

**Appendix AC**  
**Rock Boring Logs**  
**(Focused Investigation)**



PROJECT NUMBER NJ022948.ST.PT	BORING NUMBER BRTW-1	SHEET 1 OF 3
ROCK BORING LOG		

PROJECT Stepan Company LOCATION Maywood, NJ  
ELEVATION N/A DRILLING CONTRACTOR Kendrick Drilling, Inc.  
DRILLING METHOD AND EQUIPMENT Ingersoll TH-80 Air Rotary ORIENTATION Vertical  
WATER LEVEL AND DATE \_\_\_\_\_ START 9-29-93 FINISH 9-30-93 LOGGER P. van Noort

DEPTH BELOW SURFACE (FT)	CORE RUN LENGTH AND RECOVERY	DISCONTINUITIES		GRAPHIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING, ROD DROPS, TEST RESULTS, ETC
21.0	*N/A		N/A		0'-22' See 08MW-2 Boring Log	9-29-93 8" surface casing to 22' installed within 12" temporary surface casing to 10', used 11.75" tricone roller bit * no coring performed
22.0						
23.0						
24.0					SILTSTONE, reddish brown	9-30-93 8" Airhammer at 25.5' - drill break, soft
25.0						
26.0					SANDSTONE, reddish brown-moderate brown, fine sand, very silty, soft, friable at 28'-29' siltstone lamination, teal green, mottles	
27.0						
28.0						< 1 gpm foamy water, sweet odor
29.0						
30.0						
31.0						
32.0						
33.0						
34.0						
35.0						
36.0						
37.0					Alternating SILTSTONE and SANDSTONE, trace orange-reddish brown clay balls (soft mudstone)	at 37' increase in flow rate, likely fracture 5-8 gpm, frothy, odor
38.0						



PROJECT NUMBER  
NJ022948.ST.PT

BORING NUMBER  
BRTW-1

SHEET 2 OF 3

## ROCK BORING LOG

PROJECT Stapan Company

LOCATION Maywood, NJ

ELEVATION N/A

DRILLING CONTRACTOR Kendrick Drilling, Inc.

DRILLING METHOD AND EQUIPMENT Ingersoll TH-80 Air Rotary

ORIENTATION Vertical

WATER LEVEL AND DATE START 9-29-93

FINISH 9-30-93

LOGGER P. van Noort

DEPTH BELOW SURFACE (FT)	CORE RUN LENGTH AND RECOVERY	DISCONTINUITIES		GRAPHIC LOG	LITHOLOGY	COMMENTS
		ROD (%)	DESCRIPTION			
			DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
40.0					SANDSTONE, maroon-reddish brown, fine-medium sand, trace silt and coarse sand, soft-hard, friable trace mudstone laminations	at 40'-41', drill break, increase in flow rate to 25-30 gpm, likely fracture
41.0						
42.0						
43.0					SANDSTONE, same as above, fine-medium sand, feldspathic, light and dark minerals, trace silty sandstone zones	
44.0					soft-moderately hard, friable	
45.0						
46.0						
47.0					SANDSTONE, interbedded with shale-mudstone, moderate brown	
48.0						
49.0						
50.0					SANDSTONE, reddish brown, moderate brown, trace orange reddish brown to light reddish brown, trace medium sand, trace soft-very friable zones	slower drilling
51.0						
52.0						
53.0					SANDSTONE, very silty, purplish moderate brown, interbedded with sandy siltstone, moderately hard, micaceous	
54.0						54'-58' 1 minute/per foot
55.0					SANDSTONE, same as above, fine-medium sand, trace SILTSTONE and shale zones	
56.0					at 56'-57' increased SILTSTONE	56'-57' 1 minute/per foot
57.0						



PROJECT NUMBER  
NJ022948.ST.PT

BORING NUMBER  
BRTW-1

SHEET 3 OF 3

## ROCK BORING LOG

PROJECT Stapan Company

LOCATION Maywood, NJ

ELEVATION N/A

DRILLING CONTRACTOR Kendrick Drilling, Inc.

DRILLING METHOD AND EQUIPMENT Ingersoll TH-80 Air Rotary

ORIENTATION Vertical

WATER LEVEL AND DATE START 8-29-93

FINISH 8-30-93

LOGGER P. van Noort

DEPTH BELOW SURFACE (FT)	CORE RUN LENGTH, AND RECOVERY	DISCONTINUITIES		GRAPHIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	DESCRIPTION			
			DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		ROCK TYPE, COLOR, MINERALOGY, TEXTURE WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC
59.0					SILTSTONE, sandy, interbedded with sandstone, soft mudstone, shale (clay balls), reddish brown-brownish red	flushed hole to remove fines, 25-30 gpm
60.0						
61.0						
62.0						
63.0					END OF BORING @ 62'	
64.0						
65.0						
66.0						
67.0						
68.0						
69.0						
70.0						
71.0						
72.0						
73.0						
74.0						
75.0						
76.0						
77.0						
78.0						



PROJECT NUMBER

NJ022948.ST.PT

BORING NUMBER

PT-10

SHEET 1 OF 2

## ROCK BORING LOG

PROJECT Stepan Company

LOCATION Maywood, NJ

ELEVATION N/A

DRILLING CONTRACTOR

Kendrick Drilling, Inc.

DRILLING METHOD AND EQUIPMENT Ingersoll TH-60, Air Rotary

ORIENTATION Vertical

WATER LEVEL AND DATE

START 8-2-83

FINISH 10-1-83

LOGGER P. van Noort

DEPTH BELOW SURFACE (FT)	CORE RUN LENGTH, AND RECOVERY	DISCONTINUITIES		GRAPHIC LOG	LITHOLOGY	COMMENTS
		ROD (%)	DESCRIPTION			
			DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		ROCK TYPE, COLOR, MINERALOGY, TEXTURE WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC
11.0					see PT-1S Boring Log 0'-12'	9-29-83 Installed 8" casing to 21' set casing within 12" pipe set to 10'. Open hole 10'-21'. Grouted between 8" and 12", pulled 12" samples obtained by straining drilling fluids
12.0					Bedrock at approximately 12'	Bit: 12" tri-cone roller bit
13.0						
14.0					SILTY SANDSTONE, moderate brown, moderately hard, trace soft laminations very fine sand, very micaceous	
15.0						
16.0						
17.0						
18.0					same as above, interbedded with SILTSTONE, SHALE	
19.0						
20.0						
21.0						
22.0						10-1-83 Bit: 8" downhole button-bit hammer
23.0					23'-35' SANDSTONE, moderate brown, trace interbedded shale-mudstone, very fine-fine, silty, micaceous, soft-moderately hard, friable	steady, smooth drilling rate, low flow, <1 gpm
24.0						
25.0						
26.0						
27.0						
28.0						
29.0						
30.0						
31.0						
32.0						
33.0						
34.0						
35.0					35'-48' SANDSTONE, as above, traces of siltstone, fine sand, trace medium sand, feldspathic, trace white calcite (infillings of micro-fracture) trace light reddish brown, fine sandstone at 45'-47'	at 34'-35', increase in flow rate to 5-8 gpm
36.0						cleaned out hole to 43', frothy, white, odor
37.0						
38.0						
39.0						



PROJECT NUMBER  
NJ022948.ST.PT

BORING NUMBER  
PT-10

SHEET 2 OF 2

## ROCK BORING LOG

PROJECT Stepan Company

LOCATION Maywood, NJ

ELEVATION N/A

DRILLING CONTRACTOR Kendrick Drilling, Inc.

DRILLING METHOD AND EQUIPMENT Ingersoll TH-80, Air Rotary

ORIENTATION Vertical

WATER LEVEL AND DATE

START 8-2-83

FINISH 10-1-83

LOGGER P. van Noort

DEPTH BELOW SURFACE (FT)	CORE RUN LENGTH AND RECOVERY	DISCONTINUITIES		GRAPHIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	DESCRIPTION		ROCK TYPE, COLOR, MINERALOGY, TEXTURE WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC
4.0			DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
42.0						
43.0						
44.0						
45.0						at 45', drill skip, soft zone
46.0						
47.0						
48.0					48'-52' SANDSTONE, moderate to reddish brown, fine sand, trace calcified fractures (micro, 1mm), soft to moderately hard, friable soft zones at 51', SILTSTONE, MUDSTONE fragments	at 48'-50' noticeable sweet odor
49.0						
50.0						
51.0						at 51', drill break, soft zone
52.0					52'-57' SANDSTONE, as above, very fine-fine sand, very silty SANDY SILTSTONE zones, thin zones of shale-mudstone	slower drill rate
53.0						
54.0						
55.0						
56.0						
57.0					57'-59' Same as above, SILTY SANDSTONE, reddish brown, sandy siltstone zones	at 57', soft zone
58.0						at 57.5'-58', alternating, hard-slow drilling
59.0					59'-82' SANDSTONE, moderate-reddish brown, fine-medium sand chips, very fine sand, silty zones	6-8 gpm flow rate
60.0						at 61', drill break, fracture, flow rate increases to 15-20 gpm
61.0					At 61'-82' SILTY SANDSTONE, 1 1/2" fragments, coated with calcite, micro laminations of reddish brown clay, 1/8" x 1" white calcite, bounded by clay laminations	
62.0						Monitoring well couplet installed
63.0						
64.0					END OF BORING @ 62'	
65.0						
66.0						
67.0						
68.0						
69.0						
70.0						
71.0						
72.0						
73.0						
74.0						
75.0						
76.0						
77.0						
78.0						
79.0						
80.0						
81.0						
82.0						
83.0						
84.0						
85.0						
86.0						
87.0						
88.0						
89.0						
90.0						


**PROJECT NUMBER**

NJ022948.ST.PT

**BORING NUMBER**

PT-2D

SHEET 1 OF 2

# ROCK BORING LOG

**PROJECT** Stegan Company
**LOCATION** Maywood, NJ
**ELEVATION** N/A
**DRILLING CONTRACTOR** Kendrick Drilling, Inc.
**DRILLING METHOD AND EQUIPMENT** Ingersoll TH-80, Air Rotary
**ORIENTATION** Vertical
**WATER LEVEL AND DATE** START 9-28-93
**FINISH** 10-1-93
**LOGGER** P. van Noort

DEPTH BELOW SURFACE (FT)	CORE RUN LENGTH AND RECOVERY	DISCONTINUITIES		GRAPHIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	DESCRIPTION			
			DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
11.0			N/A		0'-18' see PT-2S Boring Log hole caves 0-12' 18'-25', no log	9-28-93 Installed 8" steel casing to 25' BGS, with 12" ID casing set to 10' BGS. Grouted around 8", pulled 12" Bit: 12" Tricone samples obtained by straining drilling fluids
12.0						
13.0						
14.0						
15.0						
16.0						
17.0						
18.0						
19.0						
20.0						
21.0						
22.0						
23.0						
24.0						
25.0						
26.0			N/A		25'-32.5' <u>SILTY SANDSTONE</u> , reddish brown very fine-line sand, hard, micaceous, feldspathic	9-30-93 Hit bottom of surface casing, metal fragments at casing
27.0						
28.0						
29.0						
30.0						
31.0						
32.0						
33.0						
34.0						
35.0						
36.0						
37.0						
38.0						
39.0						
40.0						
41.0			N/A		32.5'-35' Same as above, with angular fragments of mudstone/soft shale, 3/4" thick (perpendicular to sandstone laminations), very soft, greasy feel  35'-40' <u>SILTY SANDSTONE</u> , with layers of <u>SILTSTONE</u> , alternating, reddish to moderate brown, feldspathic	Bit: 8" down hole button-bit hammer  Smooth drilling, 25'-30'  Soft zones at 31', at 32.5'  Hard drilling at 32.5'-35', 37'
42.0						
43.0						
44.0						
45.0						
46.0						
47.0						
48.0						
49.0						
50.0						
51.0						
52.0						
53.0						
54.0						
55.0						
56.0						

CHM HILL

PROJECT NUMBER  
NJ022948.ST.PTBORING NUMBER  
PT-20

SHEET 2 OF 2

## ROCK BORING LOG

PROJECT Stepan Company

LOCATION Maywood, NJ

ELEVATION N/A

DRILLING CONTRACTOR Kendrick Drilling, Inc.

DRILLING METHOD AND EQUIPMENT Ingersoll TH-80, Air Rotary

ORIENTATION Vertical

WATER LEVEL AND DATE

START 9-28-93

FINISH 10-1-93

LOGGER P. van Noort

DEPTH BELOW SURFACE (FT)	CORE RUN LENGTH AND RECOVERY	DISCONTINUITIES		GRAPHIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	DESCRIPTION			
		FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			SIZE AND DEPTH OF CASING, FLUID LOSS CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC
41.0					40'-43' Same as above, <u>SILTY SANDSTONE</u>	2-4 gallons per minute End drilling for 8-30-93
42.0						
43.0						
44.0					43'-45' <u>SANDSTONE</u> , reddish brown, with silt, fine with some medium sand, hard	10-1-93 Significant water change 15-20 gpm at 45.5'-48'
45.0						Uniform, slow drilling 45.5', 48' to 55'
46.0						
47.0					At 47'-53' same as above, medium sand, trace coarse-sand, trace silt	
48.0						
49.0						
50.0						
51.0						
52.0						
53.0						
54.0						
55.0					55'-57' Same as above, with <u>SILTSTONE</u> layers, <u>SANDSTONE</u> becoming silty, fine sand, hard	Steady, smooth, drilling rate
56.0					57'-60' <u>SANDY SILTSTONE</u> , reddish-moderate brown, very fine-fine sand	
57.0						
58.0						
59.0						
60.0					60'-62' <u>SILTY SANDSTONE</u> , with alternating <u>SILTSTONE</u> , having green mottles, hard	
61.0						
62.0					END OF BORING @ 62'	Monitoring well coupler installed
63.0						
64.0						
65.0						
66.0						
67.0						
68.0						
69.0						



**CRM HILL**

**PROJECT NUMBER**

NJ022948.ST.PT

**BORING NUMBER**

BRTW-2

SHEET 1 OF 2

# **ROCK BORING LOG**

**PROJECT** Stepan Company

**LOCATION** Maywood, NJ

**ELEVATION** N/A

**DRILLING CONTRACTOR** Kendrick Drilling, Inc.

**DRILLING METHOD AND EQUIPMENT** Ingersoll TH-80, Air Rotary

**ORIENTATION** Vertical

**WATER LEVEL AND DATE** START 10-7-93

**FINISH** 10-13-93

**LOGGER** L. Vogel

DEPTH BELOW SURFACE (FT)	CORE RUN LENGTH AND RECOVERY	DISCONTINUITIES		GRAPHIC LOG	LITHOLOGY	COMMENTS
		ROD (%)	DESCRIPTION			
			DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
16.0	*N/A		N/A		18' SANDSTONE, moderate brown, medium-hard, fine sand, small planar chips	10-13-93 begin with air rotary beyond casing at 0840 at 18' HNU=Oppm background * no coring performed samples obtained by straining drilling fluids
17.0					19' same as 18' except finer chips, soft-medium	at 0858 at 18'
18.0					21' same as 18'	18.8'-19' easier drilling
19.0						
20.0						
21.0						
22.0						at 0804 at 21.5'
23.0						21'-22' easier drilling
24.0						22.5'-22.8' easier drilling
25.0					24' same as 18' with coarse sand size quartz grains, angular to subangular, sandstone chips, coarse, sand size to pebble size	at 1910 at 23'
26.0						23.5' sweet odor in return water
27.0						24.5'-25.4' easy drilling
28.0						at 0914 at 25'
29.0						
30.0					SANDY SILTSTONE, interbedded with sandstone, moderate brown, medium-hard, very fine-fine sand, trace bedding in siltstone	28'-28.5' fractures, easy drilling
31.0						29'-29.8' fractures, easy drilling
32.0						31'-31.5' fractures, easy drilling
33.0						at 0930 HNU
34.0					34' SANDSTONE, moderate brown, medium sand, slightly friable/crumbly, quartz, plagioclase, subangular-subrounded	1ppm wellhead
35.0						Oppm breathing
36.0						31.5'-37' hard drilling
37.0						at 0927 at 33'
38.0						
39.0						37'-41' faster drilling
40.0					40' same as 34' friable	at 0937 at 40'
41.0						41'-45.4' hard drilling
42.0						
43.0						
44.0						



PROJECT NUMBER  
NJ022948.ST.PT

BORING NUMBER  
BRTW-2

SHEET 2 OF 2

## ROCK BORING LOG

PROJECT Stepan Company

LOCATION Maywood, NJ

ELEVATION N/A

DRILLING CONTRACTOR Kendrick Drilling, Inc.

DRILLING METHOD AND EQUIPMENT Ingersoll TH-80, Air Rotary

ORIENTATION Vertical

WATER LEVEL AND DATE START 10-7-93

FINISH 10-13-93

LOGGER L. Vogel

DEPTH BELOW SURFACE (FT)	CORE RUN LENGTH AND RECOVERY	DISCONTINUITIES		GRAPHIC LOG	LITHOLOGY	COMMENTS
		ROD (%)	DESCRIPTION			
			DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		ROCK TYPE, COLOR, MINERALOGY, TEXTURE WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC
46.0					45' SANDY SILTSTONE, moderate brown, very fine sand, medium-hard, quartz	at 0845 at 45' 45.4'-45.5' fractures
47.0						
48.0						48'-51.2' easier drilling
49.0						
50.0					50' SANDSTONE, moderate brown, very fine-fine sand, very hard, massive, quartz, plagioclase	at 0858 at 50' 51.2'-51.4' fractures 51.4'-55.8' hard drilling
51.0						
52.0						
53.0						
54.0						
55.0					55' same as 34'	at 1003 at 55' 55.5'-58' easier drilling 58'-81' fractures
56.0						
57.0						
58.0						
59.0						
60.0					60' same as 45'	at 1009 at 80' 81'-82' hard drilling
61.0						
62.0					END OF BORING @ 82'	
63.0						
64.0						
65.0						
66.0						
67.0						
68.0						
69.0						
70.0						
71.0						
72.0						
73.0						
74.0						



PROJECT NUMBER

N102284B.ST.PT

BORING NUMBER

PT-30

SHEET 1 OF 1

## SOIL BORING LOG

PROJECT Stepan Company

LOCATION Maywood, NJ

ELEVATION N/A

DRILLING CONTRACTOR Kendrick Drilling, Inc.

DRILLING METHOD AND EQUIPMENT Ingersoll TH-80, Air rotary, hammer &amp; tricone bits

WATER LEVELS approximately 8', 10-8-93

START 10-8-93

FINISH 10-11-93

LOGGER P. van Noort

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS 8' - 8" - 8" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE DRILLING FLUID LOSS TESTS AND INSTRUMENTATION
	INTERVAL	TYPE AND NUMBER	RECOVERY			
0					0'-8" <u>SILTY SAND WITH GRAVEL</u> (SM), brown, brick chips, moist	12" tricone roller bit samples obtained by straining drilling fluids
						FILL
5.0	8				8'-8" <u>POORLY GRADED SAND WITH SILT</u> , gray, brownish gray, approximately 10% silt, medium-coarse sand, trace SM zones, moist	
	8				8'-9'11" <u>SILTY SAND</u> (SM), gray, brownish gray, moist-wet, trace reddish brown	water at approximately 8'
	9.11				9'11"-11'8" same as above grading to <u>SILTY SAND WITH GRAVEL</u> (SM), reddish brown, wet, trace wood fragments, likely transitional residual soils/bedrock	pushed 12" ID steel casing to 11'2"
10.0	11.8				11'8"-12'8" loose incompetent <u>SILTY SANDSTONE</u> , reddish brown, fine-very fine sand, silty	bedrock begins at 11'8" cleaning out 12" pipe
	12.8				12'8"-18' <u>SANDSTONE</u> , reddish brown to tannish brown, fine-medium sand, trace coarse sand, silt, very hard, trace subrounded fragments	hole collapsing around 12", significant increase in cuttings at surface viscous, silty sand
15.0						added approximately 55 gallons of cement to 12", set 8" within 12", pulled 12" 8" casing set to 18' from 0.5' below ground surface.
	18					End drilling for 10-8-93
					See Rock Boring Log	



PROJECT NUMBER NJ022948.ST.PT	BORING NUMBER PT-30	SHEET 2 OF 3
ROCK BORING LOG		

PROJECT Stapan Company LOCATION Maywood, NJ  
ELEVATION N/A DRILLING CONTRACTOR Kendrick Drilling, Inc.  
DRILLING METHOD AND EQUIPMENT Air, Water Rotary Ingersoll TH-80 ORIENTATION Vertical  
WATER LEVEL AND DATE START 10-9-93 FINISH 10-11-93 LOGGER P. van Noort

DEPTH BELOW SURFACE (FT)	CORE RUN LENGTH, AND RECOVERY	DISCONTINUITIES		GRAPHIC LOG	LITHOLOGY	COMMENTS
		RQD (%)	DESCRIPTION			
			DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS			
17.0	*N/A				18'-18' SANDSTONE, brown-reddish brown, fine to medium sand, trace silt, trace mudstone and shale fragments	Begin Air Rotary with 8" pipe, 8" OD hammer within mud tub *N/A no coring performed
18.0					18'-22' Sweet, odor, frothy, water, same as above	
19.0						easy drilling, likely fractures, increases in flow approximately 10 gpm
20.0						
21.0						
22.0						
23.0						
24.0					24'-25' Same as above, fine chips = hard, trace friable zones	
25.0						
26.0						
27.0					27'-29' SANDY SILTSTONE, reddish brown, fine sand, hard, micaceous	Drilling Rates:
28.0						27'-28' = 2' 12" (minutes, seconds)
29.0						28'-29' = 2' 8"
30.0						29'-30' = 2' 4"
31.0						30'-31' = 1' 22"
32.0					31'-32.5' SANDSTONE, pinkish reddish brown, fine-medium sand, trace buff-whitish gray zones, having medium-coarse sand	31'-32' = 1' 10"
33.0					32.5'-37' SANDSTONE, same as above, fine-medium sand, trace silt, hard	30.5' Drill skip
34.0						
35.0						
36.0						
37.0					37'-39' SANDY SILTSTONE, reddish brown, fine sand, micaceous, trace shale	
38.0						Drilling Rates:
39.0					39'-45.5' SANDSTONE, pinkish gray, fine-medium, hard to slightly friable	38'-40' = 2' 35"
40.0						
41.0						Flow Rate:
42.0						10-15 gpm, no change since 20'
43.0						
44.0						



PROJECT NUMBER  
NJ022948.ST.PT

BORING NUMBER  
PT-3D

SHEET 3 OF 3

## ROCK BORING LOG

PROJECT Stapan Company

LOCATION Maywood, NJ

ELEVATION N/A

DRILLING CONTRACTOR Kendrick Drilling, Inc.

DRILLING METHOD AND EQUIPMENT Air, Water Rotary Ingersoll TH-80

ORIENTATION Vertical

WATER LEVEL AND DATE START 10-9-83

FINISH 10-11-83

LOGGER P. van Noort

DEPTH BELOW SURFACE (FT)	CORE RUN LENGTH, AND RECOVERY	DISCONTINUITIES		GRAPHIC LOG	LITHOLOGY	COMMENTS
		ROD (%)	DESCRIPTION			
			DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		ROCK TYPE, COLOR, MINERALOGY, TEXTURE WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC
46.0					45.5'-48' SANDSTONE, reddish brown-grayish pink, trace mud drapes (thin mud laminae within sandstone matrix) likely secondary porosity, trace sandy siltstone	
47.0						
48.0					48'-49' Same as above with silty sandstone, zones	End at 49'
49.0						
50.0					50'-52' Same as above, SANDSTONE	switching to water rotary - to reduce quantity of waste water
51.0						
52.0					52'-58' SILTY SANDSTONE, SANDY SILTSTONE, micaceous, trace mudstone chips	8" tricone roller bit
53.0						
54.0						
55.0					55.8'-57' Same as above, alternating beds of reddish brown-gray sandstone, reddish brown-moderate siltstone	soft drilling at 51'8" - 51'10"
56.0						Drilling Rate: 52'-53' = 7'40"
57.0					57'-80' SANDSTONE, reddish gray, trace medium sand, likely interbedded with silty sandstone, sandy siltstone	soft drilling at 53'11" - 54'2"
58.0						Drilling Rate: 53'5"-55' = 8'20"
59.0					80'-82' SILTY SANDSTONE, same as above, trace bandstone and siltstone, mudstone, shale fragments, laminated	58'-57', 5" minutes per foot
60.0						58'-80', 4.5" per foot
61.0					END OF BORING @ 82' Hole flushed with approximately 200 gallons clean water, formation clears	Monitoring well couplet installed
62.0						
63.0						
64.0						
65.0						
66.0						
67.0						
68.0						
69.0						
70.0						
71.0						
72.0						
73.0						