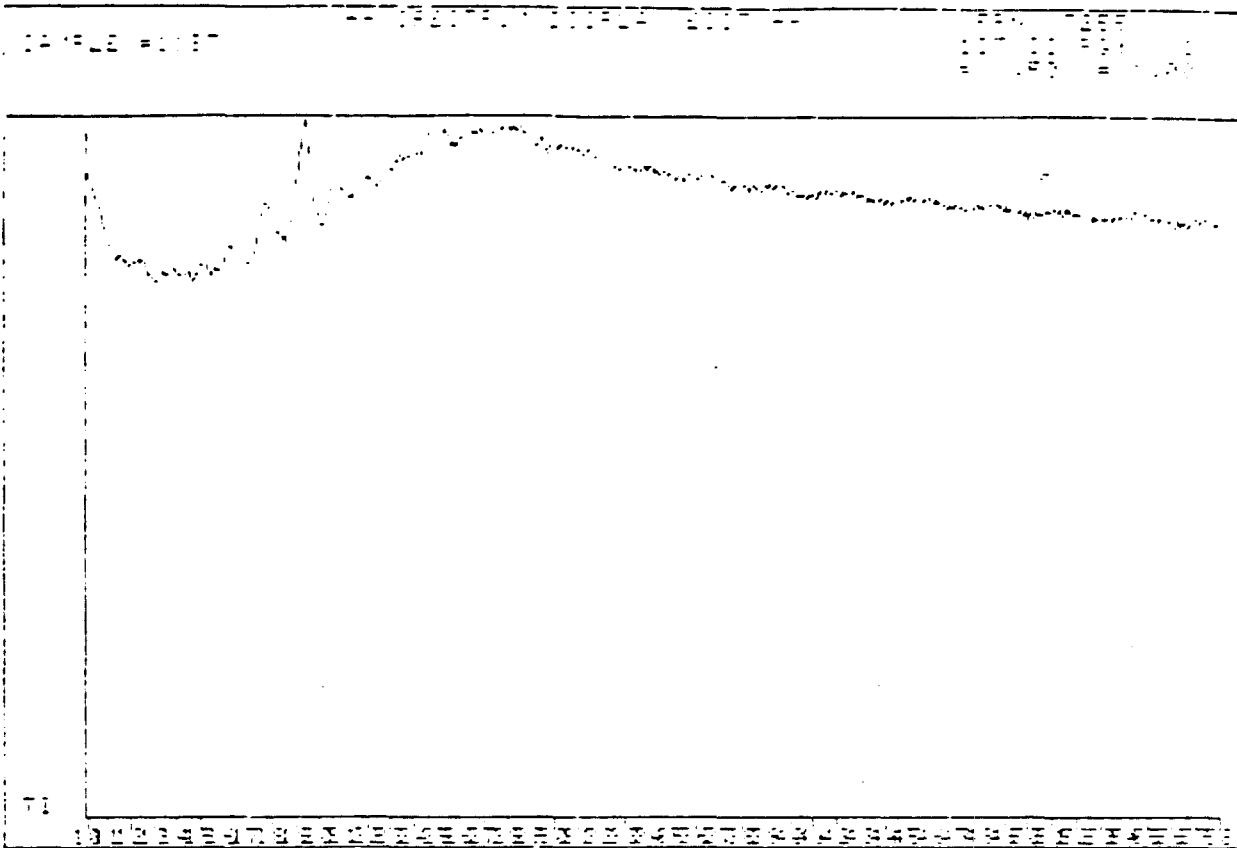
CONFIDENTIAL



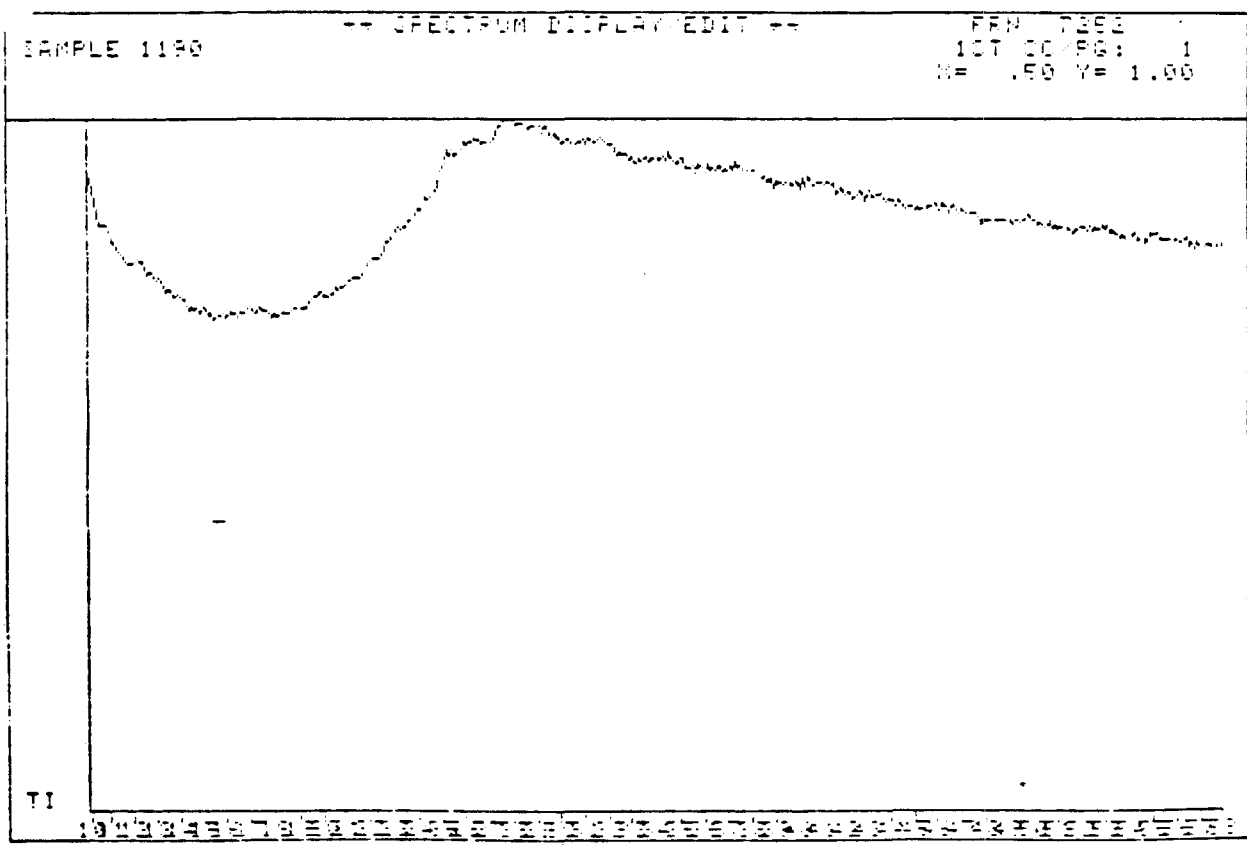
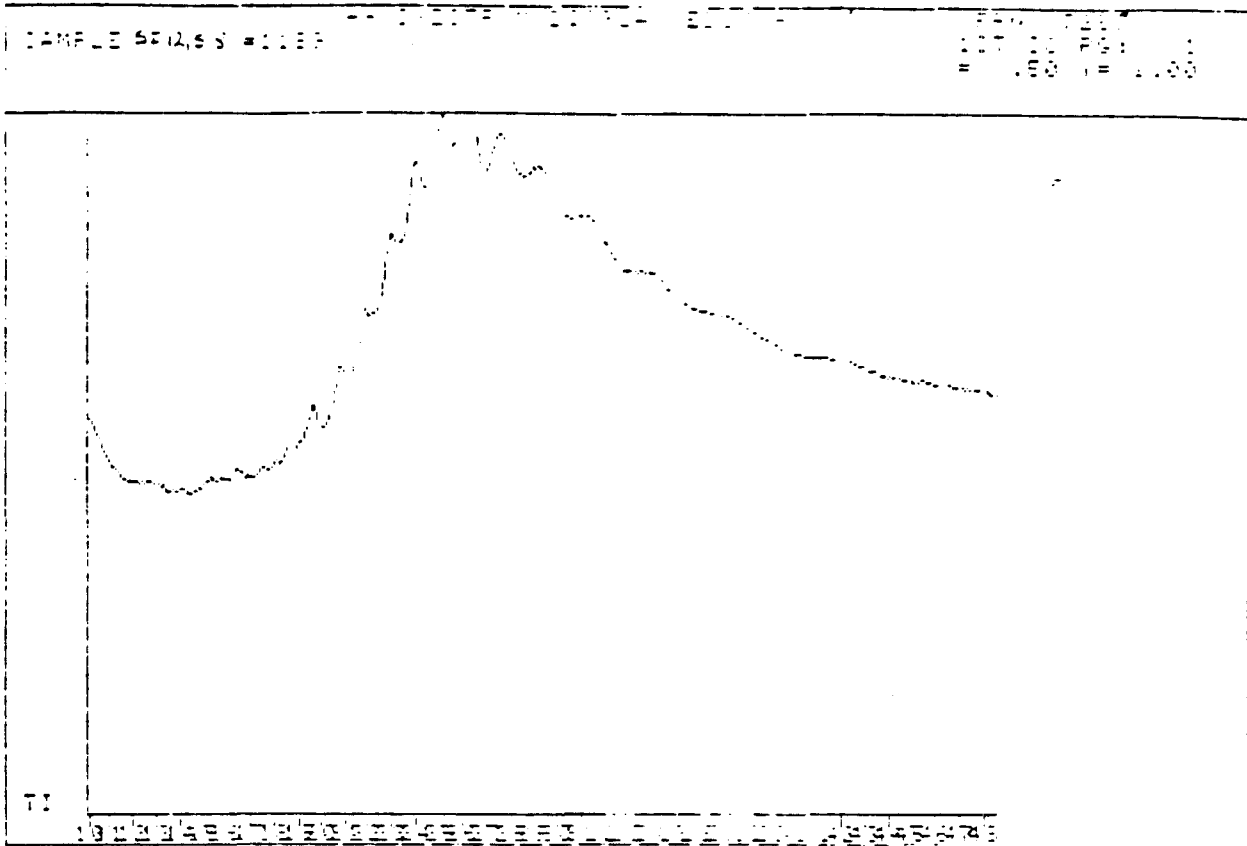


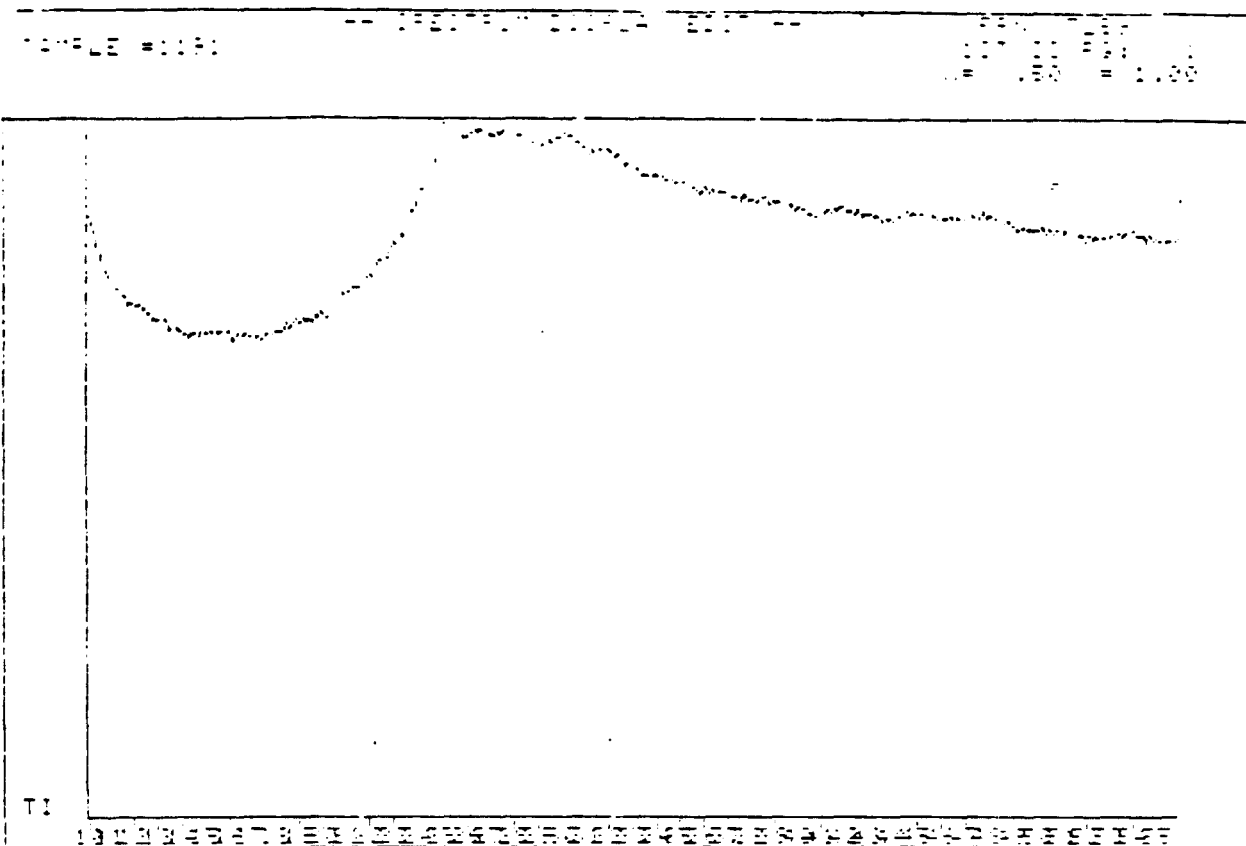
CONFIDENTIAL





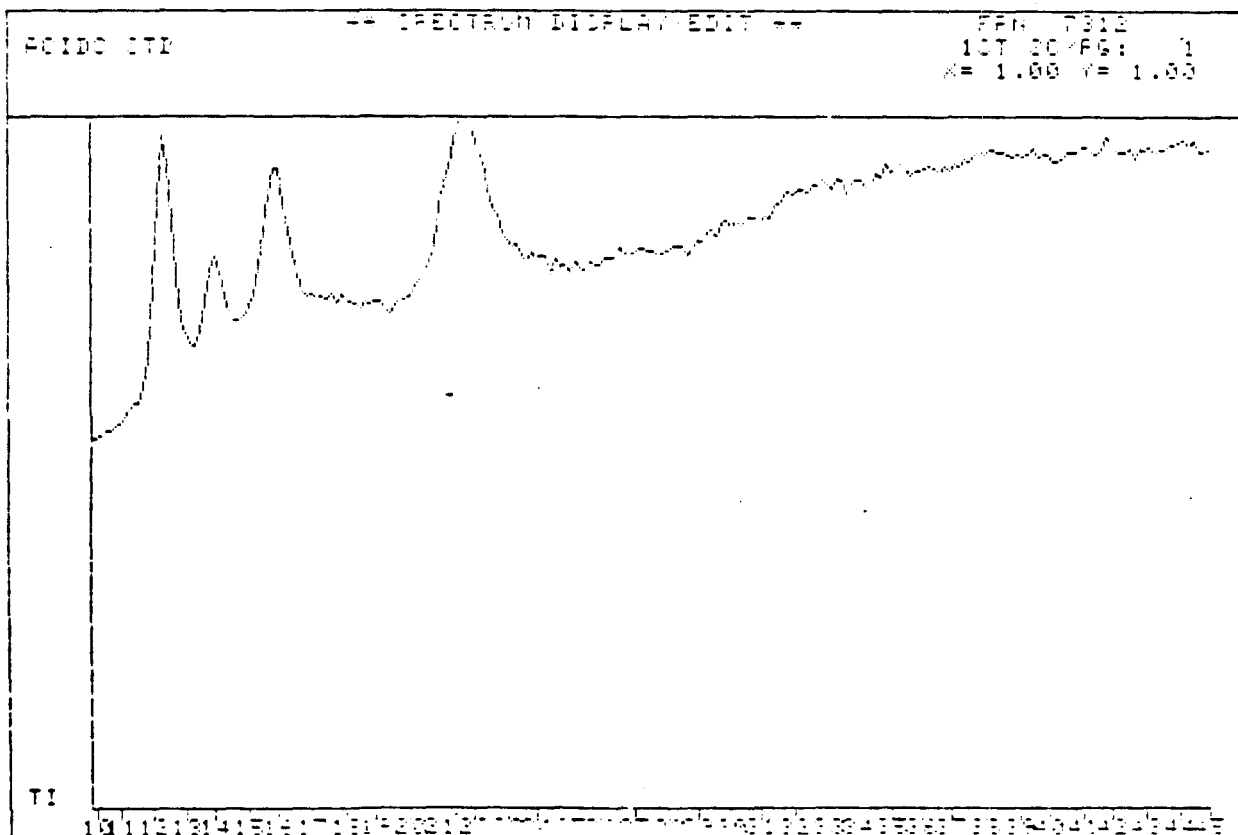
CONFIDENTIAL

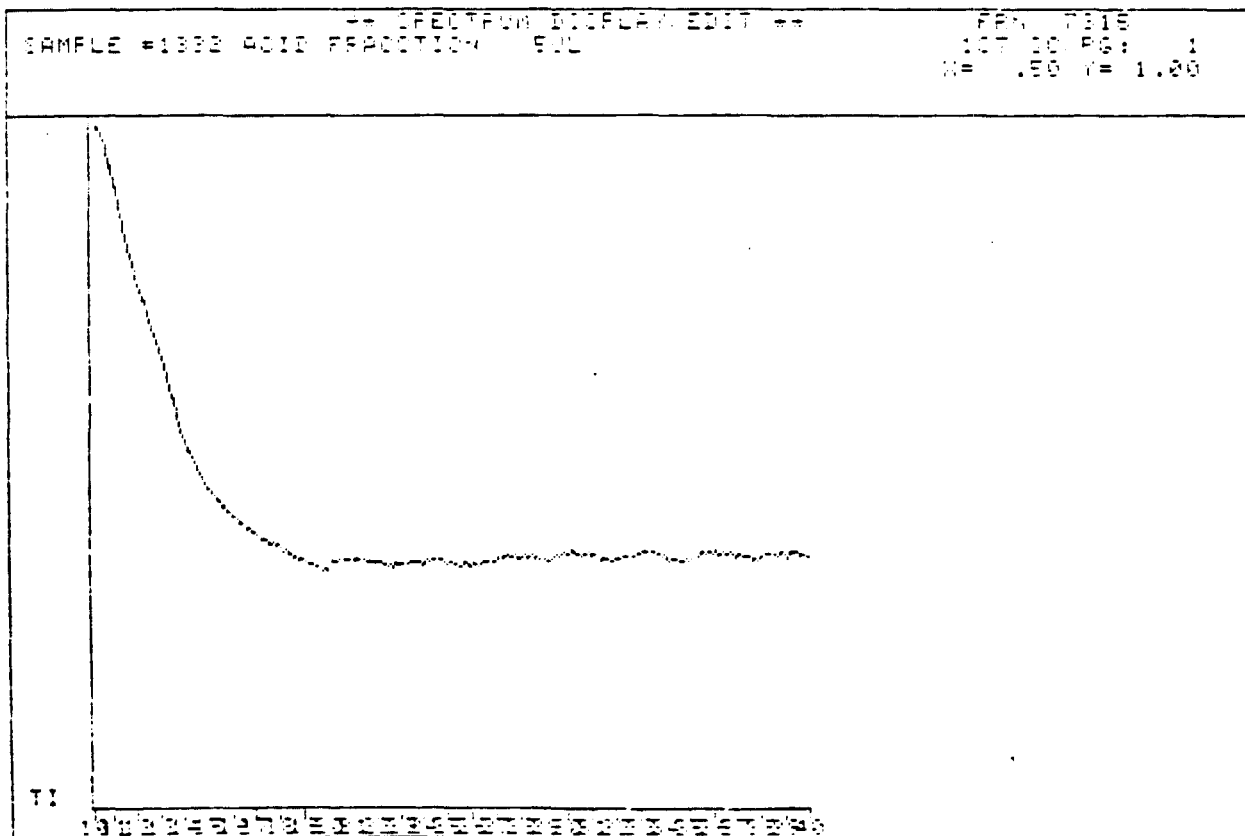
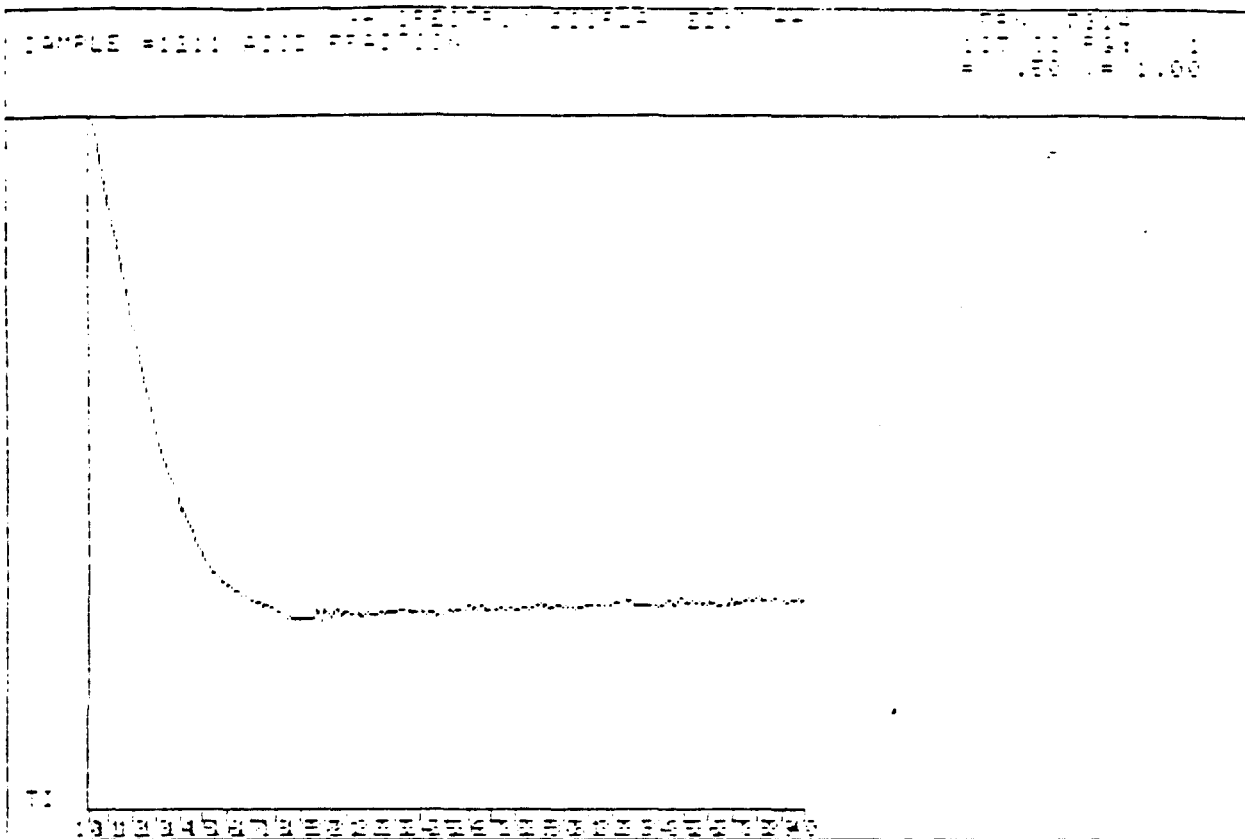




LABORATORY REPORT GC-MS CONDITIONS ACID FRACTION ANALYSIS

Operator <u>W. V. ...</u>	Date <u>2-1-6</u>
Column <u>...</u>	Detector <u>...</u>
Length <u>...</u>	Range <u>...</u>
Dia. <u>...</u>	Atten. <u>...</u>
Liquid Phase <u>...</u>	Flow Rates ml/min.
Wt % <u>...</u>	Hydrogen <u>...</u> Air <u>...</u>
Support <u>...</u>	Scavenge <u>...</u>
Mesh <u>...</u>	Split <u>...</u>
Carrier Gas <u>...</u>	Temperature, °C
Rotameter <u>...</u>	Det. <u>...</u> Inj <u>...</u>
Inlet Press <u>...</u> psig	Column Initial <u>...</u>
Rate <u>...</u> ml/min	Final <u>...</u>
CHART SPEED <u>...</u>	Rate <u>...</u>
SAMPLE <u>...</u>	Solvent <u>...</u>
Size <u>...</u>	Concn. <u>...</u>





CONFIDENTIAL

JV 290-D188

CONFIDENTIAL
Copy 3 of 7

INTERPRETATION OF SAMPLE ANALYSIS
COMBINED SEWER OVERFLOW ABATEMENT
PROGRAM, ROCHESTER PURE WATERS DISTRICT

September 1981

Prepared for:

LOZIER-SEELYE-TONIAS
65 West Broad Street
Rochester, New York 14614



ecology and environment, inc.

195 SUGG ROAD, P.O. BOX D, BUFFALO, NEW YORK 14225, TEL. 716-632-4491

International Specialists in the Environmental Sciences

recycled paper

CONFIDENTIAL

TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1	INTRODUCTION	1-1
2	RECOMMENDATIONS AND CONCLUSIONS	2-1
3	SOIL SAMPLE ANALYSIS	3-1
4	WATER SAMPLE ANALYSIS	4-1
5	BIBLIOGRAPHY	5-1
 <u>Appendix</u>		
A	HEALTH EFFECTS OF MAJOR CONTAMINANTS	A-1

CONFIDENTIAL

LIST OF ILLUSTRATIONS

<u>Figure</u>		<u>Page</u>
1-1	Location of Test Stations and Monitoring Wells	1-2

LIST OF TABLES

<u>Table</u>		<u>Page</u>
2-1	Recommended Maximum Exposure Levels of Airborne Metal Dusts	2-4
2-2	EP Toxicity Analysis of Selected Soil Samples, RG&E Lake Avenue Site, Rochester, New York	2-7
2-3	Base/Neutral Analysis of Soil Samples, RG&E Lake Avenue Site, Rochester, New York	2-8
3-1	Dry-Weight Metals Analysis of Soil Samples, RG&E Lake Avenue Site, Rochester, New York	3-2
4-1	Water Sample Analysis for Metals, RG&E Lake Avenue Site, Rochester, New York	4-2

CONFIDENTIAL

1. INTRODUCTION

From August 4 to 13, 1981, field investigators from Ecology and Environment, Inc., (E & E) collected soil and water samples during the drilling of eight test holes and the installation of monitoring wells at the Rochester Gas and Electric Corporation's (RG&E) Lake Avenue site in Rochester, New York. Figure 1-1 illustrates the location of the test stations and monitoring wells. The samples were collected at the surface and at subsequent five-foot intervals in each hole, and were divided with RG&E for analysis at their discretion. Only one monitoring well, number 12, had enough water for analysis. Water samples were also collected at the edge of the property along the Genesee River gorge. E & E monitored the site using the Century 128 Organic Vapor Analyzer (OVA) and the H-NU PI-101 Photoionizer (H-NU) to determine levels of protection for on-site personnel and to identify samples for laboratory analysis.

E & E's Analytical Services Center analyzed the samples and prepared a report entitled, Laboratory Report on the Analysis of Soil and Water Samples for the Combined Sewer Overflow Abatement Program, Rochester Pure Waters District. A summary of pertinent findings and comparisons with existing criteria may be found in the various tables in the accompanying document. The criteria cited in the tables are tools that can be used to provide relevant comparisons of the laboratory analysis to conditions on-site. However, it is important to note that, with the exception of the Extraction Procedure (EP) Toxicity Test, the criteria have no regulatory effect unless adopted by the

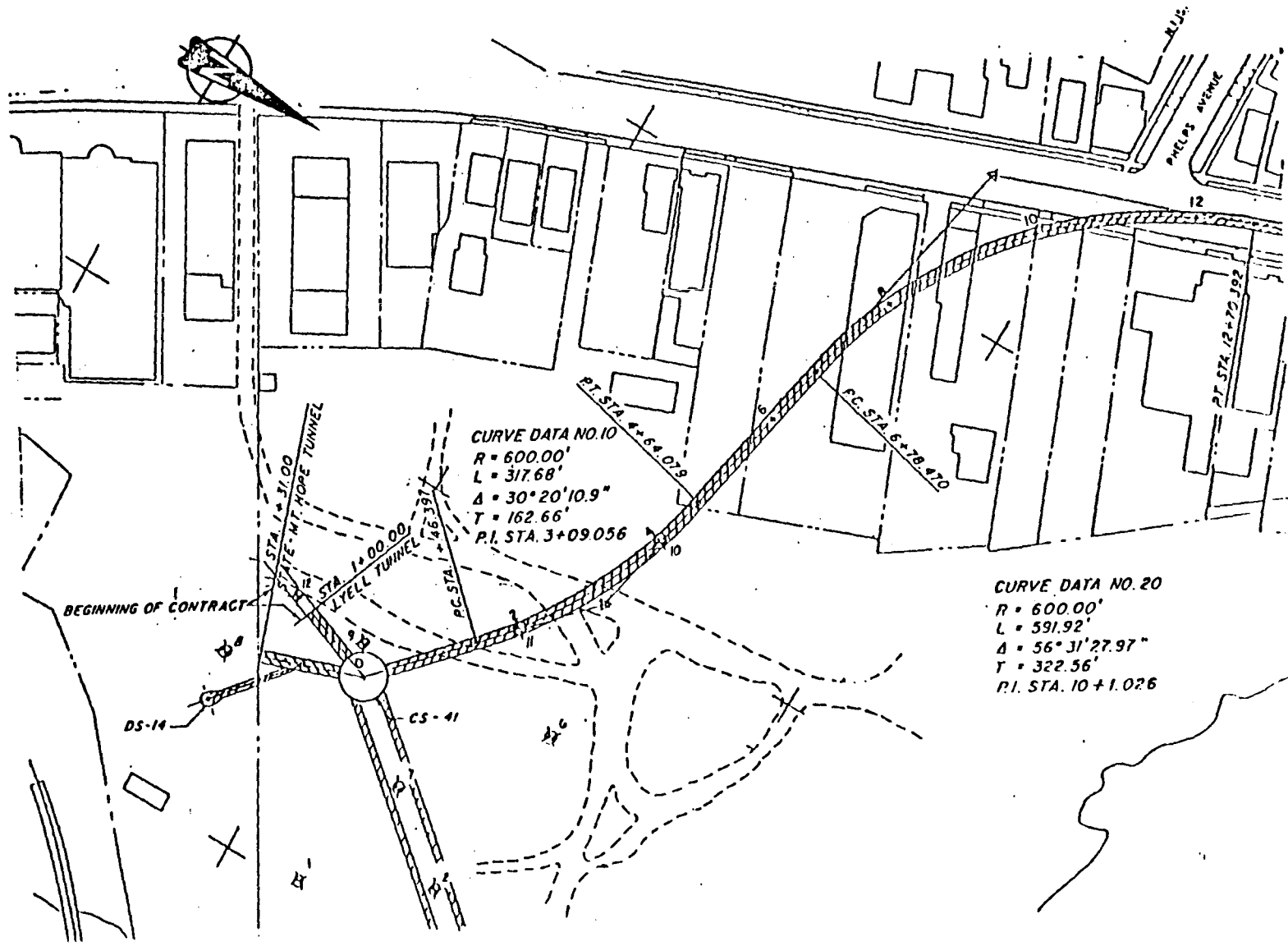


Figure 1-1 LOCATION OF TEST STATIONS AND MONITORING WELLS

CONFIDENTIAL

2. RECOMMENDATIONS AND CONCLUSIONS

The recommendations included in this report are based on data gathered during drilling activities at eight specific locations. Because of the nature and location of the landfill content, the gathered data and the recommendations may not necessarily be applicable to construction activities at significant distances from the locations sampled. Similarly, recommendations for construction at other sites cannot be made without appropriate monitoring, sampling, and analysis.

The following recommendations and conclusions are based on the laboratory analysis and field monitoring, as well as on a review of existing toxicological data and federal regulations:

- Protective clothing, including coveralls, rubber gloves, and boots, should be worn during excavation and construction;
- Monitoring should be conducted for vapors and particulates;
- A site-specific contingency plan should be developed prior to construction to provide definite safety procedures to be followed in the event that significant quantities of organic vapors are encountered;
- Dust should be controlled on-site;
- Runoff from the site, especially in the vicinity of station 12, should be controlled;

CONFIDENTIAL

- Disposal of excavated material in a secure landfill may not be necessary; however, dust should be controlled while handling the muck, which should not be taken off-site, if possible;
- Geotechnical investigations can be conducted without the use of personnel protection.

A discussion of these recommendations follows.

Direct monitoring of the test drilling at the site with the OVA and H·NU indicated varying degrees of organic contamination in the soil, but not in the ambient air. In addition, no significant levels of explosive gases were detected at the drilling locations. For these reasons, there does not appear to be conditions which would preclude further drilling for geotechnical investigations at the site. However, protective measures against the contaminants detected during laboratory and field analysis, as well as the use of air monitoring devices, are warranted during construction.

The results of the investigation, which are discussed further in Sections 3 and 4, indicate that hazardous contaminants are present on the site and, although the sample analyses do not indicate organic contaminant levels in sufficient quantities to characterize the site as extremely dangerous to human health and safety, a contingency plan is still recommended. A contingency plan provides measures to be taken in the event that significant quantities of organic or toxic vapor materials are detected on-site that could create situations potentially threatening to workers, the general public, or the environment. The elements of a contingency plan include emergency response plans and procedures, a safety authority and communication system, a site-specific safety plan, and monitoring procedures.

The contaminants of major concern found at the site are lead, chromium, arsenic, mercury, and, to a lesser extent, the polynuclear aromatic hydrocarbons (PNAs). A detailed discussion of the potential chronic health hazards of these substances is included in Appendix A of this report. The primary risks of exposure are through inhalation and skin contact with contaminated particulate matter. Adequate protection for on-site personnel against such exposure is recommended.

CONFIDENTIAL

Skin absorption is an unlikely route of exposure to the metals because of their tendency to bind tightly to organic material in the soil, as demonstrated by the EP Toxicity analysis for lead and mercury (see Section 3). However, direct contact with the PNAs found at station 2 may represent a potential risk to workers on-site. Although the levels of PNAs detected in the samples were fairly low, the demonstrated characteristics of PNAs as irritants and as potential carcinogens, as well as the possibility that higher levels could be encountered during excavation, indicate the need for protective clothing. Such clothing should include coveralls (to be disposed of or laundered daily), rubber gloves, and boots, which should be washed prior to departure from the work site. In addition, the possible presence of highly volatile, short-chain, low-boiling-point compounds represents a potential respiratory exposure hazard during excavation in confined spaces or tunneling, and suggests that a vapor monitoring program would be advisable during such activities. The hazard potential of constituents found in the samples are discussed in Appendix A.

Inhalation of metal-contaminated dusts may represent a more difficult control problem, particularly during the major excavation. Because of numerous influencing variables (e.g., wind conditions, soil moisture, etc.), levels of dust generated cannot be accurately predicted. However, the use of engineering controls, such as dust-suppressing wetting agents, may be sufficient to maintain particulate levels within established industrial hygiene standards. A suggested practice is to monitor work site particulate counts of the metals in order to determine whether dust levels are within their respective Time Weighted Averages (TWA).

Table 2-1 lists TWAs recommended by the American Conference of Governmental Industrial Hygienists (ACGIH). These values, which are based on industrial experience and experimental studies, refer to concentrations of airborne contaminants that may be safely tolerated in the work place eight hours per day, five days per week. Although they may serve as the basis for Occupational Safety and Health Administration (OSHA) standards, they are revised more frequently, and consequently, may be more conservative than current standards. However,

CONFIDENTIAL

Table 2-1
RECOMMENDED MAXIMUM EXPOSURE LEVELS OF AIRBORNE METAL DUSTS

Substance	TWA* (mg/m ³)
Barium	0.50
Cadmium	0.05
Chromium	0.05
Lead	0.15
Arsenic	0.20
Selenium	0.20
Mercury	0.05

*TWA = Time Weighted Average work place exposure levels recommended by American Conference of Governmental Industrial Hygienists.

CONFIDENTIAL

adherence to the TWAs will insure compliance with current regulations and provide the best known levels of worker health protection.

If dust levels of the toxic metals are found to be unacceptable, it will be necessary to institute a respiratory protection program that will afford high efficiency filtration of the particles. Such a program may necessitate quantitative fit-testing of respirators and a medical surveillance program to monitor blood levels of the toxic metals encountered. Because of the results of the field sampling analysis, it is further suggested that the work site be monitored for organic and explosive vapors when workers are working near the soil or in confined spaces, such as tunnels.

The contaminants found in well number 12 do not appear to pose a health threat to people working on-site. However, because contaminants in excess of New York State water quality standards may be released from the site, a National Pollutant Discharge Elimination System (NPDES) permit may be required from the state. Options for control of water from the well include surface impoundment, discharge into the sewer system (if acceptable to Monroe County and the City of Rochester), or engineering controls, such as entrenchment or grout curtains.

Although contaminants in the soil represent a potential worker exposure problem, the concentrations do not appear to be high enough to require disposal in a secure landfill under the Resource and Recovery Act (RCRA). However, special handling of the excavated soil is recommended. A verbal opinion expressed by Mr. Myles Morse of the EPA (see attached contact report) indicates that RCRA hazardous waste regulations relevant to the disposal of specific polynuclear aromatic hydrocarbons (PNAs) are not applicable to soil excavated during construction of the sewers. It must be emphasized, however, that this was a verbal opinion only. An effort should be made to obtain a formal, written confirmation of that opinion. It must also be emphasized that construction activity should include measures to prevent contaminated soil from leaving the site. It is recommended that the contaminated soil be put back in the construction areas where possible. Precautions should be taken to control erosion of the soil during construction to reduce worker exposure problems. Topsoil should be placed over the contaminated soil before revegetation.

CONFIDENTIAL

Of the seven metals found in the soil samples and analyzed, only lead and mercury were present in dry-weight concentrations potentially in excess of EP Toxicity standards. As shown in Table 2-2, however, the concentrations of lead and mercury in the extracts of each sample proved to be below EP Toxicity standards, indicating that the metals are tightly bound to the soil under field conditions and would not require special disposal procedures under RCRA.

Direct field monitoring of the soil samples with the OVA and H·NU indicated the presence of varying levels of gaseous compounds. Although such measurements were generally found to be 20 parts per million (ppm) or less above ambient air conditions, readings in excess of 500 ppm were detected by the OVA in two samples from station 6 at depths of 75 to 76.5 feet and 84 to 84.5 feet. However, subsequent laboratory analysis of the soil samples did not detect significant levels of volatile organic compounds. This suggests that the soil may be contaminated with highly volatile, short-chain, low-boiling-point compounds (such as methane), which are quickly released from the soil when aerated.

Analysis of the base/neutral fraction of the soil samples, as shown in Table 2-3, revealed the presence of low levels of PNAs in samples from station 9 at depths of 15 to 21.5 feet and in samples from station 2 at depths of 70 to 76.5 feet. Although these compounds, particularly naphthalene, are indicative of coal tar, the concentrations are too low to state conclusively that coal tar may be found in the vicinity of either station 2 or station 9.

CONFIDENTIAL

Table 2-2

EP TOXICITY ANALYSIS OF SELECTED SOIL SAMPLES
RG&E LAKE AVENUE SITE, ROCHESTER, NEW YORK

Sample Location*	Extract Analysis Results (mg/L) (rounded to nearest .001 mg)	
	Lead (5.0 mg/L)**	Mercury (0.2 mg/L)**
Leachate Seep #1	<.010	.001
Station #12, 35-36.5 ft	.015	.002
Station #12, 60-61.5 ft	<.010	.003
Station #9, 5-6.5 ft	<.010	<.001
Station #9, 20-21.5 ft	<.010	<.001
Station #9, 15-16.5 ft	.017	NA†
Station #9, Grab from auger flight, 30 ft	<.010	<.001
Station #6, 75-76.5 ft	<.010	<.001
Station #6, 84-84.5 ft	<.010	<.001

*Figures indicate depth from which sample core was taken.

**Figures refer to EPA standards for maximum allowable concentrations of contaminants as determined by Extraction Procedure.

†NA = not analyzed

Table 2-3

BASE/NEUTRAL ANALYSIS OF SOIL SAMPLES
RG&E LAKE AVENUE SITE, ROCHESTER, NEW YORK

Substance	MATE* (ppm)	Analysis Range (ppm)	Stations with Highest Concentrations
Anthracene/ Phenanthrene	1,700.0/48.0	5 - 186.0	2
Fluoranthene	2,800.0	5 - 111.0	2
Pyrene	6,900.0	5 - 109.0	2
Chrysene	66.0	5 - 12.1	9
Naphthalene	1,500.0	16 - 80.0	2
Fluorene	--	8.6 - 66.0	2

*MATE = Minimum Acute Toxicity Effluent levels of contaminants in soil that are acceptable to human health.

3. SOIL SAMPLE ANALYSIS

Table 3-1 compares the range of results from the metals analysis (dry-weight basis) of the soil samples with the Minimum Acute Toxicity Effluent (MATE) values specific to soil contamination levels acceptable to human health. The MATE levels were developed by the EPA as part of its Multimedia Environmental Goals for Environmental Assessment. They represent contaminant concentrations in source emissions to air, water, and land that will not evoke significant toxic responses when the exposures are of short duration (i.e., fewer than eight hours per day); therefore, they may be used to define action levels for personnel protection.

Virtually all samples listed in Table 3-1 exceeded the MATE levels. The highest levels of all metals were generally found in the vicinity of stations 9 and 12. The recommendations for dust control and personnel protection are based on the comparison of MATE levels and the sample analysis.

In order to determine classification of wastes as hazardous under RCRA, and because of varying tendencies of metals to leach from soil, it was necessary to determine the EP Toxicity of the soil samples. The EP Toxicity refers to the maximum allowable concentrations of contaminants in the soil extract. The samples were chosen for the EP Toxicity Test based on the dry-weight laboratory analysis results and the assumption that 100% of the contaminants in the soil would leach out. Thus, only two out of the seven heavy metals were present in sufficient quantity to perform the EP Toxicity Test for nine soil samples.

CONFIDENTIAL

Table 3-1

DRY WEIGHT METALS ANALYSIS OF SOIL SAMPLES
RG&E LAKE AVENUE SITE, ROCHESTER, NEW YORK

Substance	MATE* (ppm)	Sample Analysis Range (ppm)	Stations with Largest Concentrations
Barium	10.0	60.0 - 536.0	7, 9
Cadmium	0.1	0.102 - 6.36	7, 9, 12
Chromium	0.5	1.10 - 42.9	2, 9, 12
Lead	0.5	40.2 - 6,571.0	9, 12
Arsenic	0.5	2.86 - 36.6	6, 9, 12
Selenium	0.1	<0.2 - 0.252	12
Mercury	0.02	<1.0 - 17.6	8, 9, 12

*MATE = Minimum Acute Toxicity Effluent levels of contaminants in
soils that are acceptable to human health.

4. WATER SAMPLE ANALYSIS

In addition to the analysis of soils from the hole borings, two water samples were analyzed. The results of this analysis are compared in Table 4-1 to MATE levels specific to water contamination levels and to EPA Proposed Allowable Limits. The Proposed Allowable Limits refer to EPA water quality criteria recommending the best estimate of the concentration of specific contaminants in water which may exist and still not pose an undue risk to the health of those people who either eat fish or drink from that water. The results are also compared to New York State water quality standards for non-community drinking water supplies.

Leachate spring number 1, located at the base of the site at the Genesee River, exceeded the EPA Proposed Allowable Limits for chromium, arsenic, and mercury, but did not exceed MATE or New York State levels. Water from well number 12 was found to have lead in excess of MATE levels, as well as cadmium, chromium, lead, arsenic, and mercury in excess of the Proposed Allowable Limits. All metals analyzed in well number 12 were in excess of New York State water quality standards. This suggests that water from the site may represent a potential surface water pollution problem if not contained. However, only one of the eight installed wells produced water in sufficient quantity to sample at the time the investigation was conducted. There are limited data with respect to seasonal flow rates and direction to determine the quantities which should be controlled and the extent of the problem.

CONFIDENTIAL

Table 4-1
WATER SAMPLE ANALYSIS FOR METALS
RG&E LAKE AVENUE SITE, ROCHESTER, NEW YORK

Sample	Substance	MATE* (ug/L)	PAL** (ug/L)	NYS Standards*** (ug/L)	Sample (ug/L)
Leachate Spring #1	Barium	5,000	---	1,000	908
	Cadmium	50	10	10	6.26
	Chromium	2,500	0.008	50	5.5
	Lead	2,500	50	50	40.2
	Arsenic	2,500	0.02	50	22.9
	Selenium	50	10	10	2.0
	Mercury	10	0.2	2.0	0.47
Well #12	Barium	5,000	---	1,000	1,230
	Cadmium	50	10	10	26.5
	Chromium	2,500	0.008	50	149
	Lead	2,500	50	50	3,750
	Arsenic	2,500	0.02	50	252
	Selenium	50	10	10	5.2
	Mercury	10	0.2	2.0	4.12

*MATE = Minimum Acute Toxicity Effluent levels of contaminants in water that are acceptable to human health.

**PAL = Proposed Allowable Limits for contaminants in water that are acceptable to human health.

***NYS = New York State maximum contaminant levels for non-community water systems

5. BIBLIOGRAPHY

American Conference of Governmental Industrial Hygienists, 1980, Threshold Limit Values.

Doul, J., C.D., Klassen, and M.O. Amdur, eds., 1980, Casarett and Doul's Toxicology, 2nd edition.

International Technical Information Institute, 1981, Toxic and Hazardous Industrial Chemicals Safety Manual.

Sax, I.N., 1979, Dangerous Properties of Industrial Materials, 5th edition.

Sittig, M., ed., 1980, Priority Toxic Pollutants: Health Impacts and Allowable Limits.

Sittig, M., ed., 1976, Toxic Metals: Pollution Control and Worker Protection.

United States Environmental Protection Agency, 1977, Multimedia Environmental Goals for Environmental Assessment, vols. 1 & 2.

CONFIDENTIAL

APPENDIX A

HEALTH EFFECTS OF MAJOR CONTAMINANTS

CONFIDENTIAL

The recommendations for personnel protection are intended as precautionary measures against possible deleterious health effects resulting from respiration of or contact with lead, chromium, arsenic, mercury, and polynuclear aromatic hydrocarbons (PNAs). While each of these contaminants poses its own particular hazards, several generalizations may be made regarding their potential risks.

It must first be emphasized that, with the exception of arsenic, the health effects described refer primarily to chronic, worst-case problems resulting from excessive exposures (i.e., long-term or high concentrations) indicated by elevated blood or target organ levels of the contaminants. In addition, several other factors will affect the toxicity of each particular contaminant in question. In the case of metals, the elemental form will seldom interface with biologic systems. Therefore, the form of metal compound is of particular importance. Those metals that are easily absorbed, easily bound to alkyl compounds, and easily bound to organic tissues are generally the most toxicologically significant.

This is not to minimize, however, the possibility of more acute problems, such as lung irritation or contact dermatitis, which may occur with exposure to lower concentrations of simpler compounds. Because toxic metals typically accumulate in biological systems, and because long latent periods may be required (e.g., ten to twenty years in the case of carcinogens) before the manifestation of symptoms, appropriate protective and monitoring measures are fully justified. Summaries of the potential chronic health effects of the contaminants of interest are provided below.

Lead. Lead is a cumulative poison which interferes with the formation of heme, a blood constituent necessary for the transport of oxygen to body tissues. Chronic lead poisoning may result in damage of the central nervous system, kidneys, liver, and reproductive system, and some lead compounds have been implicated as carcinogens of the lungs and kidneys. Although routes of exposure to lead compounds include inhalation, ingestion, and dermal absorption, inhalation of lead dusts, fumes, mists, or vapors results in the earliest manifestation of symptoms and is, therefore, most important from the standpoint of industrial hygiene.

Chromium. Chromium compounds vary in their degree of toxicity. Elemental chromium and trivalent chromium compounds are rarely toxic, although some eczematous dermatitis has been reported. Hexavalent chromium compounds are considerably more toxic, and some are recognized as carcinogens of the lungs, nasal cavity, and paranasal sinus. Exposure to chromium compounds may cause inflammation of the conjunctiva, nasal itch and soreness, ulceration and perforation of the nasal septum, and dental erosion. Primary routes of exposure are through dust inhalation and dermal absorption.

Arsenic. Arsenic is a poison which is also recognized as a carcinogen of the skin, lungs, and liver. Acute arsenic poisoning results from ingestion of arsenic compounds, whereas chronic poisoning may result from ingestion or inhalation. The type and severity of reaction to arsenic depends upon the particular type of compound, with the inorganic arsenicals generally more toxic than the organics. Arsenic poisoning may manifest itself in many ways, such as digestive disturbances; liver damage; blood, kidneys, and nervous system disorders; and a variety of skin abnormalities.

Mercury. Mercury is a protoplasmic poison which, after absorption, circulates through the blood and is stored in the liver, kidneys, skin, and bone. In industrial cases, the primary effects of mercury are on the central nervous system and the mouth and gums. Classic symptoms of mercury poisoning are stomatitis, tremors, and psychic disturbances. Many mercury compounds are probably absorbed through the gastrointestinal tract, although elemental mercury is not. Many mercury compounds can cause skin irritation and can be absorbed through the skin.

Polynuclear Aromatic Hydrocarbons. The polynuclear aromatic hydrocarbons (PNAs) are a diverse class of organic compounds consisting of substituted and unsubstituted polycyclic and heterocyclic aromatic rings. PNAs are generally formed as a result of incomplete combustion of organic compounds with insufficient oxygen. Major sources include coke ovens, refuse burning, industrial activity, and coal

refuse heaps. Naphthalene, for instance, is the most abundant constituent of coal tar.

The primary concern over PNAs as a class of contaminants is the recognition of PNAs as procarcinogens, or as becoming carcinogenic upon biochemical activation. Unfortunately, there is inadequate data comparing carcinogenic activity of the PNAs under similar conditions, or comparing human responses to individual PNAs. Of those PNAs identified in the soil samples, only anthracene and chrysene have been demonstrated to be carcinogenic in experimental animals. Naphthalene has been linked to blood disorders in humans and laboratory animals. The primary routes of exposure are through dermal absorption and the inhalation of absorbed particles.

APPENDIX CC

Laboratory Analyses of Samples -
RG&E Tunnel and Station 5

TABLE T

SAMPLE COMPARISONS OF R.G. & E. AND ST. PAUL INTERCEPTOR TUNNELS

Compound	Concentration(ppm)	
	R.G. & E. ¹	St. Paul Interceptor ²
Naphthalene	42*	19,000
2-Methylnaphthalene	50*	12,000
Acenaphthylene	57	4,700
Acenaphthene	8.4	56
Dibenzofuran	NA	39
Fluorene	38	2,000
Phenanthrene	55	4,800
Anthracene	29	1,600
Fluoranthene	6.5	1,100
Pyrene	18	1,800
Benzo(a)anthracene	11	160
Chrysene	NA	830
Benzo(b)fluoranthene	5	40
Benzo(k)fluoranthene	NA	69
Benzo(a)pyrene	6.3	130
Iodeno(1,2,3-cd)pyrene	ND	55
Benzo(g,h,i)perylene	1.3	52
Benzene	<1	57
Toluene	<1	25

* estimated by library comparison search

NA - not analyzed

ND - not detected

A sample was collected from a pool at the base of the Lower Falls for comparison with the R.G. & E. tunnel sample. Results showed a similarity between the extractable fractions of each sample but the pool sample lacked the volatile constituents found in the tunnel sample.

1-Sample analysis by Recra Research, Inc.

2-Sample analysis by Versar, Inc.

SOURCE: Genesee River Sediment Toxics Survey, May 1985.

STATION 5 TUNNEL REPAIR

Water Treatment Tank

Date	Oil & Grease	Inlet					Oil & Grease	Outlet					
		pH	Benzene	Toluene	m-Xylene	p-Xylene		o-Xylene	pH	Benzene	Toluene	m-Xylene	p-Xylene
7/25/85							1	6.4	540	830	680	580	*
							3	7.3	170	38	40	9	35
							1	8.2	240	240	220	75	160
							1	8.3	16	8	43	12	31
8/08/85	33						2	7.4	32	36	53	16	39
8/12/85	40						1	7.7	40	4	76	15	58
8/15/85	18	560	950	350	130	250	2	7.8	38	<1	110	20	85
8/19/85	14						1	8.0	210	45	74	17	74
8/22/85	12						1	7.9	220	60	120	36	95
8/26/85	26						1	7.8	330	220	140	26	98
8/29/85	16						<1	9.9	480	620	220	88	170
9/03/85	1						1	11.0	220	270	130	50	87
9/05/85	24						1	11.8	142	180	94	35	74
9/09/85	7						<1	10.4	120	150	69	25	52
9/12/85	<1						10	10.8	120	130	70	27	54
9/16/85	12						1	11.1	260	260	150	62	120
9/19/85	6						1	10.7	Sample broken at testing laboratory				
9/23/85	1						<1	8.2	250	260	99	35	78
9/26/85	7						4	8.0	140	170	98	*	84
9/30/85	12						<1	7.8	21	100	74	*	45
10/03/85	1						1	7.6	<1	3	33	*	21
10/07/85	1						1	7.7	18	94	100	*	59
10/10/85	8						3	7.7	88	41	36	10	29
10/14/85	2						1	7.5	170	130	67	23	54
10/17/85	50						1	7.5	180	160	100	37	79
10/21/85	3						1	7.6	150	130	82	29	63
10/24/85	9						3	7.8	120	110	73	25	55
10/28/85	2						3	8.2	<1	<1	<1	<1	<1
10/31/85	2						1	9.1	170	200	110	42	83
11/04/85	3						1	9.0	150	120	57	26	46
11/07/85	1						1	7.9	45	27	11	5	8
11/11/85	1						<1	8.3	25	4	10	5	9
11/14/85	4						1	8.3	85	42	76	33	56
11/18/85	4						<1	8.0					



O'BRIEN & GERE

September 26, 1984

Mr. C. Robert McKay
Supervisor, Chemical Laboratory
ROCHESTER GAS AND ELECTRIC CORPORATION
89 East Avenue
Rochester, NY 14649

File: 2246.006.517

Dear Mr. McKay:

Enclosed please find the results of analytical testing performed on samples received August, 1984. The samples included three charcoal tubes and a container of black substance.

The tubes were analyzed for hydrocarbon and the report sheet reveals the predominant peaks. There were several unidentified peaks at less than 10% of the major components. The black material was identified as a coal tar base. The mass spectral scan revealed the presence of polynuclear aromatic compounds which are characteristic of coal tar. We did not see straight chain hydrocarbons which would have indicated a petroleum based material.

Should you have further questions, please feel free to contact us.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

David R. Hill
Manager of Analytical Services

DRH/bpp

Enclosure

CLIENT ROCHESTER GAS & ELECTRIC CORPORATION JOB NO. 2246.006.517
 DESCRIPTION Semi Solid Sample

SAMPLE NO. 44893 DATE COLLECTED 7-31-84 DATE REC'D. 8-6-84 DATE ANALYZED 8-23-84

ppm	ppm
1,3-Dichlorobenzene	Diethylphthalate
1,4-Dichlorobenzene	N-nitrosodiphenylamine
1,2-Dichlorobenzene	Hexachlorobenzene
Hexachloroethane	4-Bromophenyl phenyl ether
Bis (2-chloroethyl) ether	Phenanthrene 56000.
Bis (2-chloroisopropyl) ether	Anthracene 44000.
N-Nitrosodi-n-propylamine	Di-n-butyl phthalate
Nitrobenzene	Fluoranthene 23000.
Hexachlorobutadiene	Pyrene
1,2,4-Trichlorobenzene	Benzidine
Isophorone	Butyl benzyl phthalate
Naphthalene 3100.	Bis(2-ethylhexyl)phthalate
Bis (2-chloroethoxy) methane	Chrysene 9800.
Hexachlorocyclopentadiene	Benzo(a)anthracene
2-Chloronaphthalene	3,3-Dichlorobenzidine
Acenaphthylene 14600.	Di-n-octylphthalate
Acenaphthene 8600.	Benzo(b)fluoranthene
Dimethyl phthalate	Benzo(k)fluoranthene 3200.
2,6-Dinitrotoluene	Benzo(a)pyrene 4600.
Fluorene 17500.	Indeno(1,2,3-cd)pyrene
4-Chlorophenyl phenyl ether	Dibenzo(a,h)anthracene
2,4-Dinitrotoluene	Benzo(g,h,i)perylene
1,2-Diphenylhydrazine	N-Nitrosodimethyl Amine

Methodology: Federal Register — 40 CFR, Part 136, December 3, 1979

Comments:

