



Van De Mark Chemical Co., Inc.

1 N TRANSIT ROAD

• LOCKPORT, NEW YORK 14094-2399

• 716 - 433-6764

September 17, 1986

Mr. Paul Ingrisano
Environmental Engineer
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Dear Mr. Ingrisano:

Enclosed is a copy of the appendices to the Somerset Railroad Corporation Hydrogeologic Study. These sections were inadvertently omitted when the revised closure plan (September 1986) was submitted on September 30, 1986 for the VanDeMark Chemical Company Industrial Landfill, EPA I.D. #NYD991290529.

If there is any other information that you require or you have any questions concerning this submission, or the closure plan, please contact me at 716-433-6764.

Sincerely,

Matthew Barmasse
Safety/Environmental Director

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JAN 10 1964

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APPENDICES

TO

'SOMERSET RAILROAD CORPORATION

HYDROGEOLOGIC STUDY

DANIELEWICZ ROUTE

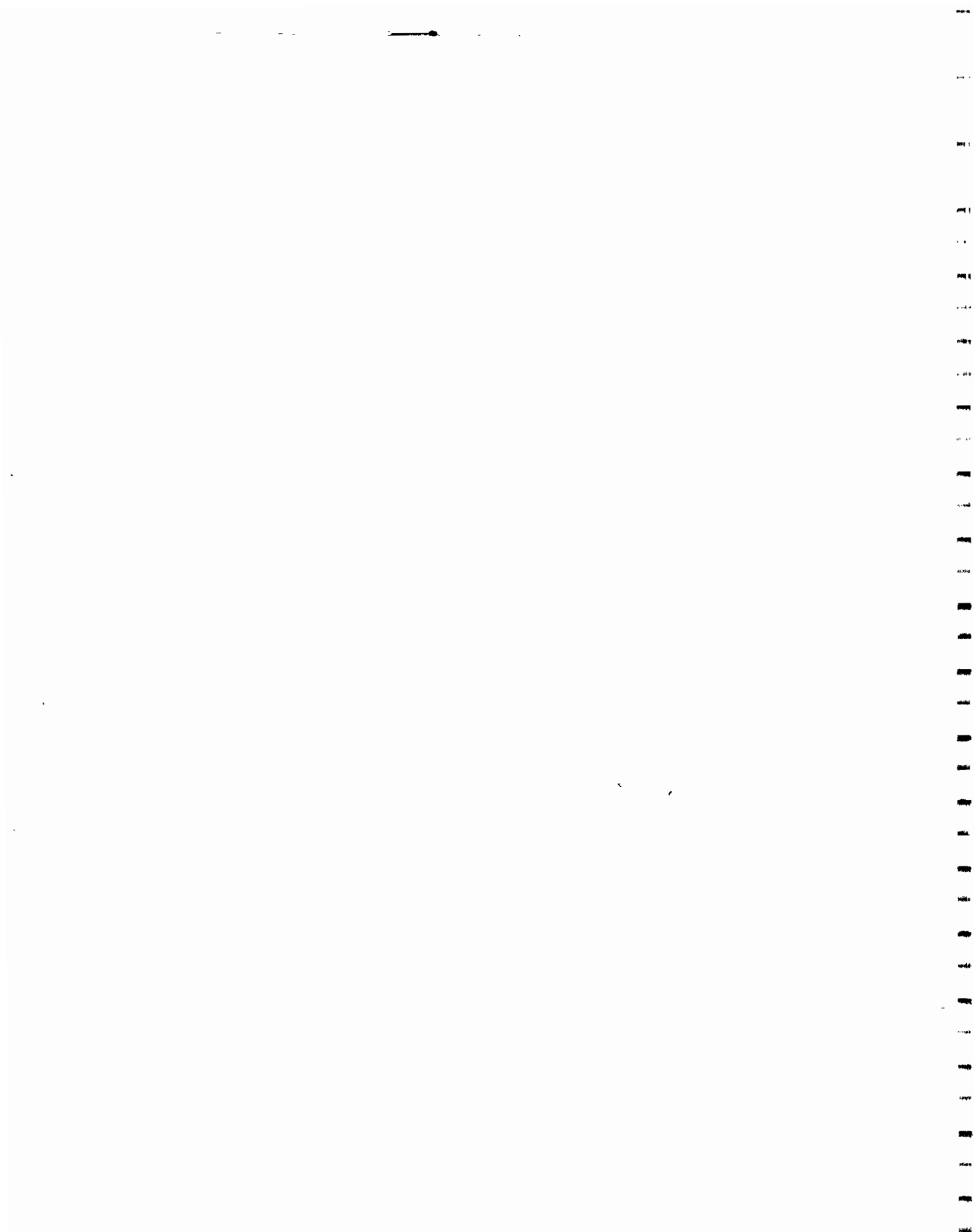
STATION 51+810 to 52+330

BECHTEL CIVIL & MINERALS, INC.

Job No. 14818

February 1982'

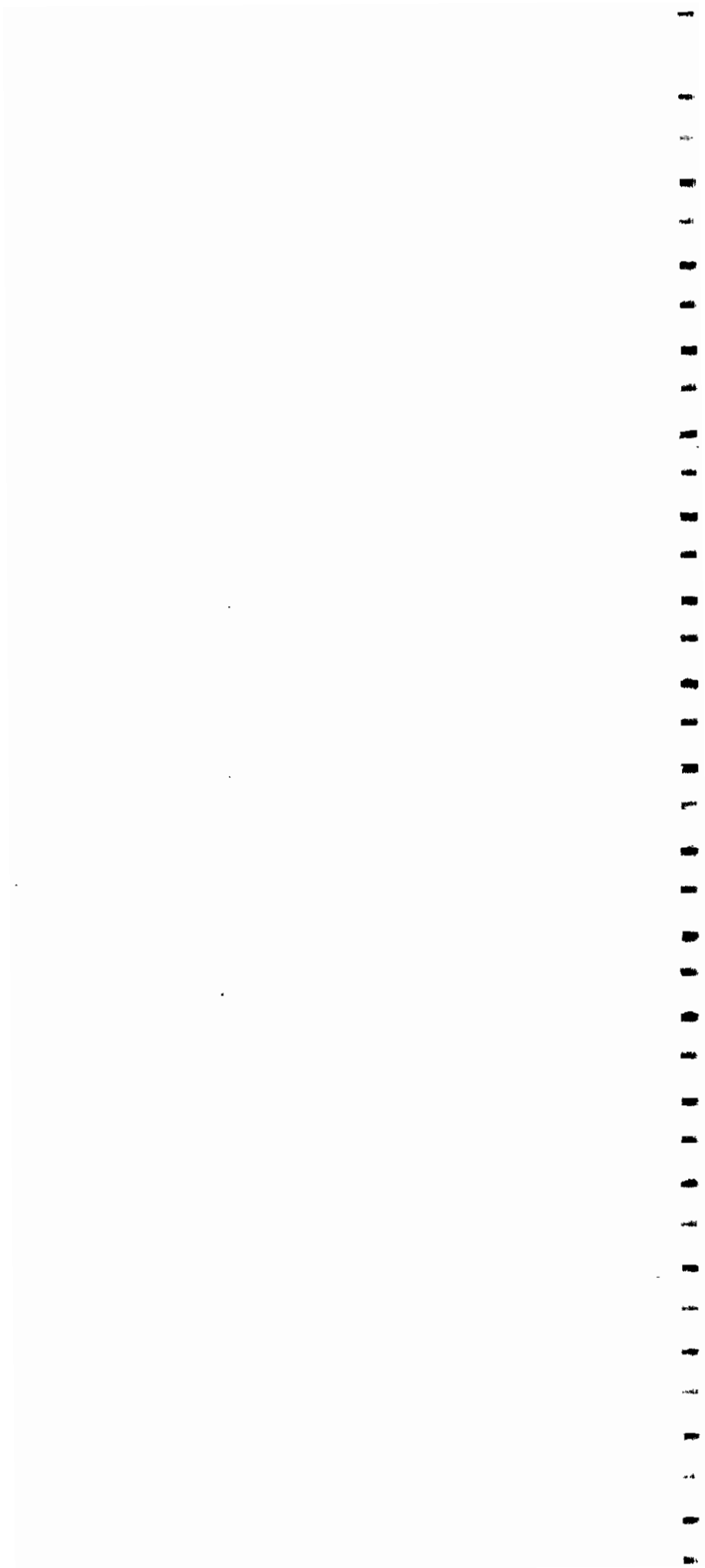
(To be read in conjunction with report prepared for Van DeMark
Chemical Co. entitled "Closure Plan - Former Landfill Site")



APPENDIX A

LOGS OF BORINGS

WELLS D-7 AND D-49 THROUGH D-70





BORING LOG						PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
						Somerset Railroad		14818	2 of 2	D-7			
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLE RECOVERY CORE RECOVERY	SAMPLE BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					1ST 6"	2ND 6"	3RD 6"						
					RQD %	FT	MIN						
NX	4.7	5.0	106		3.5/74	1 2 3 4 0.7	3.5 5 5 5 5	417.1	40		7 R U N 8	19.3'-41.3' POWER GLEN FM. (cont.)	Bore hole reamed with 3-3/4" roller-rock bit to 45.5.
NX	5.0	5.1	102		3.5/70	1 2 3 4 5	4 4 4 1/2 4 1/2 4 1/2	411.5	45		9	41.3'-46.6' WHIRLPOOL FM. Grayish white, hard to v. hard, fresh to slightly weathered, fine to medium grained SANDSTONE, slightly calcareous, bedding massive with bands of shale, 43.3-44.6 Vertical joints, rough, no coating. 45.3-45.7 Joint at 66°, vertical joints, rough, no coating.	
												Boring completed at 46.6'. Boring completed as observation well. See observation well completion report for construction details.	

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER	SITE Danielewicz Route	HOLE NO. D-7
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BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.						
SITE				COORDINATES		ANGLE FROM HORIZ.		BEARING						
Van De Mark				N 1,161,003 E 468,422		90°		--						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FT.)						
10/28/81	10/28/81	B.Scirra/Empire	CME 45C Skid		NX/6	0.9	49.6	50.5						
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)	DEPTH/EL. TOP OF ROCK (FT.)							
48.2/97		4	1	461.9	459.8	37.6/422.2	1.4/458.35							
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:										
--		--		J. A. Stone/D. Middleton										
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLE BLOWS	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
					1ST 6"	2ND 6"	3RD 6"							
								459.8						
								458.4						
NX	5.0	5.0	100						5		R	Top of Rock 1.4'-22.0' GRIMSBY FM. SANDSTONE, SILTSTONE, SHALE: interbedded 60-65%SS/40-45% sh. SANDSTONE & SILTSTONE: dk red brown to pale green to lt. gray, fine to v. fine grained, thin-bedded (horizontal) medium hard to hard, fresh to moderately weathered, cross-bedded, occ. pale green blotchy patches (mottling), gradational change between sandstone & siltstone.	10" hollow stem auger used to a depth of 1.4', 8" PVC surface casing cemented in place.	
NX	5.0	4.7	94	0					10		R	SHALE: dk red brown to pale green, thin-bedded to fissile (horizontal) soft, moderately to completely weathered to clay. Bedding plane joints (Fe stained w/clay residue): 8.7-9.2, 9.7-10.0, 12.1, 12.4-12.6, 13.0, 14.2-14.3, 14.6, 14.8, 15.0, 15.1, 15.9, 16.1-16.5, 22.9, 23.0, 23.5. Vertical joints (Fe stained) 7.4-7.9, 8.1-8.7.	Water used as drilling fluid.	
NX	2.4	2.2	91	17					15		R			
NX	4.0	3.6	90	22					20		R			
NX	4.2	5.0	119	98					25		R			
NX	5.0	4.6	92	56					30		R			
NX	5.0	4.9	98	44					35		R			
NX	5.0	4.8	96	52					40		R			
								424.8						
SS = SPLIT SPOON; ST = SHELBY TUBE; O = DENNISON; P = PITCHER; Q = OTHER													SITE	HOLE NO.
													Van De Mark	D-49



BORING LOG										PROJECT		JOB NO.	SHEET NO.	MOLE NO.
										Somerset Railroad		14818	2 of 2	D-49
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.		
					1ST 6"	2ND 6"	3RD 6"							
								424.8						
					RQD %									
NX	5.0	5.0	100	70					40	R U N	22.0'-45.1' POWER GLENN FM.(cont.) Bedding plane joints (Fe stained &/w clay residue on surface): 23.9-24.3, 24.9, 25.0, 25.2, 25.5, 32.2, 32.4, 33.8, 34.2, 35.2, 36.5-36.8, 41.5-42.2, 42.6, 43.0, 43.5, 44.1, 44.2-45.5. Vertical joints (Fe stain on surface): 41.6-42.0, 42.6-42.9, Power Glen fm.	 Boring reamed 6" Diam. to 58.0'. Obsv. well installed to 51.3' depth.		
NX END BOX 3	5.0	3.9	78	38				414.7	45	R U N				
NX	4.0	4.5	112	10				409.3	50	R U N	45.1'-50.5' WHIRLPOOL FM. SANDSTONE: lt. gray, fine grained, thin-bedded to massive, hard, fresh, unknown black mineral gives speckled look. Cross-bedded, occ. shale part- ings. No joints or fractures in this section.			
END BOX 4											Bottom of hole @ 50.5'. Boring completed as observation well. See observation well completion report for construction details.			



BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.						
Somerset Railroad				14818		1 OF 3	D-50							
SITE		COORDINATES				ANGLE FROM HORIZ.		BEARING						
Van De Mark		N 1,160,983 E 468,415				90°		--						
BEGIN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)						
10/13/81	10/16/81	Empire		CME 45		NX/6	2.8	87.8						
TOTAL DEPTH (FT.)		CORE BOXES		SAMPLES	EL TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)	DEPTH/EL. TOP OF ROCK (FT.)						
85.65/98		6		2	462.69	460.8	44.2/416.6	2.8/458.0						
SAMPLE HAMMER WEIGHT/PALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:										
140#/30"		--		J. C. Isham										
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH (INCHES)	SAMPLER RECOVERY CORE RECOVERY (%)	SAMPLE BLOWS	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH (FT.)	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
					1ST 6"	2ND 6"	3RD 6"							
SS/2"	2.0	1.5	17	REF.	25	13	4/3	74th	460.8			1	0.0'-2.8' reddish brown weathered & fractured shale & sandstone.	6" hollow stem auger used to a depth of 2.8 ft.
	.5	0.0							458.0			2	Top of rock.	
NX	5.0	3.7	74		ROD 2	13				5		R	2.8'-22.8' GRIMSBY FM.: reddish brown and mottled reddish brown & pale green sandstone, interbedded with reddish brown shale, sandstone is hard, massive to thinly bedded, horizontal bedding with cross-bedding at approx. 20' from horizontal.	NX casing installed to a depth of 2.8 ft.
NX	5.0	5.0	100	64						10		R	Shale, weathered to firm.	Water used as a drilling fluid.
NX	5.0	5.0	100	58						15		R		10" hollow stem auger used to a depth of 2.8 ft & 8" PVC surface casing cemented in place after NX coring.
NX	5.0	4.85	97	56	Packer Test #7 7.7 x 10 ⁻⁶ cm/sec					20		R	16.3'-22.8' Basal unit of GRIMSBY FM. Pale green sandstone	Water level: 7.45 10-14-81 boring at 22.81, 18.45 10-16-81 boring at 85.6.
NX	5.0	5.0	100	54					438.0	25		R	22.8'-45.95' POWER GLEN FM.: Dark reddish brown to pale green & grayish green, v. hard to soft, fresh to slightly weathered, v. fine grained to microcrystalline interbedded calcareous sandstone, shale & dolomite thin horizontal bedding with slump structures & cross-bedding, iron oxide staining on some joints, vertical fractures-22.5-22.8, 25.2-25.45.	
NX	5.0	5.0	100	78	Packer Test #6 4.8 x 10 ⁻⁴ cm/sec					30		R	Horizontal fracture zones: 23.1'-23.45', 23.8'-24.0'.	
NX	2.8	2.8	100	14					425.8	35		R		

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE: Van De Mark

HOLE NO. D-50

BECHTEL

BORING LOG						PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
						Somerset Railroad		14818	2 of 3	D-50		
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS PER CENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC
				1ST 6"	2ND 6"	3RD 6"						
							425.8					
NX	5.0	5.0	100	90						RUN	22.8'-45.95' POWER GLEN FM. (cont.)	
								40		8		
NX	5.0	5.0	100	71						RUN		
								45		9		
NX	5.0	5.0	100	90			414.85			RUN		
								50		10		
NX	5.0	5.0	100	94						RUN	45.95'-56.5' WHIRLPOOL FM.: Gray to lt. gray, v. hard sandstone, massive to thin bedding, iron oxide staining at some joints with black shale partings.	
								55		11		
NX	5.0	4.7	94	66			404.3			RUN	56.5'-90.6' QUEENSTON FM.: Dark reddish brown, firm shale, banded and mottled with blue-green shale, calcareous, fresh, massive, some open and calcite filled vugs. Core breaks along a preferential plane of weakness at an angle of 20° to 30° from horizontal.	
								60		12		
NX	5.0	5.0	100	68						RUN	56.5-57.3 soft weathered blue-green shale.	
								65		13		
NX	5.0	5.0	100	86						RUN		
								70		14		
NX	5.0	4.8	96	45						RUN		
							385.8	75		15		

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = FITCHER; O = OTHER

SITE
Van De Mark

HOLE NO.
D-50

BECHTEL

BORING LOG						PROJECT	JOB NO.	SHEET NO.	HOLE NO.			
						Somerset Railroad	14818	3 OF 3	D-50			
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 6"	2ND 6"	3RD 6"						
							385.8					
NX	5.0	4.9	98	RQD %						16	56.5'-90.6' QUEENSTON FM. (cont.): Bands of blue-green firm shale: 66.2-66.35, 68.1-68.2, 69.3-69.8, 75.7-75.85, 76.1-76.3, 90.3-90.6. Mottled zones of dark red-brown & blue-green shale: 58.0-58.4, 60.8-61.3, 76.8-77.6, 79.0-79.8, 89.4-90.0.	
NX	5.0	4.9	98			Parker Test #1 Zero Flow				17		
NX	5.0	5.0	100							18		
							370.2				Bottom of Boring: 90.6 ft. Boring completed as observation well. See well completion report for construction details.	Boring reamed to 6" Diam. to 91.0'.

BECHTEL

BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE Van De Mark				COORDINATES N 1,161,001 E 468,399		14818	1 OF 2	D-51					
BEGIN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FT.)					
10/2/81	10/21/81	J. Lamb/Empire	CME 45		NX/6	1.0	42.3	43.3					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)		DEPTH/EL. TOP OF ROCK (FT.)					
39.8/94		3	—	461.77	459.5	16.9/442.6		1.0/458.5					
SAMPLE HAMMER WEIGHT/FALL 140#/30"			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY: D. Middleton								
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH (INCHES)	CORE RECOVERY (%)	SAMPLE BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH (FT.)	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					1ST 6"	2ND 6"	3RD 6"						
								459.5					
0								458.5					
NX	3.3	2.0	61										
NX	5.0	5	100										
NX	5.0	4.8	96										
NX	5.0	5	100										
NX	5.0	4.9	98										
NX	5.0	5	100										
NX	5.0	3.5	70										
								424.5					

SS = SPLIT SPOON; ST = SHELBY TUBE;
 D = DENNISON; P = PITCHER; O = OTHER

SITE
Van De Mark

HOLE NO
D-51



BORING LOG						PROJECT	JOB NO.	SHEET NO.	HOLE NO.					
						Somerset Railroad	14818	2 OF 2	D-51					
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS IN	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
					1ST 6"	2ND 6"	3RD 6"							
								424.5						
NX	5.0	4.8	96		RQD %						R	21.7'-43.3' POWER GLEN FM. (cont.)	Boring reamed to 6" diameter to 43.3'.	
					<u>1.2</u>						U	Vertical fracture from horizontal		
					24						N	joints at 23.2'-23.6'.		
NX	5.0	4.8	96		<u>0.6</u>				40		R			
					12						U			
								416.2			N	Boring completed to 43.3'.		
									45		9			
												Boring completed as observation well.		
												See observation well completion report for construction details.		

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER	SITE Van De Mark	HOLE NO. D-51
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BECHTEL

BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
				Somerset Railroad		14818	1 OF 3	D-52					
SITE			COORDINATES			ANGLE FROM HORIZ.		BEARING					
Van De Mark			N 1,160,634 E 468,308			90°		—					
BEGIN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FT.)					
10/14/81	10/23/81	J. Jensen/Empire	CME 55		NX/6	1.5	88.7	90.2					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)		DEPTH/EL. TOP OF ROCK (FT.)					
80.8/91		6	1	468.69	466.5	55.3/411.2(12/15/81)		1.5/465.0					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140#/30"			—			J. C. Isham/D. Middleton							
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE	LENGTH CORE RUN	SAMPLE RECOVERY	SAMPLE BLOWS	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					1ST 8"	2ND 8"	3RD 8"						
SS 2	18	8	105	5	5	100		466.5				0'-1.5' Red brown, fine to coarse grained SAND, trace clay & pebbles.	Water used as drilling fluid.
NX 3	5.0	5.0	100	17				465.0				1.5'-32.6' GRIMSBY FM.: Reddish brown & mottled reddish brown, and pale green sandstone interbedded with reddish brown shale. Sandstone is hard, massive to thinly bedded, horizontal bedding with cross-bedding at approx. 20° from horizontal. Shale is weathered to firm some slump structures fracture spacings .1' to .5'. Vertical fractures at: 6.0-6.5, 8.0-9.0, 13.0-13.3, 16.5-17.0, 17.6-31.0	Lost 50% of water at 2'. 10" hollow stem auger used to a depth of 1.5' & 8" surface casing installed & cemented.
NX	1.0	1.0	100	0					5				
NX	1.3	1.2	92	0									
NX	.2	.2	100										
NX	2.0	1.6	80	0					10				
NX	2.0	2.0	100	0									
NX	4.0	3.7	93	35					15				
NX	2.9	2.9	100	39					20				
NX	4.1	4.1	100	73									
NX	5.0	4.8	96	50					25			25.0'-32.6' GRIMSBY FM. basal unit.	
NX	4.9	4.9	100	29					30			32.6'-54.6' POWER GLEN FM.: banded and mottled dark reddish brown, pale green & blue-green, interbedded sandstone and shale (cont.)	
								433.9					
								431.5	35				

SS = SPLIT SPOON; ST = STURGEY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE
Van De Mark

HOLE NO
D-52



BORING LOG						PROJECT	JOB NO.	SHEET NO.	HOLE NO.			
						Somerset Railroad	14818	2 OF 3	D-52			
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLE BLOWS "N"	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 6"	2ND 6"	3RD 6"						
							431.5					
NX	4.8	4.7	98	RQD %	60					12	32.6'-54.6' POWER GLEN FM. (cont.): with some slump structures & cross- bedding horizontal fractures of approx. .2'-.5' spacings.	
NX	4.4	4.4	100	69	Packer Test #1 2.1 x 10 ⁻⁵ cm/sec			40		13	34.3-36.0 blue-green-sandstone. 36.0-37.5 dark red-brown shale. 37.5-38.1 mottled green & dark red brown sandstone.	
NX	10.0	10.0	100	76				45		14	38.1-39.4 blue-green sandstone.	
					Packer Test #4 1.5 x 10 ⁻⁴ cm/sec			50				
NX	10.0	9.8	98				411.9	55		15	54.6'-65.6' WHIRLPOOL FM.: gray to white hard to v. hard fresh sandstone, massive to thinly bedded horizontal joint stained with FeO, 55.3. Vertical fractures: 55.3-55.9, 56.0-57.1, 58.3-59.1.	 pH of drilling fluid is 9.5.
					Packer Test #3 2.0 x 10 ⁻⁵ cm/sec			60				
NX	10.0	9.6	96	24			400.9	65		16	65.6'-90.2' QUEENSTON FM: Dark reddish brown with blue-green mottling, soft massive shale, horizontal joints on .2-.3 spacings, some joints at 20°-30°.	
					Packer Test #2 Zero Flow			70			65.6-66.1 blue-green 66.1-68.2 dk. red-brown 68.2-68.5 mottled green & red 68.5-74.4 dk. red-brown 74.4-75.7 banded green & red-brown	
							391.5	75				
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; F = FITCHER; O = OTHER						SITE Van De Mark		HOLE NO. D-52				



BORING LOG					PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
					Somerset Railroad		14818	3 OF 3	D-52		
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS "N"	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 6"	2ND 6"	3RD 6"					
NX	10.0	10.0	100	70	RQD %		391.5				
					Packer Test #1 Zero Flow			80		65.6'-90.2' QUEENSTON FM. (cont.): 75.7-77.1 dk. red-brown 77.1-77.5 green 77.5-78.6 dk. red-brown 78.0-79.15 green 79.15-79.55 dark red-brown 79.55-79.8 green 79.8-90.2 dark red-brown	
NX	6.9	6.9	100	75			376.3	85	R U N 18		
								90		Bottom of boring 90.2 ft. Boring completed as observation well. See observation well completion report for construction details.	Boring reamed to 6" diameter to 90.2'.
								95			
								100			

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE
Van De Mark

HOLE NO.
D-52

BECHTEL

BORING LOG				PROJECT Somerset Railroad		JOB NO. 14818	SHEET NO. 1 OF 2	HOLE NO. D-53				
SITE Van De Mark			COORDINATES N 1,160,626 E 468,353			ANGLE FROM HORIZ. 90°		BEARING —				
BEGUN 10/15/81	COMPLETED 10/17/81	DRILLER J. Genoves/Empire	DRILL MAKE AND MODEL CME 45B		HOLE SIZE (INCHES) NX/NQ 6	OVERBURDEN (FT.) 2.6	ROCK (FT.) 43.3	TOTAL DEPTH (FT.) 45.9				
CORE RECOVERY (FT./%) 41.9/91		CORE BOXES 3	SAMPLES 2	EL. TOP OF CASING (FT.) 469.18	GROUND EL. (FT.) 467.4	DEPTH/EL. GROUND WATER (FT.) 32.3/435.1 (12-15-81)		DEPTH/EL. TOP OF ROCK (FT.) 2.6/464.8				
SAMPLE HAMMER WEIGHT/FALL 140#/30"			CASING LEFT IN HOLE: DIA./LENGTH —			LOGGED BY: D. L. Middleton						
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH (CORE IN)	CORE RECOVERY (%)	SAMPLE BLOWS	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH (FT.)	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 6"	2ND 6"	3RD 6"						
SS	2	0.7	49	20	35	14	467.4			1	0'-2' Reddish brown, fine to coarse loose SAND, moist, some fine gravel some cobbles, trace of clay.	Set 8" PVC surface casing to depth of 2.6 ft to contain surface flow, used 10" hollow stem auger.
SS	0.6	0.2		100/1	—	—	464.9			2	Red brown, fine to coarse loose SAND, moderate amount of fine gravel.	
				ROD 4								
NX	5.0	4.7	94	7				5		1	2.6'-33.1' GRIMSBY FM.: Dk. red brown to pale green to white, fresh to severely weathered, soft to med. hard, fine grained to microcrystalline SANDSTONE, SILTSTONE, SHALE, horizontal jointing predominant, some joints 20"-30" shale completely weathered to clay.	Lost 10%-15% of water at 26.6.
NQ	8.7	8.7	100	47				10		2	Occasional shale & bedding plane separations, yellow-brown coatings present in some joints, joint spacing range 0.05'-0.8', yellow-brown stains in horizontal joints at 6.6', 15.9', 16.3'-16.6', 26.3', 30.9'.	Lost all water at 29.6.
END BOX 1												
NQ	9.3	8.8	95	17				20		3		
								25			26.1'-33.1' Basal GRIMSBY FM.: Mottled pale green to white to red-brown, v. hard, fresh to slightly weathered, fine grained, SANDSTONE horizontal & vertical jointing w/yellow-brown coatings.	
NQ	10.0	10.0	100	29				30		4	26.3'-27.0', vertical joint w/rust colored to red-brown to black coating, 28.3'-29.2' dk. brown to black stains, presence of reddish-brown dots about the size of a pin head. 29.4 - rust color dots. 30.0 - thin zone of black dots about size of straight pin head. 30.9 Horizontal joint w/yellow-brown stains.	
								35				
								40				
								45				
								50				
								55				
								60				
								65				
								70				
								75				
								80				
								85				
								90				
								95				
								100				

Packer Test #2
 1.3 x 10 cm/sec

33.1'-45.9' POWER GLEN FM.

 SS = SPLIT SPOON; ST = SHELBY TUBE;
 D = DENNISON; P = PITCHER; O = OTHER

SITE

Van De Mark

HOLE NO

D-53

GPD-13234-A Rev. 1/82 (Form 10070-2)

BECHTEL

BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				Somerset Railroad		14818	1 of 2	D-54				
SITE		COORDINATES				ANGLE FROM HORIZ.		BEARING				
Van De Mark		N 1,160,660 E 468,316				90°		--				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FT.)					
10/27/81	10/29/81	J. Jensen/Empire	CME 55	NX/6	0.7	57.1	57.8					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)		DEPTH/EL. TOP OF ROCK (FT.)				
53.2/94		4	--	468.46	466.4	54.4/412.0 (12-15-81)		0.7/465.7				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
					C. F. Wall							
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLE BLOWS "N"	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT.	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 6"	2ND 6"	3RD 6"						
							466.4					
NX	1.1	1.0	91				465.7			1	0'-0.7' Residual Soil	Drilling with NX split-tube core barrel to 57.6 ft. Reamed with 5-7/8" roller-rock bit to 58.0 ft.
NX	3.0	1.5	50	40					2	0.7'-35.3' GRIMSBY FM. SANDSTONE with interbedded SHALE: dk. reddish brown to pale green to grayish green, v. hard to med. soft (sandstone) and med. soft to v. soft (shale), fresh to completely weathered, sandstone is fine grained, cross-bedded and fossiliferous.		
NX	8.0	6.9	86	30					3	Bedding separations @ 1.4, 4.7-5.8 (com. weath. & broken), 9.8, 10.0 (sl. staining), 12.4, 13.1, 16.3, 16.4, 18.0, 20.8, 21.1, 21.2, 21.6, 25.3, 28.0, 28.7, 32.1, 32.3, 34.1, 34.4, 34.7 (occasional staining).		
NX	10.0	9.7	97	65					4	Vertical joints @ 5.2-5.8 (uneven, rough surface, no stain.), 6.0-6.5 (rough surface, no stain.), 8.4-12.3 (uneven, rough surface, sl. staining, occasionally rehealed), 16.2-16.7 (uneven, rough surface, stained), 18.0-18.2 (rehealed), 23.0-24.1 (uneven, rough surface, partially rehealed), 30.1-30.5 (rehealed).		
END BOX 1							446.4					
NX	10.0	9.9	99	95						5		
END BOX 2												

 SS = SPLIT SPOON; ST = SHELBY TUBE;
 D = DENNISON; P = PITCHER; O = OTHER

SITE

Van De Mark

HOLE NO.

D-54

BECHTEL

BORING LOG										PROJECT Somerset Railroad		JOB NO. 14818		SHEET NO. 2 OF 2		HOLE NO. D-54	
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.					
					1ST 8"	2ND 8"	3RD 8"										
NX	10.0	9.5	95	75	RQD %			431.1	40	R U N 6	35.3'-54.5' POWER GLEN FM. SHALE, calcareous sandstone, limestone: dk. reddish brown to pale red to pale green to grayish green to med. to dk. gray to white, v. hard to med. hard, fresh to mod. weathered, fine grained to microcrystalline, banded, thin to med. bedded.						
NX	10.0	10.1	101	99					45	R U N 7	Bedding separations @ 36.0, 36.2 (stained) 51.8, 54.3 (orange & bl. staining) Vertical joints @ 36.0-36.7 (rough surface, tr. staining), 38.3-38.7 (rough surface, no staining), 35.0-35.3 (uneven, rough surface, bl. staining), 53.2-53.6 (rehealed).						
END BOX 3									50								
NX	5.0	4.6	92	80				411.9	55	R U N 8	54.5'-57.8' WHIRLPOOL FM. SANDSTONE: white, v. hard, fresh to sl. weathered, fine grained, cross-bedded, with shale partings. Bed. Sep. @ 54.6, 55.6 (orange & black staining) Vertical joint @ 53.2-53.6 (rehealed).						
END BOX 4								408.6	60		Boring completed at 57.8 ft. Observation well installed. See observation well completion report for construction details.						

SS = SPLIT SPOON; ST = SHELLEY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE
Van De Mark

HOLE NO.
D-54



BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.						
				Somerset Railroad		14818	1 OF 3	D-56						
SITE		COORDINATES				ANGLE FROM HORIZ.		BEARING						
Van De Mark		N 1,160,739 E 468,251				90°		—						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FT.)							
10/24/81	10/25/81	M. Fuhrmann/Empire	CME 45C (Skid)	6	2.6	107.45	110.05							
CORE RECOVERY (FT./IN.)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)	DEPTH/EL. TOP OF ROCK (FT.)							
107.55/100.1		8	1	469.49	467.3	56.1/411.2	2.6/464.7							
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:										
—		—		D. Middleton/C. F. Wall/J. C. Isham										
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH (CORE RUN)	CORE RECOVERY	SAMPLE BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH (FT.)	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
					1ST 6"	2ND 6"	3RD 6"							
					RQD %			467.3						
								464.7				0'-2.6' Red-brown fine to coarse grained SAND, trace organics some gravel, Top of rock 2.6'.	8" PVC surface casing cemented to a depth of 4.8', 10" hollow stem augers used.	
NX	2.7	3.1	114						5		1	2.6-4.1 grout. 2.6'-32.0' GRIMSBY FM.: 4.1'-5.2' grout, SHALE intermixed completely weathered to clay, occ. chunks of pale green sandstone.	Water used as drilling fluid.	
NX	5.0	5.0	100	30					10		2	SANDSTONE, SILTSTONE, SHALE interbedded. Dk. red-brown to red-brown to green fine grained to microcrystalline, soft to moderately hard, fresh to moderately weathered.	Lost all water at 15.0'.	
NX	4.75	4.75	100						15		3	Bedding joints (Fe. stained, occ. clay residue): 7.5', 10.3', 12.15', 16.5', 18.3', 24.7', 24.8', 26.4', 26.7', 27.0', 27.6'. Vertical joints: 8.5'-8.8', 11.1'-12.15', 20.6'-21.1'.		
END BOX 1									20		4	Horiz. joints: 27.8, 30.0, 30.9, 30.95, 31.55. Vert. joints: 25.5'-26.75', 27.85'-28.05', 28.6-29.5. Grimsby Fm.		
NX	10.0	9.8	98	70					25					
									30		5			
NX	10.0	10.0	100	49										
END BOX 2												32.0': 2 cm red-brn. plastic CLAY. 32.0'-54.0' POWER GLEN FM.		
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; F = FITCHER; O = OTHER													SITE	HOLE NO.
													Van De Mark	D-56

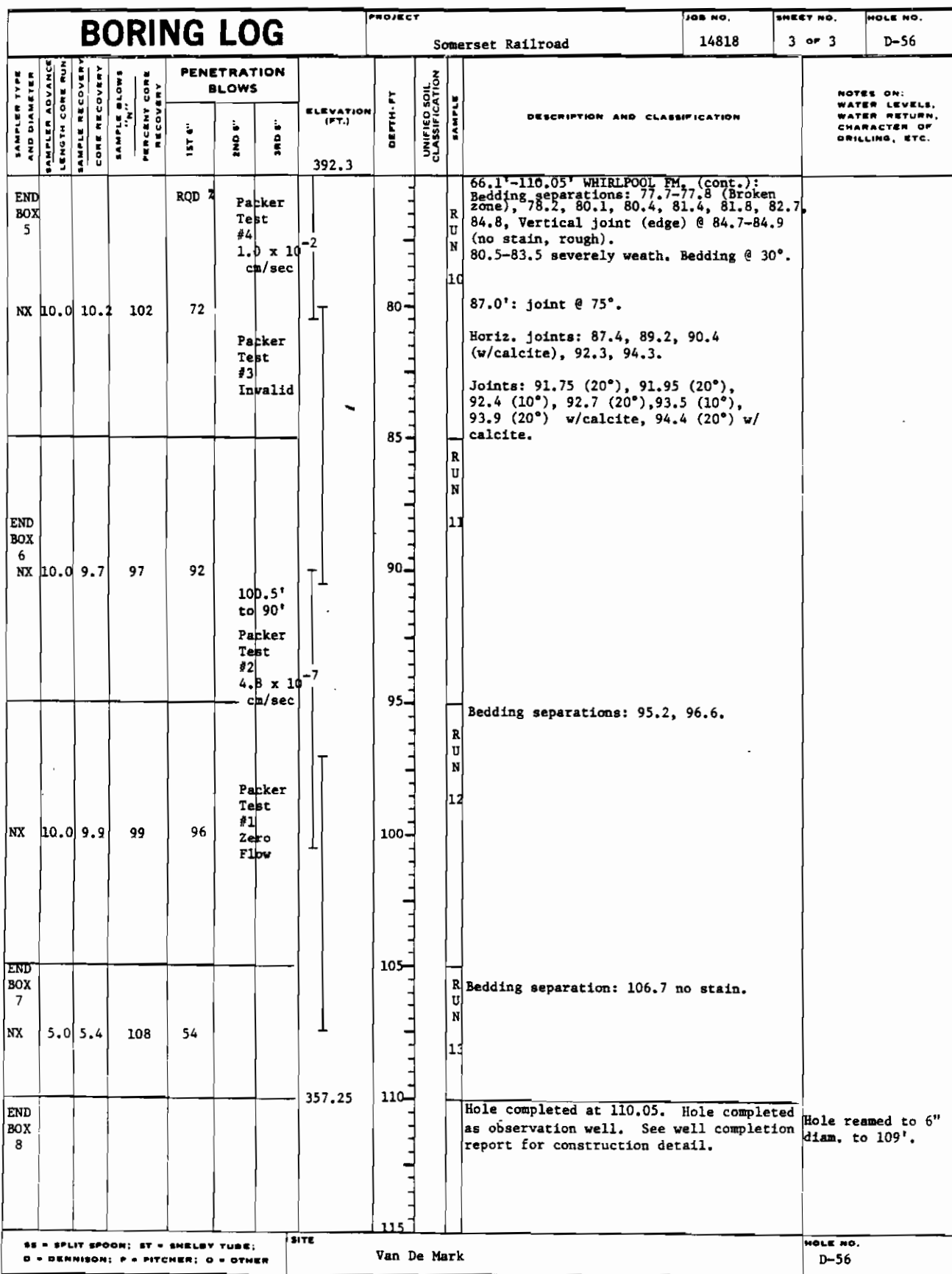
BECHTEL

BORING LOG										PROJECT		JOB NO.		SHEET NO.		HOLE NO.	
										Somerset Railroad		14818		2 of 3		D-56	
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLE RECOVERY CORE RECOVERY	SAMPLE BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF GRILLING, ETC.				
					1ST 6"	2ND 6"	3RD 6"										
NX	10.0	10.0	100		RQD %							32.0'-54.0' POWER GLEN FM. (cont.): SHALE, LS, calcareous SANDSTONE, light to dark red-brown to dark green, fresh to sli. weath., soft to med. hard, occ. banding, slump structures.					
					68				40			33.6-34.0 - vertical joint. 36.2-36.4 - vertical joint. Horiz. joints: 34.1, 34.35(20°), 34.65, 35.5, 35.8-35.95 (several), 36.2, 36.4, 36.75, 37.2, 37.5, 37.8, 38.0, 38.25, 38.3, 38.45, 38.7, 38.9, 39.7, 40.2, 41.1, 42.3, 42.5, 42.55, 42.75, 43.5, 44.6, 45.35, 45.37, 45.6, 47.15, 52.05, 52.65.					
END BOX 3									45			37.25'-54.0': light gray to dark gray interbedded SHALE, LS, and calc. SS, fresh, soft to med. hard, f. grained to microcrystalline.					
NX	10.0	10.0	100		74				50								
									55			54.0'-66.1' WHIRLPOOL FM. SANDSTONE: white to gray, fresh, v. hard f. grained, massive. Horiz. joints: 54.05, 54.2, 54.3, 54.7, 54.75.					
NX	10.0	9.6	96		74				60								
END BOX 4									65								
									70			66.1'-110.05' QUEENSTON FM. MUDSTONE: dk. red brown w/pale green mottling, mod. soft, fresh to mod. weathered. Bedding separations: 67.1, 67.4, 68.6, 68.8, 69.1, 69.4, 71.1, 71.5, 71.6, 72.6, 72.7, 74.5, 74.6.					
NX	10.0	10.1	101		75				392.3								

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE
Van De Mark

HOLE NO.
D-56





BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.						
SOMERSET RAILROAD				14818		1 OF 2	D-57							
SITE		COORDINATES				ANGLE FROM HORIZ.		BEARING						
Van De Mark		N 1,160,739 E 468,229				90°		--						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FT.)							
10/25/81	10/27/81	M. Goudy, J. Genevese/Empire	CME 45B	6	1.2	58.1	59.3							
CORE RECOVERY (T./%)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)	DEPTH/EL. TOP OF ROCK (FT.)							
56.3/95		4	—	469.27	467.0	54.6/412.4	1.2/465.8							
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:										
—		—		S. Balone/J. C. Isham/ C. F. Wall										
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLE BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNITED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
					1ST 8"	2ND 8"	3RD 8"							
					1ST 8"	2ND 8"	3RD 8"	467.0						
NX	3.4	3.0	88		RQD	%		465.8						
					0.4	12								
NX	8.2	6.7	82		2.0	24								
NX	0.50	0.46	92		0	0								
NX	2.2	2.1	95		1.6	71								
NX	5.0	4.9	98		2.6	52								
NX	5.0	4.9	98		4.03	81								
NX	5.0	4.83	97		3.95	79								
NX	5.0	5.0	100		3.5	70								
								432.0						
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER													SITE	HOLE NO.
Van De Mark														D-57

BECHTEL

BORING LOG							PROJECT	JOB NO.	SHEET NO.	HOLE NO.		
							Somerset Railroad	14818	2 OF 2	D-57		
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH - FT.	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 6"	2ND 6"	3RD 6"						
NX	5.0	5.0	100	RQD	Z		431.8					
				0.75	15							
NX	5.0	5.0	100	1.1	22			40				
NX	5.0	4.3	86	3.2	64			45				
NX	5.0	5.1	102	2.4	48			50				
NX	5.0	5.0	100	0.9	18		412.8	55				
							407.7	60				
											35.2'-54.2' POWER GLEN FM. SHALE with interbedded limestone and calcareous sandstone: reddish brown to grayish green to lt. gray to med. gray, v. hard to med. soft, fresh to mod. weathered. Bedding separations with slight staining are numerous from 35.2 to 44.0. Vertical joints @ 35.6-36.0 (rough surface, no staining), 41.1-41.6 (no staining), 52.4-53.9 (rough surface, no staining). Bedding separation @ 52.5 w/orange staining. Completely weathered & broken @ 53.0-54.0. 54.2'-59.3' WHIRLPOOL FM. SANDSTONE: white, v. hard to hard, fresh to mod. weathered, with occasional shale partings. Bedding separations @ 54.25, 54.5, 55.4, 55.9, 56.1 (no staining), 58.7, 58.8 (orange & black staining). Weathered zone w/banded shale partings @ 56.7-57.2. Vertical joints @ 54.6-55.1, 55.7-55.8 (rehealed, stained), 56.1-57.0 (rough surface, uneven, stained), 57.2-57.8 (rough surface, stained) 58.8-58.9 (rough surface, brilliant green mineralization). Bottom of boring @ 59.3 ft. Boring completed as observation well. See well completion report for construction details.	Reamed to 6" nom. diam. to 58.0'

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE

Van De Mark

HOLE NO.
D-57



BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.						
SITE				COORDINATES		ANGLE FROM HORIZ.		BEARING						
Van De Mark				N 1,160,948 E 468,241		90°		--						
BEGIN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FT.)							
10/17/81	10/17/81	Empire	CME 45	NX	1.5	50.0	51.5							
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)	DEPTH/EL. TOP OF ROCK (FT.)							
49.25/98.5		4	1	467.68	465.7	50.7/415 (Dry)	1.5/464.3							
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:										
--		--		J. C. Isham										
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH (CORE RUN)	SAMPLE RECOVERY	SAMPLE BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNITED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
					1ST 8"	2ND 8"	3RD 8"							
10" Auger								465.7						
NX	5.0	5.0	100		RDQ 4	0		464.2				0.0-1.5 ft red-brown, weathered & fractures Shale & Sandstone, top of rock.	8" PVC surface casing cemented to a depth of 1.5 ft.	
NX	5.0	4.7	94	38					5		1	1.5-27.85 ft GRIMSBY FM: Dark reddish brown and mottled reddish brown & pale green to white sandstone interbedded with dark reddish brown shale. Sandstone is v. hard to hard, fresh, jointed at .2' to .3', spacing joints are horizontal to 20°-30° from horizontal, massive to thinly bedded. Shale is v. soft to soft, highly weathered to weathered horizontal joints at .2'-.3' spacings.	Water used as a drilling fluid.	
NX	5.0	5.0	100	45					10		2	Some FeO staining in joints. Vertical Joints 3.7'-4.1' & 6.5'-9.7'.	Driller indicates lost all return water at 15.0' probably lost water in weather to highly weathered soft to v. soft fractured inter-bedded sandstone & shale from 11.5' to 14.5'.	
END BOX 1									15		3			
NX	5.0	4.7	94	77					20		4			
NX	5.0	5.0	100	88					25		5	21.55'-27.85' Basal unit of GRIMSBY FM. Pale green-blue sandstone.		
NX	5.0	5.0	100	56				437.85	30		6	27.85'-51.5' POWER GLEN FM. Dark reddish brown to pale green & grayish green, v. hard to soft, fresh to slightly weathered, fractured, interbedded fine grained calcareous sandstone and shale, banded & thinly bedded with slump structures, FeO staining on some joints, joints range from .2'-.5' spacing.	Note: As of 10/29/81 the water elevation measured is that which is in the sump.	
END BOX 2											7			
NX	5.0	5.0	100	46				430.7						
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER													SITE	HOLE NO
													Van De Mark	D-58



BORING LOG							PROJECT	JOB NO.	SHEET NO.	HOLE NO.		
							Somerset Railroad	14818	2 OF 2	D-58		
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS "N"	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 5"	2ND 5"	3RD 5"						
				RQD %			430.7				27.85'-51.5' POWER GLEN FM. (cont.)	
NX	5.0	4.85	97	75				40		R U N 8		
NX	5.0	5.0	100	94				45		R U N 9		
END BOX 3 NX	5.0	5.0	100	66				50		R U N 10		
END BOX 4							414.2				Bottom of Boring: 51.5 ft. Boring completed as observation well. See well completion report for construction details.	 Boring reamed to 6" diameter follow- ing coring. Reamed to 51.3'.

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER	SITE Van De Mark	HOLE NO. D-58
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BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.										
				Somerset Railroad		14818	1 OF 3	D-59										
SITE		COORDINATES				ANGLE FROM HORIZ.		BEARING										
Van De Mark		N 1,160,951 E 468,216				90°		—										
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)										
10/23/81	10/25/81	M. Gaudy/Empire		CME 45B		6	2.4	97.6										
TOTAL DEPTH (FT.)		CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)										
100.0		97.0/98		7	—	467.68	465.0	53.6/411.4										
DEPTH/EL. TOP OF ROCK (FT.)		SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:												
2.4/462.7		—		—		D. Middleton/J. C. Isham/S. Balone												
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE	LENGTH CORE RUN	SAMPLER RECOVERY	CORE RECOVERY	SAMPLE BLOWS	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.			
							1ST 6"	2ND 6"	3RD 6"									
										465.0								
NW	3.2	3.0	94		RQD%	0				462.6			RUN	0'-2.4' Residual soil & grout.	Drilled w/NW 80 split inner-tube core barrel, 10' long.			
NW	5.0	4.4	88			0					5		RUN	2.4'-27.3' GRIMSBY FM. SANDSTONE & SHALE: dark red-brown to gray, fresh to severely weath., soft to med. hard, f. grained to microxtalline. Joints horiz. to 3.4'; 30° to 3.8'. Vert. joint 2.5'-3.05', ylw-or. coating. Clay seams 2.5'-2.7', 2.8-2.9', 3.1-3.2. Color varies to pale green. 10.6'-11.0': vert. joint. 11.8'-12.0': vert. joint w/dark red-brn. coating. 12.0'-12.2': vert. joint w/red-brn.coat. 14.25'-15.5': red-brn. to pale green fresh, massive, f. grain SS, banded.	20% return water. 11.0': lost all water return. 8" PVC surface casing cemented to a depth of 2.1 ft.			
NW	3.0	3.0	100	57							10		RUN	18.0'-19.7': fossiliferous SS.				
NW	3.5	3.5	100	26							15		RUN	v. hard, fine grained, SS, pale green, fresh, massive.				
END BOX 1													RUN					
NW	9.1	9.0	99	86							20		RUN					
											25		RUN	25.3'-25.9': vertical fractures.				
NW	10.0	10.0	100	93	Packer Test #7					437.7	30		RUN	27.3'-49.5' POWER GLEN FM. Dark red-brown to dark green to pale green SHALE, LS, SS, DOL., SLT ST., fresh to slightly weath., soft to med. hard, occ. slump structures, locally fossiliferous. 28.95: vuggy zone.				
END BOX 2													RUN					
										430.0								
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER															SITE		HOLE NO	
Van De Mark																	D-59	



BORING LOG						PROJECT	JOB NO.	SHEET NO.	HOLE NO.			
						Somerset Railroad	14818	2 of 3	D-59			
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLE BLOWS PER CENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 6"	2ND 6"	3RD 6"						
				RQD %							27.3'-49.5' POWER GLEN FM. (cont.):	
NW	10.0	9.9	99	88	Packer Test #6	3.4 x 10 ⁻⁶ cm/sec		40		RUN 7	41.6': 1.5 cm fragmented zone. Horizontal joints 46.3', 47.1', 48.95'.	
END BOX 3												
NW	10.0	10.0	100	69	Packer Test #5	4.4 x 10 ⁻⁶ cm/sec	415.5	50		RUN 8	49.5'-60.6' WHIRLPOOL FM. Light gray, fresh to sl. weath., well cemented f. gr. SANDSTONE, hard to v. hard.	48': lost all return water.
											50.1-51.7: vertical joint w/yellow-tan coating. 59.74-60.6': weath. zone. LS & shale. Horizontal joints 52.9', 53.45', 54.0', 54.4', 55.69', 57.2', 57.9', 58.37', 59.13', 59.51', 59.74', 60.2', 60.53. thin calcite coatings 59.74'-60.6': weath. zone in SS	
END BOX 4												
NW	10.0	9.95	99		Packer Test #4	3.5 x 10 ⁻⁶ cm/sec	404.4	60		RUN 9	60.6'-100' QUEENSTON FM. Lt. greenish-red SANDSTONE and MUD- STONE, mod. fractured, SS is hard. Horiz. fractures: 60.65, 60.97, 61.6, 61.78-61.88, 62.00, 62.50, 63.03.	
NW	10.0	9.92	99		Packer Test #3	Zero Flow		70		RUN 10	Red-brown SS, SLTST, SH, w/green lenses, scratched w/fingernail. Joints: 65.05 @ 30°, open, 65.7' horiz. & jagged, 65.82' 30°, 65.9' & 66.0' conjugate @ 30° & 45°, 66.12' horiz., 66.25 @ 20°, 66.32 @ 30°, 66.42 @ 30°, 66.75 horiz., 66.85 @ 30°, Horiz. : 67.36, 67.81, 68.10, 68.12.	90% water return.
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER						SITE			Van De Mark			HOLE NO. D-59

BORING LOG

PROJECT

Somerset Railroad

JOE NO.	
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14818

SHEET NO.

3 of 3

HOLE NO.	
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D-59

SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC
					1ST 6"	2ND 6"	3RD 6"						
NW	9.6	9.35	97		RQD %							60.6'-100' QUEENSTON FM. (cont.): 74.8'-74.9': Pale green. 74.9'-80.7': mottled dark red-brown & green. 80.7'-81.6': dk. reddish-brown. 81.6'-81.9': green. 82.9'-83.6': fracture zone. 81.9'-86.1': dark red-brown. 86.1'-86.7': mottled green & dk. red-brn.	
NW END BOX 6	10.0	10.0	100			Packer Test #2 7.9 x 10 cm/sec						86.7-94.0': dark red-brown.	
NW	5.9	4.96	84									Red-brown siltstone, med. hard (can be scratched by screw), horizontal bedding, fractured parallel to bedding, HCl test negative. Color change to wht-gray 95.3' to 95.6', 97.2' to 97.3'.	
END BOX 7	B. O.	H. =		100.0								Fractures: 94.5': 0°, closed, fresh, smooth. 94.7': 0°, closed, fresh, smooth, mechanical. 95.5': <5°, tight, fresh. 96.1': <5°, tight, fresh, 1/4" frag's. 96.4': 0°, tight, fresh to sl. weath. v. thin brown clay coating. 96.8': 5°, tight, fresh to sli. weath. v. thin brown clay coating. 98.3': mechanical. Boring completed to 100'. Boring completed as observation well. See well completion report for construction details.	Driller reports 0.9' of core left in bottom of hole Boring reamed to 6" diameter following coring. Reamed to 100'.

SE = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE
Van De Mark

HOLE NO.
D-59



BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
Somerset Railroad				14818		1 OF 2	D-60						
SITE		COORDINATES				ANGLE FROM HORIZ.		BEARING					
Van De Mark		N 1,160,934 E 468, 227				90°		---					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FT.)					
10/24/81	10/26/81	Empire	Acker		NX/6	1.4	55.65	57.05					
CORE RECOVERY (P.Y./%)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)	DEPTH/EL. TOP OF ROCK (FT.)						
		4	1	467.75	465.7	54.1/411.6	1.4/456.4						
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
					J. C. Isham/B. Blodnikar								
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					1ST 6"	2ND 6"	3RD 6"						
6" FA					RQD %			465.7					
NX	3.6	2.65	74	0				464.3					
									5				
NX	5.0	4.7	94	16									
									10				
NX	5.0	5.0	100	0									
									15				
NX	5.0	5.0	100	76									
END BOX 1									20				
NX	4.5	3.05	68	64									
									25				
NX	1.8	1.8	100	100									
									30				
NX	5.0	4.9	98	70				437.5					
END BOX 2								430.7					
SS = SPLIT SPOON; ST = SHELBY TUBE; SITE													HOLE NO.
D = DENNISON; P = PITCHER; O = OTHER Van De Mark													D-60



BORING LOG							PROJECT		JOB NO.		SHEET NO.		HOLE NO.	
							Somerset Railroad		14818		2 of 2		D-60	
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE	LENGTH CORE RUN	SAMPLER RECOVERY	SAMPLE BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						1ST 6"	2ND 6"	3RD 6"						
NX	10.0	9.99	100%			RQD	CORE	RATE				R	28.2'-50' POWER GLEN FM. (cont.) Occ. LS layers, foss. siltstone & calc. cemented SS. Horiz. fractures: 31.4, 31.8, 32.75, 31.7-31.74 (thin crushed zone), 33.05, 33.66, 34.0, 34.6, 36.02, 36.94, 37.3, 37.97 (20°), 38.08, 38.45, 38.58 @ 45°, 39.32, 40.14, 40.9, 41.99, 42.56, 42.6, 43.38, 47.7'-48.3' vertical, 43.42' (30°), 43.99, 46.24, 46.78, 47.62 (1/4" clay), 49.3', 49.4', 49.97'.	
NX	10.0	10.0	100%						415.7	40		U		
END BOX 3										45		N		
NX	5.75								407.7	50		R	50'-57.05' Light gray hard SANDSTONE, thin bedded upper 1.2' is weathered, f. to med. grained, locally calc. cemented, WHIRLPOOL FM. Fractures: horizontal except as noted. 50.22', 50.22'-50.68' (90°), 51.08, 51.18, 52.22 (30°), 53.2 (30°), 53.27 (30°), 54.9, 54.9-56.5 (arcuate near-vertical), 55.1, 55.3, 55.4, 55.6, 56.04, 56.16, 56.8.	
END BOX 4	T.D. =			57.05'						55		U		
										60			Boring completed to 57.05'. Boring completed as observation well after reaming. See well completion report for construction details.	After coring, boring reamed to 6" nom. diam. to 58.0'.
										65				
										70				

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE
Van De Mark

HOLE NO.
D-60

[illegible]

BECHTEL

BORING LOG							PROJECT	JOB NO.	SHEET NO.	HOLE NO.		
							Somerset Railroad	14818	2 OF 2	D-61		
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS "N" PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 6"	2ND 6"	3RD 6"						
							432.4					
				ROD	FT	MIN						
NQ	10.0	10.0	100	100	1-10	7.5		40		R U N	30.1'-46.1' POWER GLEN FM. (cont.) jointed, occasional banding and slump features, overall rock is tight. 34.5 - color of rock turns to shades of gray, lt. gray to dk. gray. 34.0' - horizontal joint with yellow-brown coatings.	
							421.3	45				
END BOX 3								50			Boring completed to 46.1 ft. Boring completed as observation well. See well completion report for construction details.	Boring reamed to 6" diameter following coring. Reamed to 45.9'.

BORING LOG						PROJECT Somerset Railroad		JOB NO. 14818	SHEET NO. 1 OF 2	HOLE NO. D-62			
SITE Van De Mark				COORDINATES N 1,160,878 E 468,358				ANGLE FROM HORIZ. 90°		BEARING —			
BEGIN 10/28/81	COMPLETED 10/29/81	DRILLER Empire		DRILL MAKE AND MODEL CME 45C		HOLE SIZE (INCHES) NX/6	OVERBURDEN (FT.) 1.0	ROCK (FT.) 58.6	TOTAL DEPTH (FT.) 60.3				
CORE RECOVERY (%T.N.) 57.6/98		CORE BOXES 5	SAMPLES —	EL TOP OF CASING (FT.) 471.04	GROUND EL. (FT.) 469.0	DEPTH/EL. GROUND WATER (FT.) 51.7/417.3		DEPTH/EL. TOP OF ROCK (FT.) 1.0/468.0					
SAMPLE HAMMER WEIGHT/FALL —			CASING LEFT IN HOLE: DIA./LENGTH —			LOGGED BY: J. A. Stone/D. Middleton							
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	CORE RECOVERY %	SAMPLE BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FY	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					1ST 6"	2ND 6"	3RD 6"						
					RQD %			469					
NX	5.0	3.4	68	56				468	5	RUN	1	0'-1.0' Residual Soil 1.0'-30.95' GRIMSBY FM: SANDSTONE, SILTSTONE, SHALE interbedded. 70-75% SS + slts./25-30% sh. SANDSTONE - dk. red brown to pale green to white, fine-grained, thin-bedded (horizontal) hard, fresh to mod. weathered, occasional burrows, cross-bedding and clay inclusions. Occasional pale green blotches in red-brown sandstone. SILTSTONE - dk. red brown to pale green, v. fine grained, thin bedded (horizontal), mod. hard, fresh to mod. weathered. Gradational change to sandstone. SHALE - dk. red brown to pale green, thin bedded to fissile, soft, mod. to completely weathered. Bedding plane joints (Fe stained w/clay residue): 4.8, 5.3-5.5, 5.8, 6.3-6.5, 6.7, 7.1-7.6, 8.3-8.5, 8.9, 11.0-13.0, 13.3-14.0, 16.2-16.4, 16.8, 17.3-17.7, 18.8-19.4, 19.8-20.0, 21.5-21.8, 23.3-23.8, 24.3, 24.5, 24.6, 24.7, 25.0. Vertical joints (Fe stained): 1.3-1.4, 1.8-2.1, 7.7-8.2, 8.4, 8.9, 13.1-13.3, 17.7-18.6.	Drilling with NX split tube core barrel to 60.3'. Boring reamed to 6" nom. diam. Reamed to 59.1'. Water used as drilling fluid. Lost return water @ 2.0'. Minimal return of drill water throughout drilling of remainder of hole.
NX	5.0	4.9	98	16					10	RUN	2		
NX	5.0	4.8	96	27					15	RUN	3		
END BOX 1									20	RUN	4		
NX	5.0	5.0	100	22					25	RUN	5		
NX	5.0	4.9	98	79					30	RUN	6		
NX	5.0	5.0	100	82					35	RUN	7		
END BOX 2								438.05					
NX	5.0	5.0	100	28				434.0					
26.0'-30.95' Basal GRIMSBY FM., lt. gray to pale green, fine grained massive, hard, fresh. 30.95'-53.6' POWER GLEN FM. SHALE and LIMESTONE: interbedded, dk. gray to lt. gray, thin bedded, moderately hard to soft, fresh to slightly weathered. Occasional banding in shale. Limestone is cross-bedded and contains bedding joints.													

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE
Van De Mark

HOLE NO
D-62

BECHTEL

BORING LOG						PROJECT Somerset Railroad		JOB NO. 14818	SHEET NO. 2 OF 2	HOLE NO. D-62			
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					1ST 8"	2ND 8"	3RD 8"						
					RQD %							30.95'-53.6' POWER GLEN FM. (cont.) Bedding joints: 36.5, 36.8, 36.9.	
NX	5.0	4.8	96	0					40		R U N 8		
NX	5.0	4.8	96	26					45		R U N 9		
END BOX 3												POWER GLEN FM.	
NX	3.5	3.5	100	66					50		R U N 10		
NX	3.8	3.8	100						55		R U N 11		
NX	5.0	5.0	100	58				414.4	55		R U N 12	54.6'-60.3' WHIRLPOOL FM. SANDSTONE: lt. to dk. gray, fine grained, very hard to soft, fresh to slightly weathered occasional interbedded shale seams (1 mm-2 cm thick) occur in upper 3' of unit.	
END BOX 4												Bedding joints: 56.1, 56.3	
NX	2.0	2.0	100					408.7	60		R U N 13		
												Bottom of Hole 60.3'. Hole completed as observation well. See well completion report for construction details.	

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE
Van De Mark

HOLE NO.
D-62



BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.								
Van De Mark				Somerset Railroad		14818	1 OF 2	D-63								
SITE				COORDINATES		ANGLE FROM HORIZ. BEARING										
Van De Mark				N 1,160,693 E 468,464		90°										
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FT.)								
10/24/81	10/24/81	J. Lamb/Empire	CME 45		NX/3	0.5	37.5	38.0								
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)	DEPTH/EL. TOP OF ROCK (FT.)									
37.1/99		3	—	—	469.7	—	0.5/469.2									
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:											
—		3"NW rods & barrel/16 ft			C. F. Wall											
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE	LENGTH CORE RUN	SAMPLE RECOVERY	SAMPLE BLOWS	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.		
						1ST 6"	2ND 6"	3RD 6"								
									469.7							
NX	4.5	4.5	100	RQD	0	0						RUN	0'-0.5' Residual Soil	Drilling with NX split-tube core barrel.		
												1	GRIMSBY FM. SANDSTONE with interbedded SHALE: dk reddish brown to pale green, v. hard (sandstone) to v. soft (shale) fresh to completely weathered (shale), fossiliferous. Sandstone is fine grained, cross-bedded.			
NX	4.0	4.0	100		0.7	17						2	Completely to severely weathered sandstone and shale @6.8-6.9, 7.3-7.7, 9.2-9.9, 11.4-12.3, 12.5-13.6, 14.0-18.0, 20.0-20.1, 34.3-34.8.			
NX	4.0	4.1	102		0	0						3	Bedding separations and/or broken zones with staining @ 0.6-20.3, 23.0-23.3, 24.3-24.4, 24.9-25.1, 29.0, 30.2, 33.2, 33.6, 33.9, 34.1-34.7, 35.0-37.6.			
NX	5.0	4.8	98		3.1	62						4	Vertical joints @ 13.6-13.9 (uneven, rough surface, with orange staining & clay coating), 18.8-19.2 (rehealed), 18.0-18.3 & 19.6-19.9 (uneven, rough surface, with black & orange staining), 33.4-33.8 & 33.9-34.2 (rehealed), 35.8-36.6 (uneven, rough surface, orange staining-rehealed from 36.3).			
NX	5.0	4.9	98		3.2	64						5				
NX	5.0	4.8	96		3.5	70						6				
NX	5.0	4.9	98		4.7	94						7		Lost drilling water at 18.5 ft.		
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER																
SITE										Van De Mark					HOLE NO. D-63	



BORING LOG							PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
							Somerset Railroad		14818	2 of 2	D-63			
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLE BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNITED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
					1ST 6"	2ND 6"	3RD 6"							
								434.7						
NX	5.0	5.1	102		RQD 1.6	% 32		431.7			R U N 8			
END BOX 3								427.7	40 45				NOTE: Core barrel fused to rock @ 42.0 ft. Unable to retrieve. Steel left in hole from 26.0-42.0 ft. Hole grouted to surface.	
SS = SPLIT SPOON; ST = SHELBY TUBE; O = DENNISON; P = PITCHER; Q = OTHER											SITE Van De Mark		HOLE NO. D-63	



BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				Somerset Railroad		14818	1 OF 3	D-63A				
SITE		COORDINATES				ANGLE FROM HORIZ.		BEARING				
Van De Mark		N 1,160,674 E 468,453				90°		--				
BEGIN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)				
10/26/81	10/28/81	J. Jensen/Empire		CME 55		NX/6	1.5	99.8				
TOTAL DEPTH (FT.)		CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)				
101.3		96.45/97		7	13	471.63	469.6	59.2/410.4				
DEPTH/EL. TOP OF ROCK (FT.)		SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
1.5/468.1						C. F. Wall/D. Middleton						
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS N. PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 6"	2ND 6"	3RD 6"						
							469.6					
				RQD %			468.1					
NX	4.5	3.5	78	0						RUN 1	0'-1.5' Residual Soil	Drilling with NX split-tube core barrel.
											1.5'-30.7' GRIMSBY FM. SANDSTONE with interbedded SHALE: dk. reddish brown to pale green, v. hard (sandstone) to v. soft (shale), fresh to severely weathered (sandstone) and severely to completely weathered (shale). Sandstone is fine grained and cross-bedded & fossiliferous.	
NX	2.0	1.8	90	15						2	Severely to completely weathered shale @ 2.1-5.4.	
											Sandstone is severely weathered @ 1.5-2.1, 5.4-8.0, 11.0-16.5.	
NX	8.5	7.1	83	0		Packer Test #9				3	Bedding separations with clay filling or orange staining @ 6.5, 6.7, 7.4, 8.1, 8.4, 8.9, 9.3, 10.1, 10.3, 10.7-16.5 (broken zone w/orange & black staining), 16.9, 18.1, 18.2, 26.3, 30.7. Bed. sep. w/no staining @ 21.9, 22.0. Vertical joints @ 8.2-8.6(rough surface, sl. weath. stain), 9.2-9.8 (rehealed to 9.4, rough surface w/staining to 9.8), 12.9-16.0 (v. rough surface, uneven, no staining).	
						2.3 x 10 cm/sec						
NX	5.0	5.0	100	66						4		
END BOX 1												
NX	2.0	1.85	93	80		Packer Test #8				5		
						4.3 x 10 cm/sec						
NX	8.0	7.7	96	93						6		
NX	10.0	10.0	100	78		Packer Test #7				7	30.7'-59.3' POWER GLEN FM. SHALE, calcareous SANDSTONE & LIMESTONE dk. reddish brown to white to med. to dk. gray, v. hard to med. soft, fresh to mod. weathered, fossiliferous, banded, fine grained to microcrystalline,	
END BOX 2						1.3 x 10						
							434.6					
SS = SPLIT SPOON; ST = SHELBY TUBE; SITE												HOLE NO.
D = DENNISON; P = PITCHER; O = OTHER Van De Mark												D-63A

BORING LOG

PROJECT

Somerset Railroad

JOB NO.

14818

SHEET NO.

2 of 3

HOLE NO.

D-63A

SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLE RECOVERY CORE RECOVERY	SAMPLE BLOW "N"	PENETRATION BLOWS PERCENT CORE RECOVERY	ELEVATION (FT.)	DEPTH- FT.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION AND CLASSIFICATION
IST 6"	2ND 8"	3RD 8"						
RQD #7 See Sheet 1. 	Packer Test #7 1.3 x 10 ⁻⁵				434.6	40	R UN N 7	3.7'-59.3' POWER GLEN FM. (cont.): occasionally vuggy. Bed. sep. @ 32.1, 37.5 (no stain.) Vertical joint @ 37.2-37.5 (uneven, rough surface, orange staining).
NX 10.0 10.0 100 100	Packer Test #6 1.3 x 10 cm/sec					45	R UN N 8	
END BOX 3	Packer Test #5 7.3 x 10 cm/sec					50	R UN N 9	Interbedded SHALE, calcareous SANDSTONE LIMESTONE, banded. Horizontal joints, except as noted: 52.6, 53.1, 53.7, 54.45, 54.95, 55.95, 56.7, 57.5, 57.65, 58.0, 58.2, 58.5, 59.3, 57.55. 57.0'-57.55': vertical. 58.2'-58.5': vertical. 57.15, 57.15-57.65, 58.0, 59.3.
NX 10.0 9.9 99 75	Packer Test #4 1.3 x 10 cm/sec				410.3	60	R UN N 10	59.3'-68.7' WHIRLPOOL FM. SANDSTONE, white to light gray, v. hard, fresh to slightly weathered, f.grained. 59.3-59.95: vertical joint. 60.0-60.2: vertical joint. Horiz. joints: 62.4, 62.8, 63.8, 64.6, 65.1, 67.65, 67.1-67.8: vert. fract., vuggy.
END BOX 4 NX 10.0 9.9 99% 55	Packer Test #3 Zero Flow				400.9	70	R UN N 11	68.7'-101.31' QUEENSTON FM. SHALE, red, fresh, Horiz. joints: 69.0, 69.65, 69.7, 69.8, 71.7, 71.9, 72.0, 72.75, 73, 73.5, 73.7, 73.85, 74.2, 74.3, 75.7, 75.95, 77.1.
See Sheet 3.					394.6	75		

▽

SS = SPLIT SPOON; ST = SHREVEY TUBE;
O = OENNISON; P = FITCHER; D = OTHER

SITE Van De Mark

MOLE NO. D-63A

BORING LOG										PROJECT	JOB NO.	SHEET NO.	HOLE NO.
										Somerset Railroad	14818	3 of 3	D-63A
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					1ST 6"	2ND 6"	3RD 6"						
NX	10.0	10.1	101		RQD %			394.6					
END BOX 5					67	Packer Test #3 Zero Flow						68.7'-101.31' QUEENSTON FM (cont.): Horiz joints (cont'd): 78.8, 80.5, Fractured core @ 77.7.	
NX	10.0	10.0	100		76	Packer Test #2 Zero Flow						Green seams @ 81.9-82.0, 87.2-87.8, 88.2-88.4.	
END BOX 6						Packer Test #1 Zero Flow						Common mechanically created horizontal joints.	
NX	9.8	9.6	98		61							92.6-92.7: clay seam washed out by coring.	
END BOX 7	T.	D.	101.3'					368.3				Boring completed to 101.3. Boring completed as observation well. See well completion reports for construction details.	Boring reamed to 6" nominal diameter to 101'.

SS = SPLIT SPOON; ST = SHELLEY TUBE;
D = DENNISON; P = FITCHER; O = OTHER

SITE
Van De Mark

HOLE NO.
D-63A

BECHTEL

BORING LOG				PROJECT		JOB NO.		SHEET NO.		HOLE NO.					
				Somerset Railroad		14818		1 of 2		D-64					
SITE				COORDINATES				ANGLE FROM HORIZ.		BEARING					
Van De Mark				N 1,161,713 E 468,448				90°		---					
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		HOLE SIZE (INCHES)		OVERBURDEN (FT.)					
10/22/81		10/23/81		J. Jensen/Empire		CME 45		NX/6		1.2					
CORE RECOVERY (FT./IN)		CORE BOXES		SAMPLES		EL. TOP OF CASING (FT.)		GROUND EL. (FT.)		DEPTH/EL. GROUND WATER (FT.)					
46.1/97.0		4		10		471.37		469.1		26.5/442.6					
SAMPLE HAMMER WEIGHT/FALL				CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:							
---				---				C. F. Wall							
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE	LENGTH CORE RUN	SAMPLER RECOVERY	CORE RECOVERY	SAMPLE BLOWS	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							1ST 6"	2ND 6"	3RD 6"						
NX	2.5	2.4	96	0	0		RQD	2		467.9		R	1	0'-1.2' Residual Soil	Drilled with NX split-tube core barrel to 48.7 ft. Reamed with 5-7/8 roller-rock bit to 47.7 ft. Lost return water at 9.7 ft.
NX	5.0	4.2	84	0.75	15					5	R	2	1.2'-37.6' GRIMSEY FM. SANDSTONE with interbedded SHALE: dk. reddish brown with lt. gray and pale green mottling, v. hard (sandstone) to v. soft (shale), fresh to completely weathered, fine grained & thin bedded, cross-bedding in sandstones, occasionally fossiliferous.		
NX	5.0	5.1	102	0	0					10	R	3	Numerous bedding separations with slight staining to 18.0 ft. Severely to completely weathered shale beds @ 2.0-2.2, 3.2-3.5, 4.8-5.0, 6.5-6.9, 8.7-9.6, 12.1-13.7, 20.5-20.9.		
NX	5.0	4.9	98	3.5	70					15	R	4	Vertical joints @ 4.9-5.0 (no staining), 10.3-11.8 (curvilinear with rough surface, orange & black staining), 11.9-12.9 (no staining) 22.5-23.0 (rehealed), 27.3-27.8 (slight orange staining) 36.6-37.1 (rough surface with orange staining). Moderate to severely weathered sandstone @ 14.5-19.6.		
NX	5.0	5.1	102	3.6	72					20	R	5	Bedding separations with slight staining @ 19.4, 19.9, 20.9, 22.5, 23.4, 25.9, 27.1. 28.7 to 37.6: banded fine grained sandstone with thin shale interbeds. Separations @ shale beds with no staining.		
NX	5.0	5.0	100	3.7	74					25	R	6	Bedding is predominately horizontal.		
NX	5.0	5.1	102	4.1	82					30	R	7			
See Sheet 2.										434.1	35				

SS = SPLIT SPOON; ST = SHELBY TUBE;
 D = DENNISON; P = PITCHER; O = OTHER

SITE
 Van De Mark

HOLE NO
 D-64

BORING LOG							PROJECT Somerset Railroad	JOB NO. 14818	SHEET NO. 2 OF 2	HOLE NO. D-64		
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLE RECOVERY CORE RECOVERY	SAMPLE BLOWS "N"	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT.	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 6"	2ND 6"	3RD 6"						
				RQD	%		434.1	35			1.2'-37.6' GRIMSBY FM. (cont.)	
NX	5.0	4.5	90	2.0	40		431.5			R U N 8	37.6'-48.7' POWER GLEN FM. SHALE with interbedded limestone, dolomite and calcareous sandstone: dk. reddish brown to pale green to grayish green to greenish gray, v. hard to v. soft, slightly to severely weathered.	
NX	5.0	5.1	102	0.5	10			40		R U N 9	No staining on numerous horizontal bedding breaks. Clay layer @ 40.5-40.6.	
NX	5.0	4.7	94	3.1	62			45		R U N 10	Vertical joints@ 40.6-41.1 (rough surface, orange staining), 42.5-42.7 (uneven, no staining).	
END BOX 3							420.4	48.7			Bottom of Boring @ 48.7. Boring completed as observation well See well completion report for details.	Boring reamed to 6" diam. to 47.7'.
END BOX 4								50				

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE
Van De Mark

HOLE NO.
D-64

BECHTEL

BORING LOG				PROJECT		JOB NO.		SHEET NO.		HOLE NO.		
				Somerset Railroad		14818		1 OF 2		D-65		
SITE				COORDINATES				ANGLE FROM HORIZ.		BEARING		
Van De Mark				N 1,161,735 E 468,433				90°		--		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FT.)				
10/23/81	10/24/81	J. Jensen/Empire	CME 55		NX/6	2.5	58.0	60.5				
CORE RECOVERY (%T./%)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)		DEPTH/EL. TOP OF ROCK (FT.)				
58/100		4	12	471.33	469.1	50.4/418.7		2.5/466.6				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:								
--		--		C. F. Wall								
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH (CORE RUN)	SAMPLER RECOVERY CORE RECOVERY (%)	SAMPLER BLOWS "N"	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT.	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 6"	2ND 6"	3RD 6"						
				RQD	%		469.1					
							466.6					
NX	3.0	3.1	103	0	0			5	R	UN	0'-2.5' Residual Soil	Drilled to 60.5 ft with NX split-tube core barrel. Reamed to 63.0 ft with 5-7/8" roller-rock bit.
NX	5.0	4.9	98	0.45	9				R	UN	2.5'-38.2' GRIMSBY FM. SANDSTONE with interbedded SHALE: dk. reddish brown with pale green mottling, v. hard to v. soft (shale), fresh to completely weathered (shale).	
NX	5.0	4.8	96	0.78	16			10	R	UN	Sandstone is fine grained, thin to thick bedded, cross-bedded and occasionally fossiliferous.	
NX	5.0	4.8	96	0.78	16				R	UN	Completely to severely weathered shale beds @ 4.2-4.4, 7.3-7.4, 10.6-10.7, 12.2-13.1, 13.6-13.7, 14.1-14.2, 18.3-18.8, 21.6-22.1, 23.9-24.2, 33.2-33.4.	
NX	5.0	4.8	96	0.78	16				R	UN	Completely to severely weathered sandstone beds @ 15.0-17.8, 23.0-23.9.	
NX	5.0	5.1	102	0.8	16			15	R	UN	Bedding separations coincident with weathered zones. In addition, bedding separations @ 3.2, 19.5.	
NX	5.0	5.1	102	0.8	16				R	UN	Vertical joints @ 2.5-3.1, 4.5-5.3 (curvilinear, rough surface, orange staining), 6.4-6.8, 7.4-7.7, 14.6-15.0, (rough surface, no staining), 15.7-15.8, 17.8-18.8, 20.4-21.0 (rough surface, no to slight staining), 24.2-24.7 (rough surface, slight staining), 26.8-27.2 (rough surface, black & orange staining), 31.7-32.4 (rehealed), 33.4-33.6 (rough surface, red. br. staining), 34.9-35.2 (rough surface, orange staining), 35.9-37.1 (uneven, rough surface, bland orange staining), 37.3-38.2 (curvilinear, rough surface, slight staining).	
NX	5.0	4.9	98	3.0	60			20	R	UN	Joint @ 21.5 @ 50° (rough surface, stained).	
NX	5.0	5.1	102	3.7	74			25	R	UN		
NX	5.0	4.9	98	2.6	52			30	R	UN		
							434.1	35				
SS = SPLIT SPOON; ST = SHELBY TUBE; SITE D = DENNISON; P = PITCHER; O = OTHER Van De Mark												
HOLE NO. D-65												



BORING LOG							PROJECT	JOB NO.	SHEET NO.	HOLE NO.		
							Somerset Railroad	14818	2 OF 2	D-65		
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORRECTION	SAMPLE RECOVERY	SAMPLE BLOWS PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 6"	2ND 6"	3RD 6"						
				RQD	%		434.1					
NX	5.0	5.1	102	2.3	46		430.9			RUN	2.5'-38.2' GRIMSBY FM. (cont.)	
								40		8	38.2'-56.7' POWER GLEN FM. SHALE with interbedded calcareous SANDSTONE and LIMESTONE (calcareenite): greenish gray to lt. gray to dk. reddish brown, v. hard to med. soft, slightly to mod. weathered.	Moderate loss of drilling water from 38.2 ft.
NX	5.0	5.0	100	2.6	52			45		9	Vertical joint @ 40.0-40.5 (3 joints, curvilinear, rough surface, slight staining), 54.3-54.6 (rough surface, no staining).	NOTE: Bedding separations difficult to detect in P.G. because of weak character of rock parallel to bedding.
END BOX 3								50		10		Breaks (whether from drilling or natural) are numerous in the P.G., however, no staining was evident.
NX	5.0	4.9	98	3.7	74			55		11		
NX	5.0	5.2	104	1.5	30		412.4			12	56.7'-60.5' WHIRLPOOL SANDSTONE SANDSTONE: pale greenish gray to white, fine grained, v. hard, fresh to sl. weathered, with occasional shale partings, bedding locally contorted.	Reamed to 5-7/8" diam. to 63.0 ft.
END BOX 4							408.6	60.5			Bedding separations usually at shale partings @ 56.7, 57.1, 57.3, 57.8, 58.3, 58.8 to 59.2 (no staining). Vertical joints @ 57.9-59.6 (uneven, rough surface, black and orange staining), 59.8-60.5 (uneven, rough surface, with black and orange staining and spots of brilliant green (SG6/6) mineralization). Boring completed to 60.5'. Boring completed as observation well. See well completion reports for details of well construction.	
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER							SITE	Van De Mark			HOLE NO.	D-65

BORING LOG

PROJECT

Somerset Railroad

JOB NO.

14818

SHEET NO.

1 OF 1

HOLE NO.

D-66

SITE

Van De Mark

COORDINATES

N 1,160,859 E 468,567

ANGLE FROM HORIZ.

90°

BEARING

BEGIN

10/26/81

COMPLETED

10/27/81

DRILLER

J. Genovese/Empire

DRILL MAKE AND MODEL

CME 45B

HOLE SIZE (INCHES)

NX/5-7/8

OVERBURDEN (FT.)

11.0

ROCK (FT.)

24.5

TOTAL DEPTH (FT.)

35.5

CORE RECOVERY (FT./%)

23.5/86

CORE BOXES

2

SAMPLES

EL. TOP OF CASING (FT.)

466.33

GROUND EL. (FT.)

464.4

DEPTH/EL. GROUND WATER (FT.)

25.6/438.8

DEPTH/EL. TOP OF ROCK (FT.)

11.0/453.4

SAMPLE HAMMER WEIGHT/FALL

CASING LEFT IN HOLE: DIA./LENGTH

LOGGED BY:

C. F. Wall

SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE	SAMPLER CORE RUN LENGTH	SAMPLER RECOVERY	SAMPLER BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
						1ST 6"	2ND 6"	3RD 6"							
									464.4						
						RQD	Z						0'-11.0'		Drilling with NX split-tube core barrel to 35.5 ft.
													Residual Soil		Reamed with 5-7/8 roller-rock bit to 38.0 ft.
															Installed 3" flush joint casing to 13.0 ft.
NX	3.8	2.3		61		0	0								
									453.4				11.0'-31.7' GRIMSBY FM. SANDSTONE and interbedded SHALE: dk. reddish brown to pale green, v. hard to med. hard (sds) and mod. hard to v. soft (shale), fresh to completely weathered, fossiliferous, banded, fine grained to microcrystalline.		
3" CASING															
NX	3.6	3.5		97		2.0	56						Bed. Sep. @13.1,13.3, 13.4, 13.6, 16.9, 17.4, 17.6, 17.7, 18.2, 20.0, 20.1, 20.2, 31.1, 31.7 (weathering staining)		
													Vertical joints @ 31.1-32.9 (rough surface, uneven, no staining), 34.3-34.8 (uneven, rough surface, no staining, 2 joints), 35.25-35.35 (gray clay filled).		
NX	10.0	7.7		77		6.4	64								
END BOX 1															
NX	9.9	10.0		101		4.0	40		432.7				31.7'-35.5' SHALE w/interbedded limestone & calcareous SANDSTONE: dk. reddish brown to grayish green, v. hard to med. hard, sl. to severely weathered.		Boring completed at 35.5 ft.
															Completed as observation well. See well completion report for construction details.

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE 428.9

Van De Mark

HOLE NO

D-66



BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		ANGLE FROM HORIZ.		BEARING				
Van De Mark				N 1,160,874 E 468,575		90°		--				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FT.)				
10/25/81	10/26/81	M. Gaudy/Empire	CME 45B		NX/6	9.5	90.5	100.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)		DEPTH/EL. TOP OF ROCK (FT.)				
82.8/93		6	1	465.91	462.9	50.1/412.8		9.5/453.4				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:								
140#/30"		—		J. C. Isham/S. Balone/D. Middleton								
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH (CORE RUN)	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 8"	2ND 8"	3RD 8"						
SS	24"	4"	7	3	3	4	462.9					
SS	24"	4"	10	4	5'	5						
SS	24"	5"	10	2	4	6		5				
SS	24"	4"	35	7	27	8						
SS	24"		120+	47	70	50/0"	453.4					
			REC.	RQD%				10				
NX	2.5'	1.0	40	18								
NX CASING												
NX	5.0	4.85	97	44	Packer Test #8			15				
					1.27 x 10 ⁻⁶ cm/sec							
NX	1.2'	1.2'	100	86				20				
NX	6.9'	6.85	99	91								
END BOX 1					Packer Test #7			25				
					3.7 x 10 ⁻⁶ cm/sec							
NX	10.0	9.81	98	57				30				
								35				
SS = SPLIT SPOON; ST = SHELBY TUBE; SITE												HOLE NO.
D = DENNISON; P = PITCHER; O = OTHER												D-67
Van De Mark												

BORING LOG

PROJECT

Somerset Railroad

498 29

14818

QUEST NO.

2 OF 5

WOLF NO.

D-67

SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLE RECOVERY CORE RECOVERY	SAMPLE BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					1ST "	2ND "	3RD "						
NX	See Sheet 1.							427.9				27.9'-46.4' POWER GLEN FM. (cont.) 30.1-30.45: red-brn. laminated SHALE, med. soft, fresh to slightly weathered. Color change to silver-gray @30.3. Irregular near-horizontal bedding. 30.45' - 3 mm diam. calcite vugs.	
NX END BOX 2	10.0	9.68	97	49	RQD %	Packer Test #6 5.1 x 10 cm/sec			40		R U N 6	30.8'-32.05': similar to 27.9' to 28.5' with thin inter/x-bedded SS. 32.05'-32.5': dark steel-gray soft to med. soft thin-bedded shale w/thin lenses lt. brown to gray f. grained SS, bedding 0°.	
NX	10.0	9.91	99	76		Packer Test #5 1.0 x 10 cm/sec		416.5	45		R U N 7	32.5-33.15': similar to 29.8'-30.1'. 33.15'-42.8': v. similar to 32.05'-32.5', med. soft. Numerous thin interbeds of lt. gray f.-grained SS. Alternates thin-bedded (poker chips) to massive to laminated; where massive, varies to mudstone. Bedding 0° to 3°. SS lenses become thicker, more numerous with depth.	
END BOX 3						Packer Test #4 3.7 x 10 cm/sec			50			42.8'-46.4': Similar to above, but SS here predominated w/thin to med. interbeds of dark steel gray shale & mudstone, locally soft. SS is lt. gray f. grained, hard, locally massive, fresh, v. well indurated, bedding varies 0° to 15°.	
NX	10.0	9.75	98	72				401.9	55		R U N 8	46.4'-61.0' WHIRLPOOL FM: lt. gray-white f. grained sandstone/qtzite., v. hard, v. well indurated, massive but interbedded to 55.2' w/dk. steel gray shale described above. Below 55.2', common shaly laminae 1/32" thick.	
NX END BOX 4	10.0	9.55	96	86		Packer Test #3 3.7 x 10 cm/sec			60		R U N 9	61.0'-100' QUEENSTON FM. 61.0'-61.4': Dark green-gray mudstone, massive, med. soft, fresh to slightly weathered, sharp upper contact. 63.48'-63.7': green shale interbed. 69.0-69.3: green shale interbed. 74.3-74.4: green shale interbed.	
					See page 3			387.9	70			61.4'-100.0': dark red-brown shale and silty shale, med. soft to med. hard, fresh to slightly weathered, thin-bedded @ 0°, clayey zone 61.9'-62.15'. Intermittent thin green shale beds, 79.2-80.05, 80.25-80.58, 83.31-83.73, 84.06-84.23, 93.85-93.95, 94.15-94.7, 97.4-97.5.	

SE = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE
Van De Mark

MOLE NO.
D-67

BORING LOG						PROJECT	WELL NO.	SHEET NO.	HOLE NO.					
						Somerset Railroad	14818	3 OF 5	D-67					
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
					1ST "	2ND "	3RD "							
								387.9						
NX	See Sheet 2.												61.0'-100' WHIRLPOOL FM (cont.) Boring completed to 100'. Boring completed as observation well. See well completion report for construction details.	
NX	10.0	9.78	98		RQD %								Fractures 18.4 0° mod. weath. irregular smooth. 18.43 0° tight thin gray clayey silt coating. 18.52 0° weath. open 1/16", mustard-yellow discoloration, smooth. 18.58-18.68: (4) 0° bedding plane partings, weath., tight, smooth, flat, 1/16" thick shaly layers @ partings. 18.74 0°, tight, hi. weath., mustard-ylw. discoloration. 18.96 0°, open 1/16", hi. weath., gray shaly coating. 19.02: 5°, tight, rough, hi. weath. 19.58: 0°, weath., open 1/16" 19.7: 0°, weath., open > 1/16" 19.71-19.73: (3) 0°, weath., tight, smooth. 21.27': 5°, sli. weath., open 1/16", rough 23.15: 10°, fresh, tight, smooth. 26.03: 0°, fresh, closed, rough. 26.0'-26.4': 90°, fresh, closed. 26.65': 50°, sli. weath., tight, smooth. 26.87: 40°, tight, weath., rough. 27.28: 20°, open < 1/16", weath., rough. 28.0: 5°, sli. weath., open 1/4", irregular 28.56: 0°, fresh, tight to open 1/16". 28.78: 5°, tight, sli. weath. 29.10: 0°, weath., open < 1/16". 29.17: 0°, weath., open < 1/16". 29.30: 0°, closed, sli. weath. 29.84: 20° tight, sli. weath. 29.84-30.2: 90°, fresh, closed. 30.0: 0°, closed, fresh (mech. break). 30.2: 0°, sli. weath., open 1/16". 30.29: 0°, sli. weath., open 1/16" to 1/4". 30.4: 10° weath., open < 1/16". 30.52: 50°, weath., open 1/16" to 1/4". 30.52-30.9: 90°, open < 1/16", calcite coated, sli. weath. 30.9: 0°, fresh, smooth, spun core. 31.0: 35°, tight, fresh, smooth. 31.17: 15°, tight, fresh, smooth. 31.32: 5°, open 1/16"-1/4", fresh, smooth. 32.04: 0°, fresh, tight to open 1/16", smooth. 32.15: 0° fresh, tight to open 1/16", smooth. 32.27: 0°, fresh, tight to open 1/16" smooth. 32.57: 5°, fresh, tight, smooth. 33.09: 0°, fresh, closed, smooth. 33.24: 5°, tight, thin weath. calcite. 33.44: 0°, fresh, closed, smooth. 33.68: 0°, fresh, open 1/16-1/4, smooth.	
END BOX 5														
NX	10.0	8.70	87											
NX	3.6	1.73	38											
END BOX 6														
					B.O.H.	100.0'		362.9	100				Driller reports he left 1.9' of core in hole on last run of hole. Boring reamed to 6" diameter following coring.	

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE
Van De Mark

HOLE NO.
D-67

BECHTEL

BORING LOG							PROJECT		JOB NO.	SHEET NO.	HOLE NO.	
							Somerset Railroad		14818	4 OF 5	D-67	
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLE BLOWS PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 6"	2ND 6"	3RD 6"						
											34.07: 0°, fresh, tight, smooth. 34.41: 0°, fresh, tight, smooth. 34.54: 0°, fresh, open 1/16", smooth. 35.1: 0°, fresh, closed, smooth. 35.23: 0°, fresh, tight, irregular. 35.84: 0°, fresh, tight, smooth. 36.16: 0°, fresh, open 1/16", smooth. 36.52: 0°, fresh, open 1/16". Unless otherwise noted, the following fractures dip 0° to 5° & are tight to open 1/16": 36.62, 36.8, 36.9, 37.1, 37.25, 37.55, 37.8, 37.95, 38.15, 38.3, 38.5, 38.85, 39.0, 39.15, 39.63, 39.7, 39.9, 40.27, 40.4, 40.95, 41.4, 41.47, 41.6, 41.9, 42.13: 0°, 1/4" clay and shale frag's. 42.33, 42.53, 42.6: 1/2" shale frag's., 0°. 42.85, 43.82, 44.0, 44.35, 44.5, 45.35, 45.9, 47.65, 47.93. 47.93 to 48.88: 90°, tight, ylw. weathering, 48.88, 48.95, 49.10, 49.78, 50.23, 51.14, 51.52, 52.5, 52.8, 52.88, 53.07, 53.1-53.4: 90°, closed. 53.25, 53.55, 53.67, 54.20, 54.78, 54.8, 55.14. 55.34: < 1/4" clay & shale frag's., 0° 55.98, 56.32.	

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER	SITE	Van De Mark	HOLE NO.	D-67
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BORING LOG							PROJECT	JOB NO.	SHEET NO.	MOLE NO.				
							Somerset Railroad	14818	5 of 5	D-67				
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS "N"	PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
					1ST 6"	2ND 6"	3RD 6"							
													Unless noted otherwise, all fractures listed below are near horizontal, tight, and fresh. 56.55, 57.3, 57.55, 58.06, 58.1, 60.1, 61.0, 61.23, 61.3 (crushed zone from coring to 61.4), 61.54, 61.9, 62.12: 0°, 2" zone of clay & weathered shale, 62.45, 62.74. 62.83 to 62.92: 0°, crushed zone from drilling. 63.14: 20°, tight. 63.19-63.3: crushed from coring, 63.48. 64.1: 20°, tight. 64.48: 30°, tight. 64.89: 10°, tight, shale partings. 65.21: 0°, 1/2" clay seam. 65.68: irregular fract., w/crushed frag's. 65.9, 66.07, 66.5, 67.02, 67.07, 67.07-67.17 - zone of crushed frag's. from coring 67.65, 67.7, 67.73, 68.02 - zone of crushed core 1/4" thick 68.45, 68.52, 69.3, 74.62 (mechanical), 75.05, 75.58, 76.44, 76.6: 40°, fresh, poor fit. 76.72, 77.3, 77.53, 77.61, 77.7, 77.86, 77.99, 78.12, 78.32, 78.33, 78.45, 78.58, 78.81. 78.96: 45°, fresh, poor fit. 79.1: 30°, fresh. 79.25-79.3: 1/2" zone of crushed core. 79.49: 50°, fresh. 79.78, 79.92, 81.15, 81.54, 82.32, 82.63, 84.23, 84.25, 84.43, 84.52, 84.65, 84.86, 85.1, 85.21, 85.28, 85.41, 85.51, 86.1, 87.64, 87.76, 87.99. 88.27: 40°, tight. 88.52, 88.68, 89.31, 89.5, 89.45: 30°, tight. 90.4: 0°, crushed core, poor fit. 90.63: 20°, tight. 91.2: 15°, tight. 91.8, 91.95, 92.1, 92.13, 92.79, 92.94, 93.05, 94.11.	

SS = SPLIT SPOON; ST = SHELLEY TUBE; D = DENNISON; P = PITCHER; O = OTHER	SITE Van De Mark	MOLE NO. D-67
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BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.						
SITE				COORDINATES		ANGLE FROM HORIZ.		BEARING						
Van De Mark				N 1,160,838 E 468,555		90°		---						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FT.)						
10/24/81	10/26/81	S. Gaudy/Empire	CME 45B		NX/3	10.0	44.2	54.2						
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)	DEPTH/EL. TOP OF ROCK (FT.)							
39.8/97		3	7	467.55	465.2	47.4/417.8	10.0/455.2							
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:										
140#/30"		---		J. C. Isham/C. F. Wall										
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE	LENGTH CORE RUN	CORE RECOVERY	SAMPLE BLOWS	PENETRATION BLOWS				ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					1st	2nd	3rd	4th						
SS	2"	2.0'	2.0'	10	1	3	4	6	465.2			1	0.0'-10.0' Fill. Dk. reddish brown, mixture of gravel, clay & black plastic industrial waste.	8" PVC surface casing installed to a depth of 12.5 ft. Water used as a drilling fluid.
SS	2"	2.0'	0	5	3	2	2	3				2		
SS	2"	2.0'	1.0'	6	2	3	2	4				3		
SS	2"	2.0'	1.5'	58	40	10	41	17				4		
SS	2"	2.0'		143	57	42	53	90				5		
SS	2"	1.3'		150	23	50	100/4"		455.2	10		6	Top of weathered rock.	
SS	10"	.5'	0			104/6						7	Top of unweathered rock.	
NX	3.4	3.4	100		RQD %	32						1	10.0'-29.0' GRIMSBY FM. Banded & mottled dark reddish brown & pale green interbedded hard sandstone & soft shale. Horizontal fractures: 13.7, 13.75, 13.8, 14.15, 14.25, 14.5, 14.55, 14.8, some with FeO stains. Fracture zone 15.1-15.35. Vertical fracture 15.7-16.4. Horizontal fractures: 16.45, 16.5, 16.6, 16.9, 17.5, 17.6, 17.7, 17.75, 18.7, 18.8, 18.85, 19.3, 20.05, 20.3, 20.4, some with FeO stains. Vertical fracture 18.85-19.3, FeO. Horizontal frac. 20.55, 20.65, 21.2-21.4, 21.9-22.0, 21.3, 22.15, 22.6, 23.0, 23.4, 23.75. Vert. frac. 20.65-21.2. Basal GRIMSBY FM. 21.45-29.0.	
NX	1.6	1.6	100			36						3	Horizontal fractures: 26.95, 27.05. Shale bed 28-28.25.	
END BOX 1									436.2			4	29.0'-52.4' POWER GLEN FM. banded & mottled dark reddish brown, pale green & gray, interbedded sandstone and shale, 30° fracture at 33.5. Horizontal fractures: 30.7, 31.1, 31.5 to 32.2, 32.05, 33.0, 33.35, 34.05, 34.75.	
NX	8.6	7.85	91			58			430.2	35				

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE
Van De Mark

HOLE NO.
D-68A



BORING LOG						PROJECT	JOB NO.	SHEET NO.	HOLE NO.			
						Somerset Railroad	14818	2 OF 2	D-68A			
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORRECTION	SAMPLE RECOVERY CORRECTION	SAMPLE BLOWS "N"	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-PT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 8"	2ND 8"	3RD 8"						
							430.2					
NX	5.0	5.0	110	RQD % 18						R U N 5	29.0'-52.4' POWER GLEN FM. (cont.) Vert. joints 30.4-30.9, 31.4-31.8, 32.3-32.5, 34.9-35.5. 35.5-52.4: interbedded LS, SH, calc. SS, med. soft to med. hard, med. to dark gray, slightly to moderately weathered.	
NX	5.0	4.7	96	36				40		R U N 6	Horiz. joints: 36.5, 39.4. Vert. joints: 37.9-38.1, 39.8-40.0, 51.2-51.4.	
END BOX 2								45		R U N 7		
NX	4.4	4.95	113	85								
								50		R U N 8		
NX	5.0	5.0	100	69			412.8				52.4'-54.2' WHIRLPOOL FM. SANDSTONE, lt. gray to white, very hard, fresh to sli. weath., f. grained, occ. shale partings. Vert. fract.: 52.8- 53.1, 53.5-54.0.	
END BOX 3							411.0		55		Bottom of boring: 54.2 ft. Boring completed as observation well. See well completion report for construction details.	Boring reamed to 6" diam. to 58.0'.

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE
Van De Mark

HOLE NO.
D-68A



BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14818	1 OF 1	D-69				
Norton				N 1,160,836 E 468,601		ANGLE FROM HORIZ. BEARING						
						90°						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FT.)					
10/28/81	10/28/81	J. Genovese/Empire	CME 45B	6	12.7	3.7	16.4					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)	DEPTH/EL. TOP OF ROCK (FT.)					
3.7/74		1	1	466.11	464.4	5.8/458.6	12.7/451.7					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:								
140#/30"				C. F. Wall								
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH (INCHES)	SAMPLER RECOVERY CORE RECOVERY (%)	SAMPLER BLOWS N. PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH (FT.)	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				1ST 6"	2ND 6"	3RD 6"						
							464.4	0				
2" SS	2	0.6	12	6	7	5/4				1	0'-12.7'	Drilling with 5" ID hollow-stem augers to 11.4 Drilling with NX split-tube core barrel to 16.4'.  Reaming w/5-7/8 roller-rock bit to 18.0'.
SS	2	0.9	10	2	3	7/9				2	Fill: tan to br. to bl. to creme silty CLAY and clayey SAND and plastic, metal fibers, loose to med. dense to v. dense, wet, tr. gravel, occasional orange staining.	
SS	2	0.7	8	6	4	4/2		5		3		
SS	2	0	12	5	2	10/12				4		
SS	2	0.9	52	50	37	15/30		10		5		
SS	1.4	0.7	70	14	24	46/.4				6		
				RDQ	Z		451.7			R	12.7'-16.4' GRIMSBY FM. SANDSTONE w/interbedded SHALE: dk. reddish brown to pale green, v. hard to med. hard to soft, sl. to completely weathered, fine-grained.	
NX	5.0	3.7	74	0	0			15		U	Bed. Sep. @ 13.2 (clay), 13.7 (sl. orange stain.), 13.9 (tr. clay), 14.1 (0.01 clay), 14.3 (0.01 clay), 14.5 (blueish-yellowish green clay 0.05' thick), 14.9 (0.04' same as @ 14.5) 16.0-16.1 (shale bed w/yellow-green clay coating). Vertical joint @ 12.8-13.2 (rough surface, v. sl. orange staining), 14.9-15.0 (rough surface, no staining).	
							448.0'			N		
								20			Bottom of boring @ 16.4 ft. Boring completed as observation well See well completion report for construction details.	

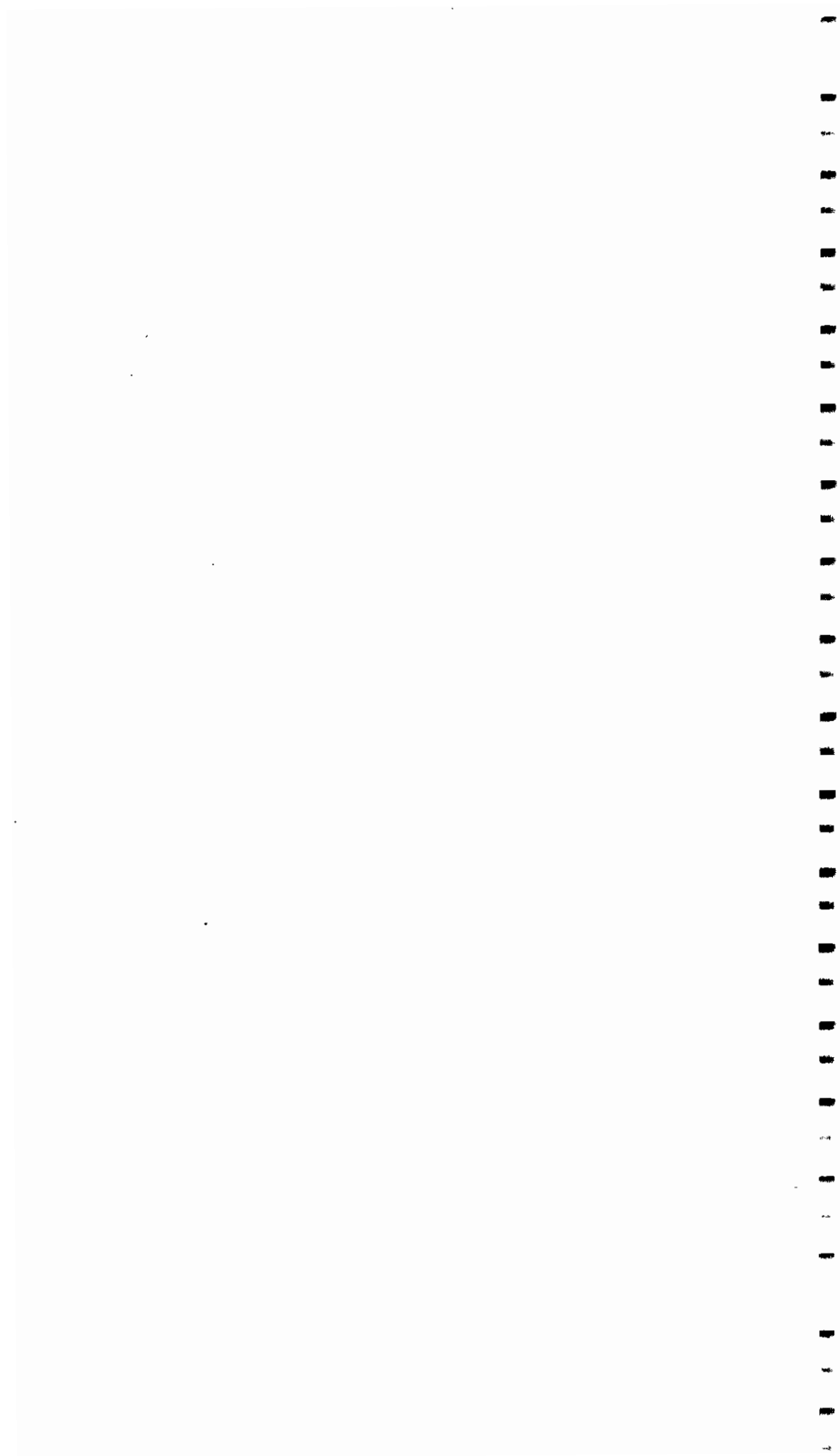
SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE Norton

HOLE NO. D-69



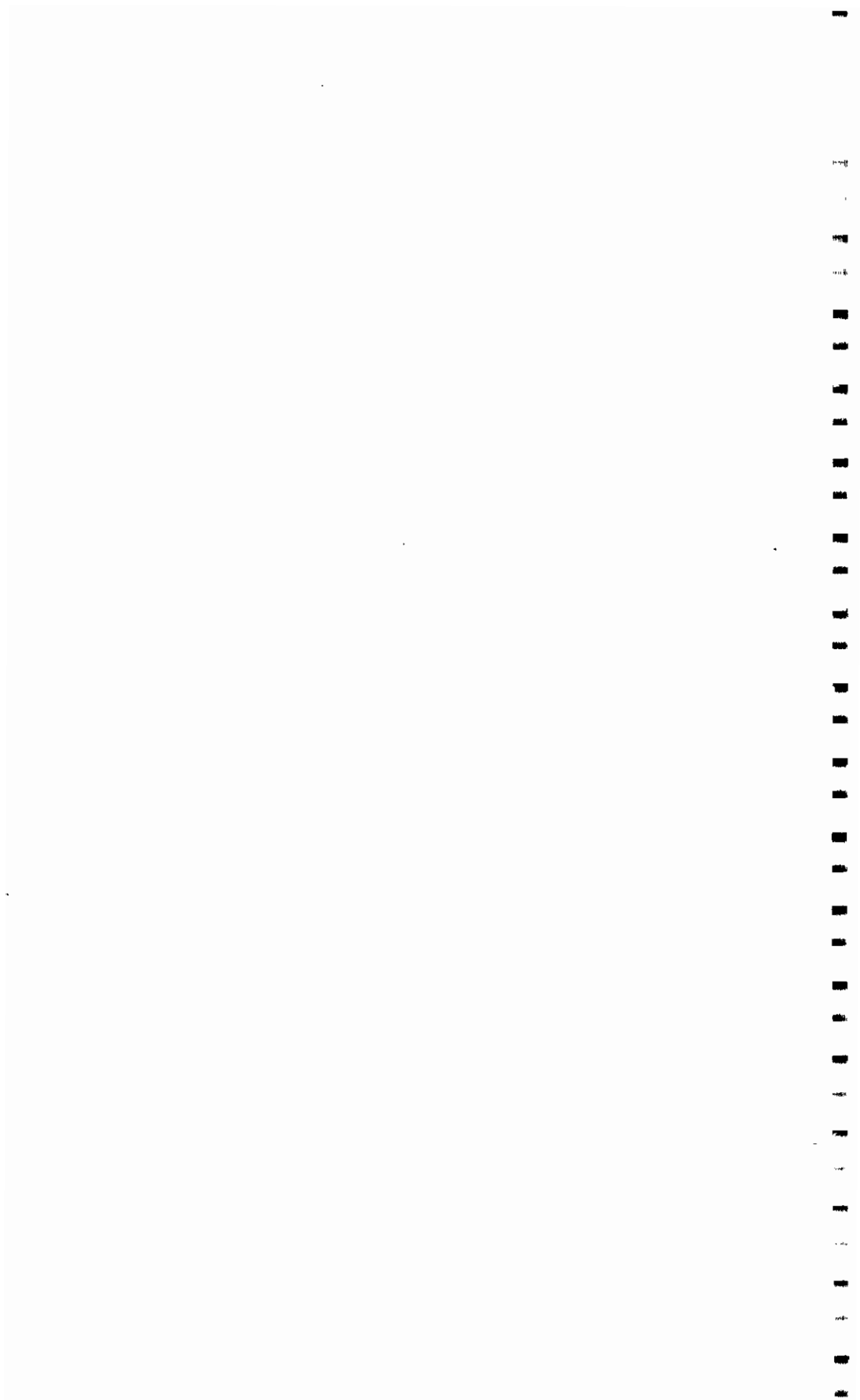
BORING LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.							
SITE				COORDINATES		ANGLE FROM HORIZ.		BEARING							
Norton				N 1,160,737 E 468,896		90°		—							
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		HOLE SIZE (INCHES)	OVERBURDEN (FT.)	ROCK (FT.)	TOTAL DEPTH (FT.)							
10/28/81	10/29/81	Empire	CME 45B		6	14.0	5.0	19.0							
CORE RECOVERY (FT./IN)		CORE BOXES	SAMPLES	EL. TOP OF CASING (FT.)	GROUND EL. (FT.)	DEPTH/EL. GROUND WATER (FT.)	DEPTH/EL. TOP OF ROCK (FT.)								
3.9/78		1	7	468.10	466.3	6.7/459.6	14/452.3								
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:									
140#/30"			—			C. F. Wall/D. Middleton									
SAMPLER TYPE AND DIAMETER	SAMPLER ADVANCE LENGTH CORE RUN	SAMPLER RECOVERY CORE RECOVERY	SAMPLER BLOWS PERCENT CORE RECOVERY	PENETRATION BLOWS			ELEVATION (FT.)	DEPTH-FT	UNIFIED SOIL CLASSIFICATION	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.			
				1ST"	2ND"	3RD"									
2"	SS	2	0.7	10	1	3	7/4	466.3			1	0'-14'	Drilling with 5" ID hollow-stem augers to 6.9 ft.		
	SS	2	0.2	6	3	3	3/4				2	Fill: dk. reddish brown, loose, moist, v. fine clayey SAND and plastic, metal, carbon rods, tr. med. sand			
	SS	2	1.0	40	5	10	30/40		5		3				
	SS	0.9	0.1	—	20	100/4	—				4				
	SS	2.0	0.8	8	4	4	4/7		10		5				
	SS	2.0	0.9	29	17	15	14/70				6				
	SS	1.5	0.9	79	19	29	50	452.3			7	Top of rock.			
	NX	5.0'	3.9	78	RQD 1.05 21%			447.3	15		R U N 1	14.0'-19.0' GRIMSBY FM. Dark red-brown to pale green, fresh to severely weathered, fine grained to microcrystalline, interbedded SANDSTONE, SILTSTONE, and SHALE, shale completely weathered to clay.	Ream with 6" roller rock bit to 19.4'.		
									20			Bottom of boring @ 19.0.			
												Boring completed as observation well.			
												See well completion reports for construction details.			
									25						
									30						
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER												SITE		HOLE NO.	
Norton												D-70			



APPENDIX B

GROUND WATER OBSERVATION WELL REPORTS

WELLS D-7 AND D-49 THROUGH D-70



GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>		Page <u>1</u> of <u>23</u>
LOCATION <u>N1,161,003 E468.422</u>		Well No. <u>D-49</u>
Date Completed <u>10/30/81</u> Original Depth <u>58'</u>		Aquifer <u>Power Glen</u>
Inspected By <u>D. L. Middleton</u> Date <u>10/30/81</u>		Whirlpool Contact
Checked By _____ Date _____		Elev. Interval <u>408.45-428.75</u>

Ground
Elevation 459.8

Grimsby-Power
Glen Contact
437.75
422.1

Power Glen-
Whirlpool Contact
414.65

Elevation of top of surface casing / riser pipe. 461.95/461.90

Height of top of surface casing / riser pipe above ground surface. 2.2/2.15

Depth of surface seal below ground surface 27.5'

Type of surface seal: Cement

I.D. of surface casing. 4"

Type of surface casing: Cast iron
with lock cap

Depth of surface casing below ground 3'

I.D. of riser pipe. 2"

Type of riser pipe: Sch 40 PVC

Diameter of borehole 6"

Depth of borehole 51.3'

Type of backfill: Cement

Elev./depth top of seal. 432.3/27.5'

Type of seal: Bentonite

Elev./depth bottom of seal. 428.8/31'

Type of sand pack: Q-02 (fine to med. sand)

Depth of top of sand pack. 31'

Elev./depth top of screened section. 418.8/41.0'

Type of screened section: Sch 40 PVC

Describe openings: 0.010" machine
slot - horizontal slot

I.D. of screened section. 2"

Elev./depth bottom of screened section. 409.5/50.3'

Length of blank section. 1'

Elev./depth bottom of plugged blank section. 408.5/51.3'

Elev./depth bottom of sand column. 408.5/51.3'

Type of backfill below observation pipe. N/A

Elev./depth of hole. 408.5/51.3'

GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>	Page <u>2</u> of <u>23</u>
LOCATION <u>N1,160,983</u> <u>E468.415</u>	Well No. <u>D-50</u>
Date Completed <u>10/23/81</u> Original Depth <u>91.0'</u>	Aquifer <u>Whirlpool -</u>
Inspected By <u>D. L. Middleton</u> Date <u>10/23/81</u>	Queenston Contact
Checked By _____ Date _____	Elev. Interval <u>369.8-410.3</u>

Generalized Stratigraphy and Water Level		Elevation of top of surface casing / riser pipe. 462.9/462.69 Height of top of surface casing / riser pipe above ground surface. 2.1/1.97' Depth of surface seal below ground surface 46.10 Type of surface seal: <u>Cement</u> I.D. of surface casing. 4" Type of surface casing: <u>Cast iron with lock cap</u> Depth of surface casing below ground 3' I.D. of riser pipe. 2" Type of riser pipe: <u>Sch 40 PVC</u> Diameter of borehole 6" Depth of borehole 91.0' Type of backfill: <u>Cement</u> Elev./depth top of seal. 414.7/46.10' Type of seal: <u>Bentonite</u> Elev./depth bottom of seal. 410.3/50.5' Type of sand pack. <u>Q-02 (fine to med. sand)</u> Depth of top of sand pack. 410.3/50.5' Elev./depth top of screened section. 402/58.8' Type of screened section: <u>Sch 40 PVC</u> Describe openings <u>0.010" machine slot - horizontal slot</u> I.D. of screened section. 2" Elev./depth bottom of screened section. 373.2/87.6' Length of blank section. 1' Elev./depth bottom of plugged blank section. 372.2/88.6' Elev./depth bottom of sand column. 372.2/88.6' Type of backfill below observation pipe. <u>Cuttings</u> Elev./depth of hole. 369.8/91.0'
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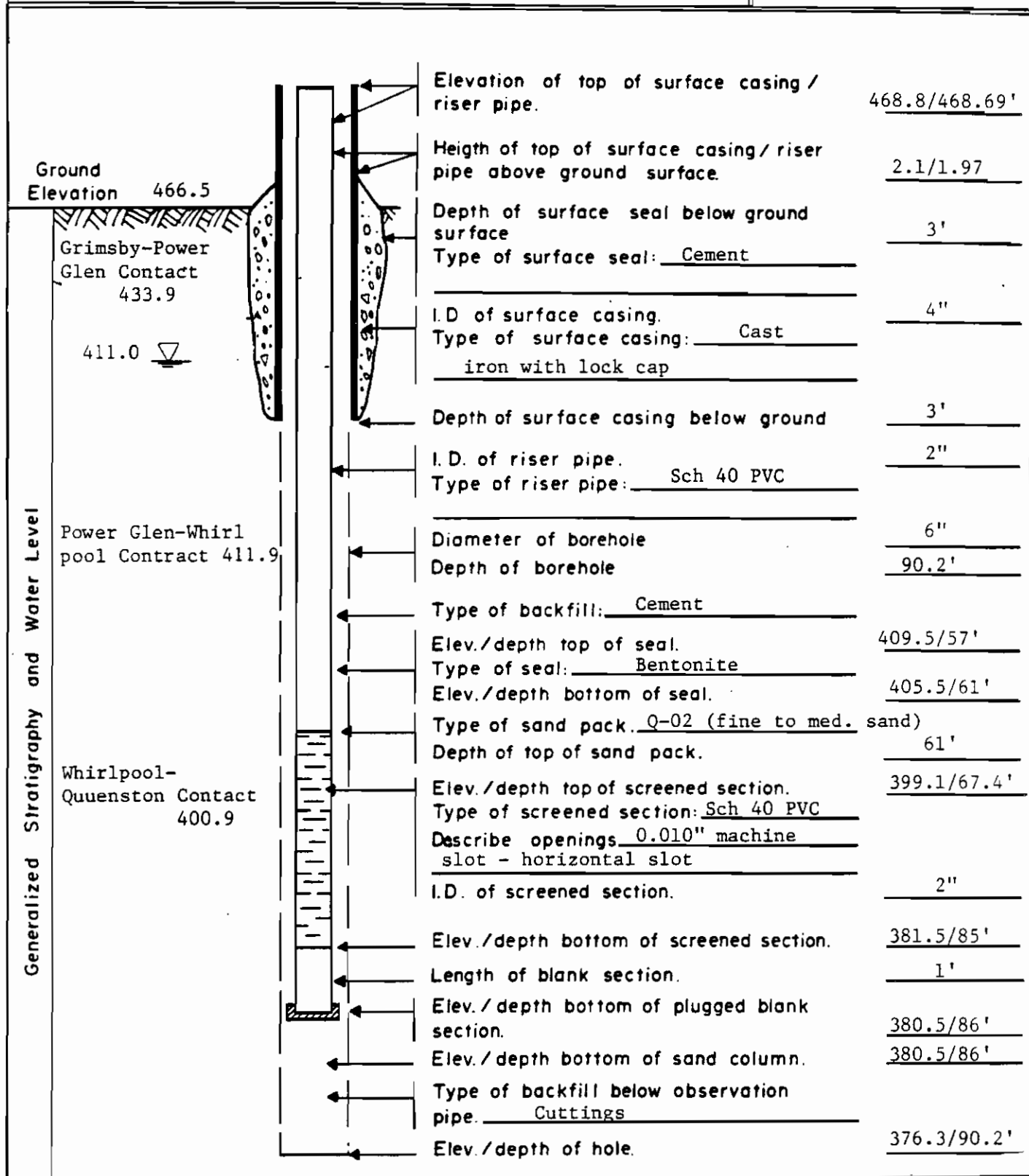
GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>	Page <u>3</u> of <u>23</u>
LOCATION <u>N1,161,001 E468,399</u>	Well No. <u>D-51</u>
Date Completed <u>10/27/81</u> Original Depth <u>43.3'</u>	Aquifer <u>Grimsby/</u>
Inspected By <u>R. L. Blodnikar</u> Date <u>10/27/81</u>	Power Glen Contact
Checked By _____ Date _____	Elev. Interval <u>416.2-444.75</u>

Generalized Stratigraphy and Water Level		Elevation of top of surface casing / riser pipe. <u>462/461.77'</u>
	Height of top of surface casing / riser pipe above ground surface. <u>2.5' / 2.27</u>	
	Depth of surface seal below ground surface <u>11.75</u>	
	Type of surface seal: <u>Cement</u>	
	I.D. of surface casing. <u>4"</u>	
	Type of surface casing: <u>Cast iron with lock cap</u>	
	Depth of surface casing below ground <u>3'</u>	
	I.D. of riser pipe. <u>2"</u>	
	Type of riser pipe: <u>Sch 40 PVC</u>	
	Diameter of borehole <u>6"</u>	
	Depth of borehole <u>41'</u>	
	Type of backfill: <u>Cement</u>	
	Elev./depth top of seal. <u>447.75/11.75'</u>	
	Type of seal: <u>Bentonite</u>	
	Elev./depth bottom of seal. <u>444.75/14.75'</u>	
Type of sand pack. <u>Q-02 (fine to med. sand)</u>		
Depth of top of sand pack. <u>14.75'</u>		
Elev./depth top of screened section. <u>437.22/22.28'</u>		
Type of screened section: <u>Sch 40 PVC</u>		
Describe openings. <u>0.010 machine slot-horizonal slot</u>		
I.D. of screened section. <u>2"</u>		
Elev./depth bottom of screened section. <u>419.5/40'</u>		
Length of blank section. <u>1'</u>		
Elev./depth bottom of plugged blank section. <u>418.5/41'</u>		
Elev./depth bottom of sand column. <u>418.5/41'</u>		
Type of backfill below observation pipe. <u>Cuttings</u>		
Elev./depth of hole. <u>416.2/43.3'</u>		

GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>	Page <u>4</u> of <u>23</u>
LOCATION <u>N1,160,634</u> <u>E468,308</u>	Well No. <u>D-52</u>
Date Completed <u>10/25/81</u> Original Depth <u>90.2'</u>	Aquifer <u>Whirlpool-</u>
Inspected By <u>D. L. Middleton</u> Date <u>10/25/81</u>	Queenston Contact
Checked By _____ Date _____	Elev. Interval <u>376.3-405.5'</u>



GROUND WATER OBSERVATION WELL REPORT

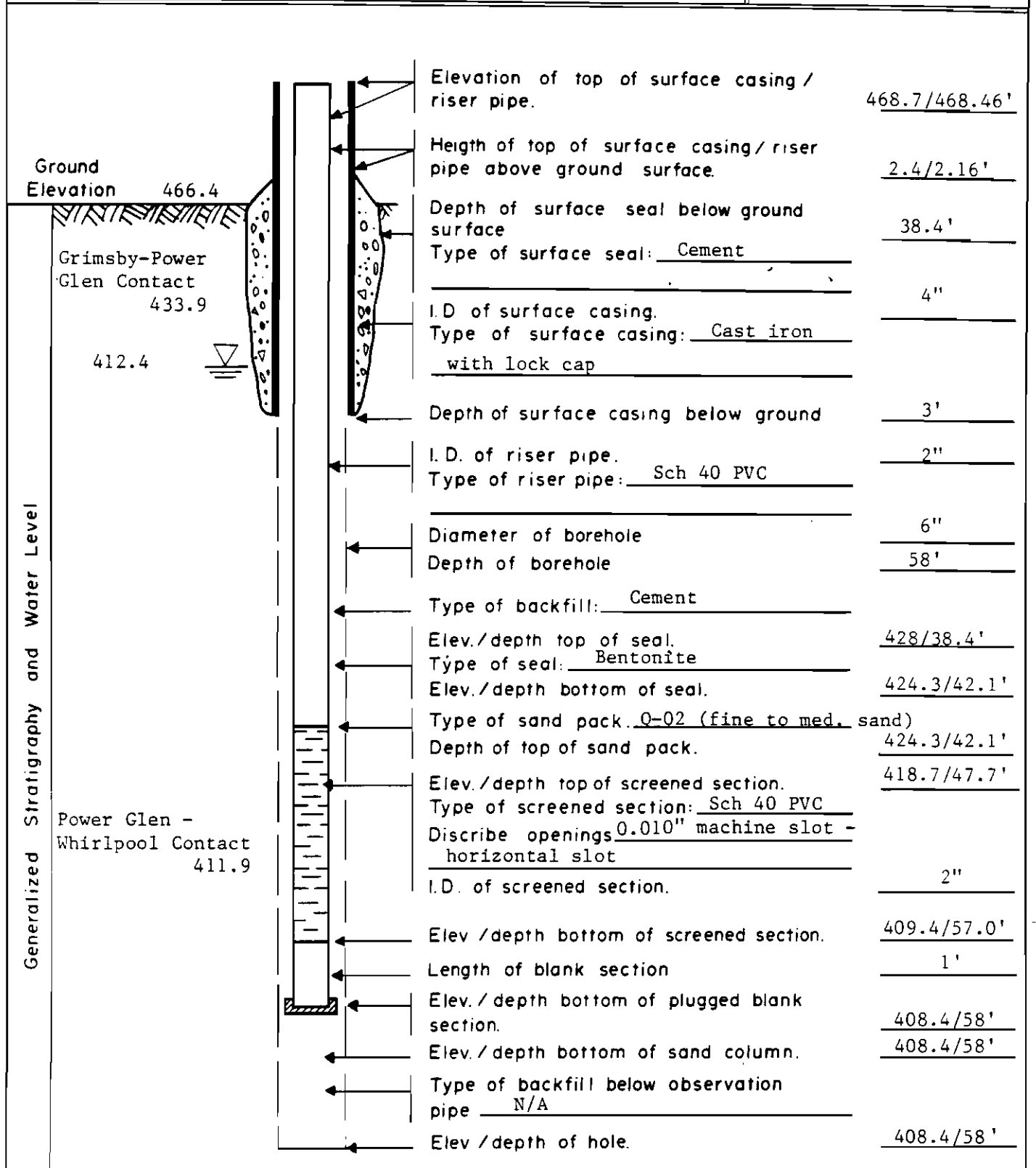
PROJECT <u>Somerset Railroad - Van De Mark</u>		Page <u>5</u> of <u>23</u>
LOCATION <u>N1,160,626 E468,353</u>		Well No. <u>D-53</u>
Date Completed <u>10/20/81</u> Original Depth <u>45.9' (cored)</u>		Aquifer <u>Grimsby-</u>
Inspected By <u>J. C. Isham</u> Date <u>10/20/81</u>		Power Glen Contact
Checked By _____ Date _____		Elev. Interval <u>421.5-442.34'</u>

Generalized Stratigraphy and Water Level

Elevation of top of surface casing / riser pipe.	469.18/469.18'
Height of top of surface casing / riser pipe above ground surface.	2.0' / 2.0'
Depth of surface seal below ground surface	3.0'
Type of surface seal: <u>Cement</u>	
I.D. of surface casing.	4"
Type of surface casing: <u>Cast iron</u> <u>with lock cap</u>	
Depth of surface casing below ground	3.0'
I.D. of riser pipe.	2"
Type of riser pipe: <u>Sch 80 PVC</u>	
Diameter of borehole	0.5'
Depth of borehole	46.0'
Type of backfill: <u>Cement</u>	
Elev./depth top of seal.	445.4/22.0'
Type of seal: <u>Bentonite</u>	
Elev./depth bottom of seal.	442.34/25.06'
Type of sand pack <u>0-02 (fine to med. sand)</u>	
Depth of top of sand pack.	442.34/25.06'
Elev./depth top of screened section.	437.2/30.2'
Type of screened section: <u>Sch 80 PVC</u>	
Describe openings <u>0.010" machine</u> <u>slot - horizontal slot</u>	
I.D. of screened section.	2"
Elev./depth bottom of screened section.	422.8/44.6"
Length of blank section.	1.0'
Elev./depth bottom of plugged blank section.	421.8/45.6
Elev./depth bottom of sand column.	421.8/45.6
Type of backfill below observation pipe. <u>Cuttings</u>	
Elev./depth of hole.	421.5/45.9

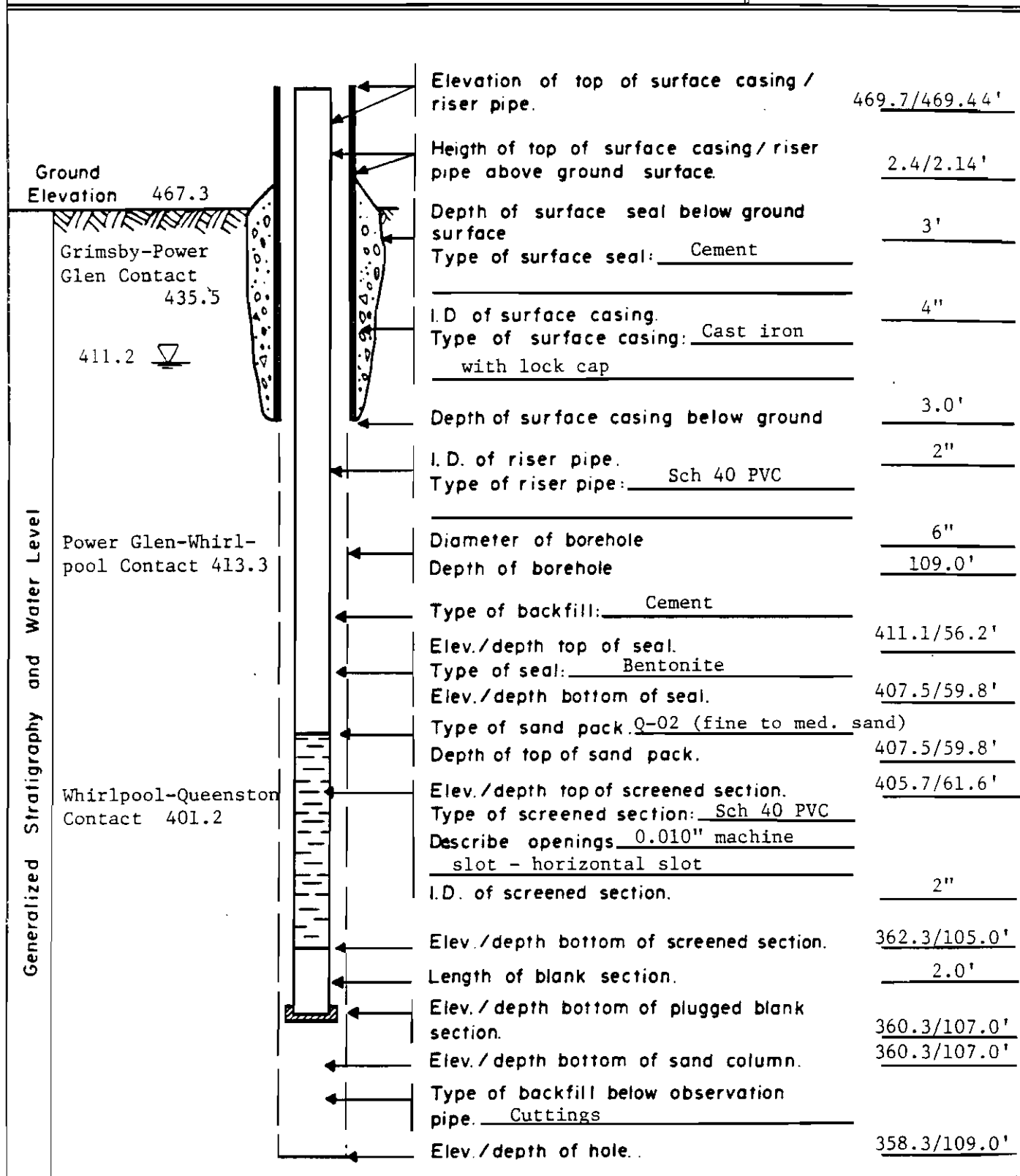
GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>		Page <u>6</u> of <u>23</u>
LOCATION <u>N1,160,660</u>	<u>E468,316</u>	Well No. <u>D-54</u>
Date Completed <u>10/29/81</u>	Original Depth <u>58'</u>	Aquifer <u>Power Glen</u>
Inspected By <u>J. Stone</u>	Date <u>10/29/81</u>	Whirlpool Contact
Checked By _____	Date _____	Elev. Interval <u>408.4-424.3</u>



GROUND WATER OBSERVATION WELL REPORT

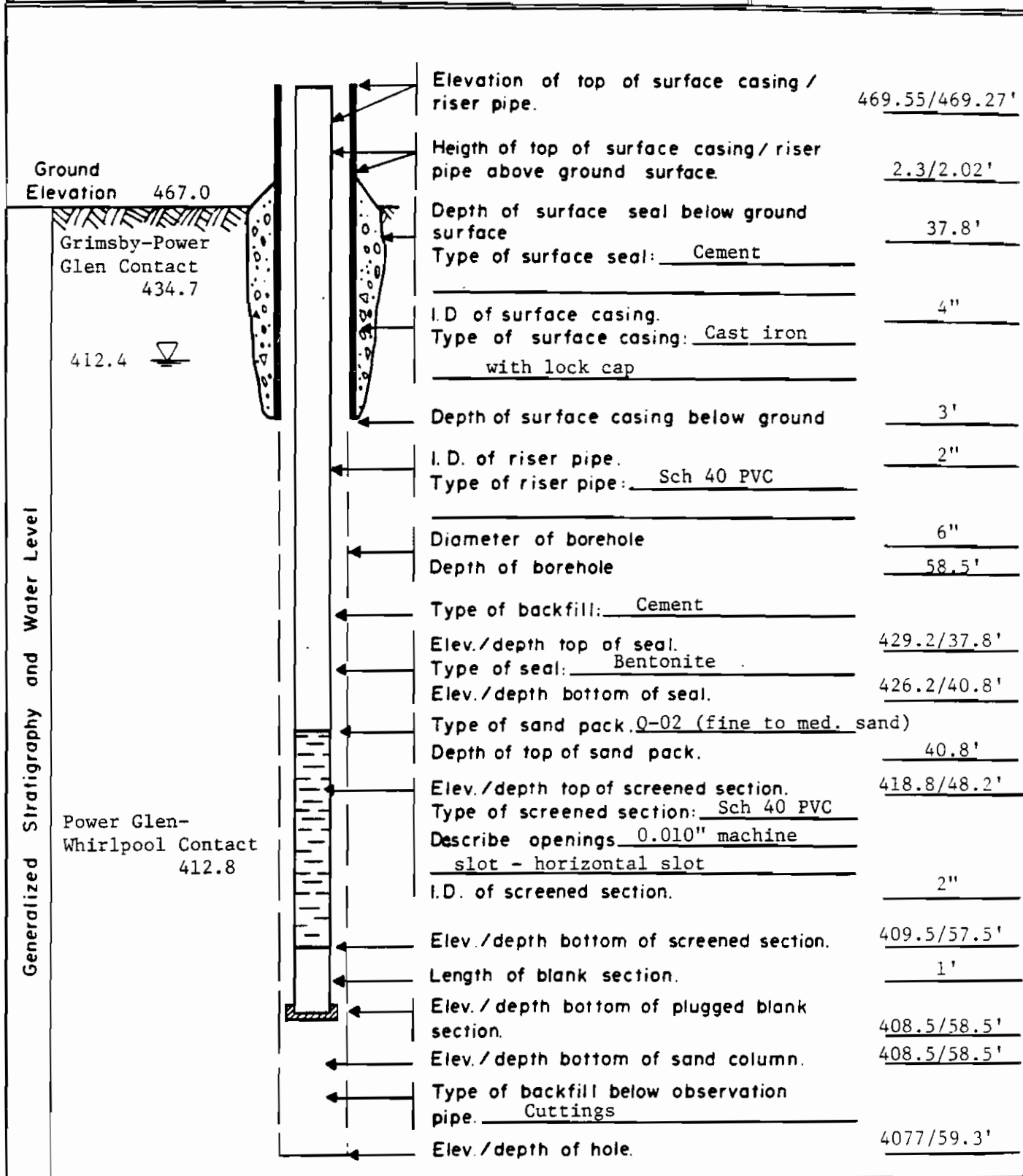
PROJECT <u>Somerset Railroad - Van De Mark</u>	Page <u>8</u> of <u>23</u>
LOCATION <u>N1,160,739 E468.251</u>	Well No. <u>D-56</u>
Date Completed <u>10/28/81</u> Original Depth <u>109.0'</u>	Aquifer <u>Whirlpool -</u>
Inspected By <u>J. C. Isham</u> Date <u>10/28/81</u>	Queenston Contact
Checked By _____ Date _____	Elev. Interval <u>358.3-407.5</u>



Two screened sections: Bottom 105.0-90.6 Top 80.8-61.6

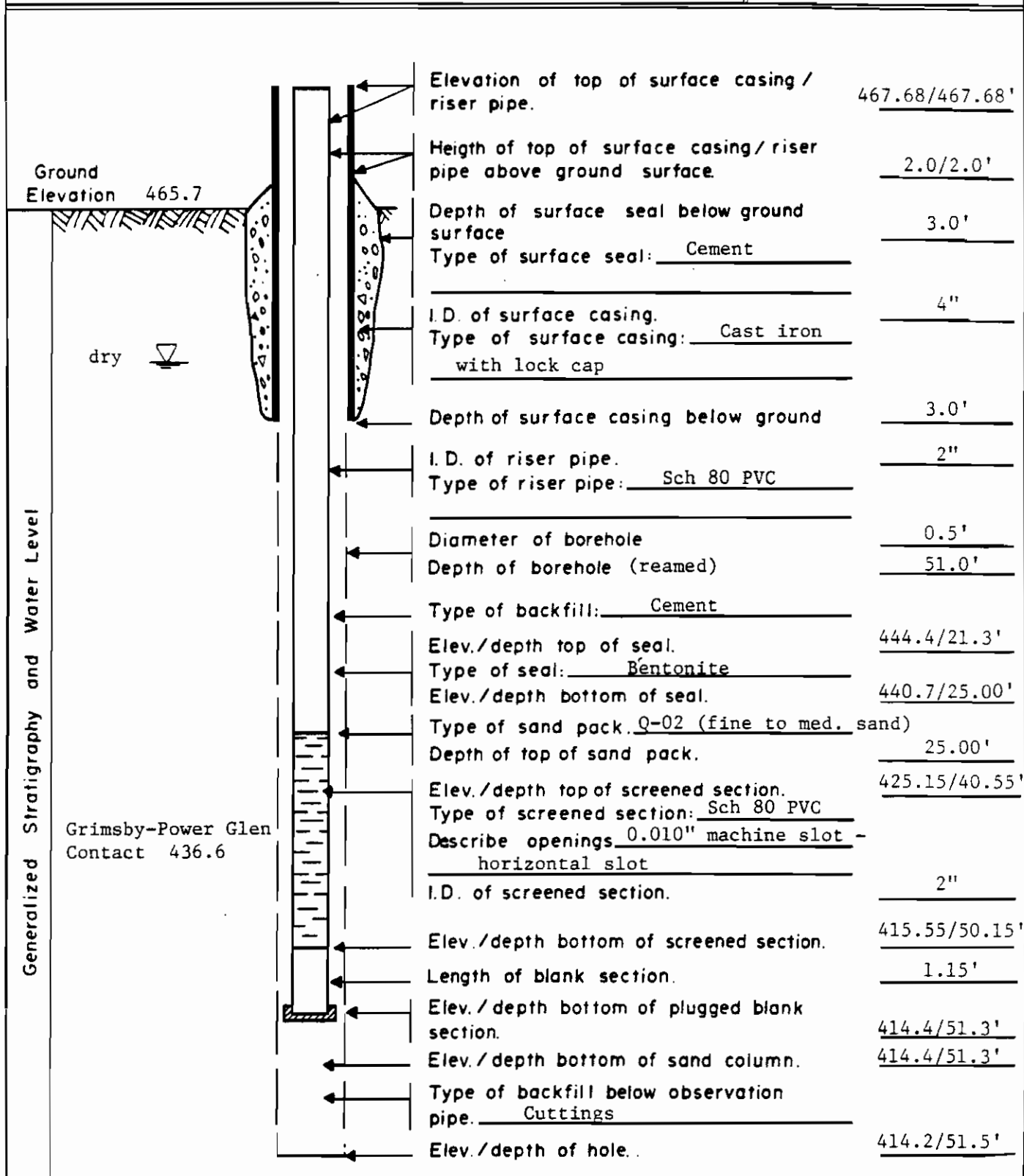
GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>	Page <u>9</u> of <u>23</u>
LOCATION <u>N1,160,739 E468,229</u>	Well No. <u>D-57</u>
Date Completed <u>10/28/81</u> Original Depth <u>59.3 (cored)</u>	Aquifer <u>Power Glen</u>
Inspected By <u>D. L. Middleton</u> Date <u>10/28/81</u>	<u>Whirlpool Contact</u>
Checked By _____ Date _____	Elev. Interval <u>408.0-426.2</u>



GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>	Page <u>10</u> of <u>23</u>
LOCATION <u>N1,160,948 E468,241</u>	Well No. <u>D-58</u>
Date Completed <u>10/20/81</u> Original Depth <u>51.5' (cored)</u>	Aquifer <u>Grimsby-</u>
Inspected By <u>J. C. Isham</u> Date <u>10/20/81</u>	Power Glen Contact
Checked By _____ Date _____	Elev. Interval <u>414.2-440.7'</u>



GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>	Page <u>11</u> of <u>23</u>
LOCATION <u>N1.160.951</u> <u>E468.216</u>	Well No. <u>D-59</u>
Date Completed <u>10/25/81</u> Original Depth <u>100'</u>	Aquifer <u>Whirlpool -</u>
Inspected By <u>D. L. Middleton</u> Date <u>10/25/81</u>	Queenston Contact
Checked By _____ Date _____	Elev. Interval <u>365.0-409.0'</u>

Generalized Stratigraphy and Water Level		Elevation of top of surface casing / riser pipe. <u>467.7/467.25'</u>
	Height of top of surface casing / riser pipe above ground surface. <u>2.7/2.25'</u>	
	Depth of surface seal below ground surface <u>59'</u>	
	Type of surface seal: <u>Cement</u>	
	I.D. of surface casing. <u>4"</u>	
	Type of surface casing: <u>Cast iron with lock cap</u>	
	Depth of surface casing below ground <u>3'</u>	
	I.D. of riser pipe. <u>2"</u>	
	Type of riser pipe: <u>Sch 40 PVC</u>	
	Diameter of borehole <u>6"</u>	
	Depth of borehole <u>100'</u>	
	Type of backfill: <u>Cement</u>	
	Elev./depth top of seal. <u>406.0/59'</u>	
	Type of seal: <u>Bentonite</u>	
	Elev./depth bottom of seal. <u>409.0/56'</u>	
Type of sand pack. <u>Q-02 (fine to med. sand)</u>		
Depth of top of sand pack. <u>409.0/56'</u>		
Elev./depth top of screened section. <u>395.4/69.6'</u>		
Type of screened section: <u>Sch 40 PVC</u>		
Describe openings <u>0.010" machine slot - horizontal slot</u>		
I.D. of screened section. <u>2"</u>		
Elev./depth bottom of screened section. <u>366.0/99'</u>		
Length of blank section. <u>1'</u>		
Elev./depth bottom of plugged blank section. <u>365.0/100'</u>		
Elev./depth bottom of sand column. <u>365.0/100'</u>		
Type of backfill below observation pipe. <u>N/A</u>		
Elev./depth of hole. <u>365.0/100'</u>		

Ground Elevation 465.0

411.4

Grimsby-Power
Glen Contact
438.15

Power Glen-
Whirlpool Contact
415.6

Whirlpool-Queenston
Contact 404.5

GROUND WATER OBSERVATION WELL REPORT

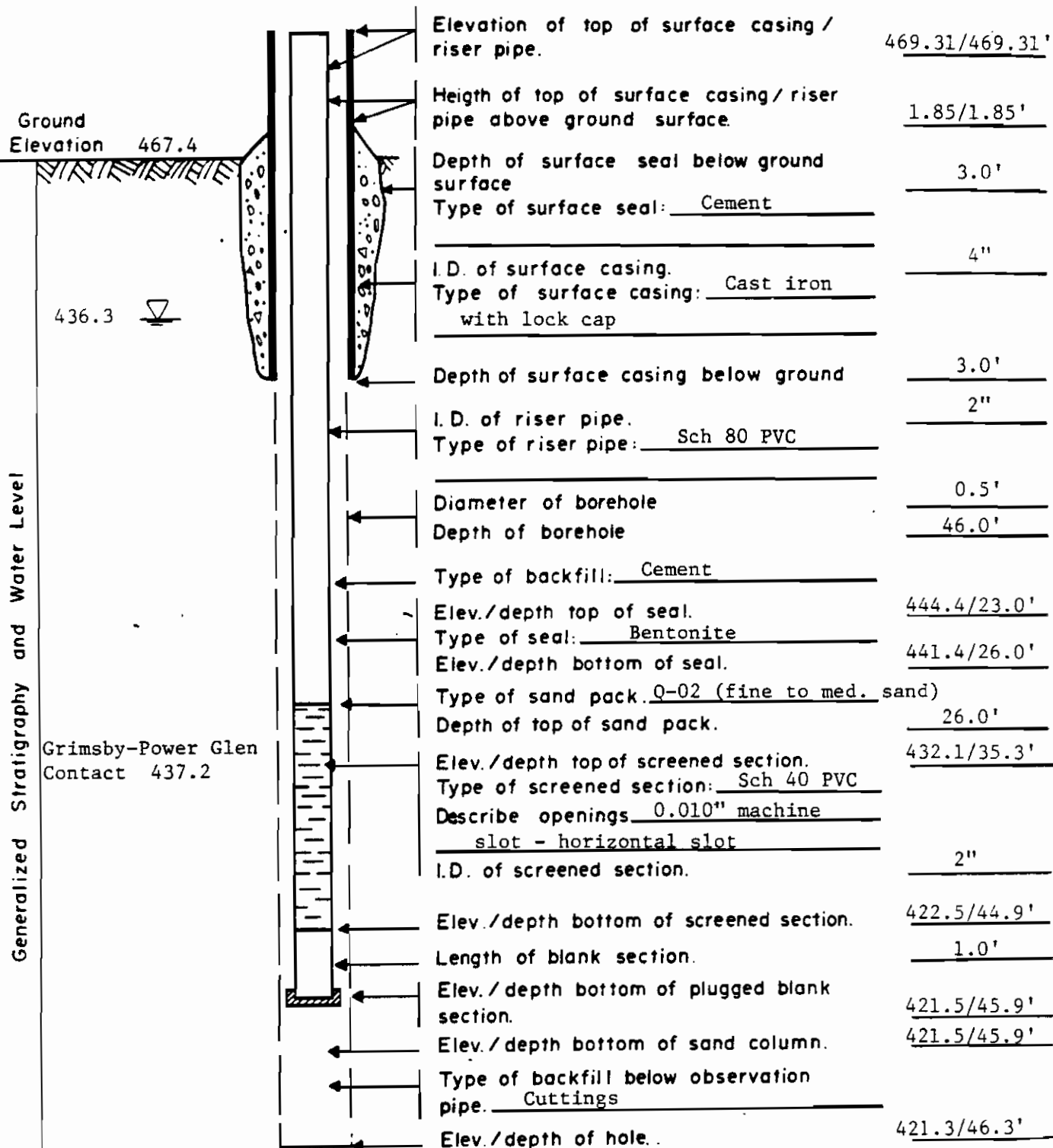
PROJECT <u>Somerset Railroad - Van De Mark</u>	Page <u>12</u> of <u>23</u>
LOCATION <u>N1,160,934</u> <u>E468,227</u>	Well No. <u>D-60</u>
Date Completed <u>10/26/81</u> Original Depth <u>58.0'</u>	Aquifer <u>Power Glen-</u>
Inspected By <u>C. F. Wall</u> Date <u>10/26/81</u>	Whirlpool Contact
Checked By _____ Date _____	Elev. Interval <u>399.8-414.8'</u>

Ground Elevation <u>465.7</u> Grimsby-Power Glen Contact <u>437.5</u> <u>411.6</u> ▽ Power Glen-Whirl- pool Contact <u>415.7</u> Generalized Stratigraphy and Water Level		Elevation of top of surface casing / riser pipe. <u>467.85/467.75</u> Height of top of surface casing / riser pipe above ground surface. <u>2.1/2.0'</u> Depth of surface seal below ground surface <u>39.9'</u> Type of surface seal: <u>Cement</u> I.D. of surface casing. <u>4"</u> Type of surface casing: <u>Cast iron</u> <u>with lock cap</u> Depth of surface casing below ground <u>3'</u> I.D. of riser pipe. <u>2"</u> Type of riser pipe: <u>Sch 40 PVC</u> Diameter of borehole <u>6"</u> Depth of borehole <u>58.0'</u> Type of backfill: <u>Cement</u> Elev./depth top of seal. <u>425.8/39.9'</u> Type of seal: <u>Bentonite</u> Elev./depth bottom of seal. <u>422.7/43.0'</u> Type of sand pack. <u>Q-02 (fine to med. sand)</u> Depth of top of sand pack. <u>43.0'</u> Elev./depth top of screened section. <u>418.4/47.3'</u> Type of screened section: <u>Sch 40 PVC</u> Describe openings <u>0.010" machine</u> <u>slot - horizontal slot</u> I.D. of screened section. <u>2"</u> Elev./depth bottom of screened section. <u>408.9/56.8'</u> Length of blank section. <u>1.2'</u> Elev./depth bottom of plugged blank section. <u>407.7/58.0'</u> Elev./depth bottom of sand column. <u>407.7/58.0'</u> Type of backfill below observation pipe. <u>None</u> Elev./depth of hole. <u>407.7/58.0'</u>
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GROUND WATER OBSERVATION WELL REPORT

PROJECT Somerset Railroad - Van De Mark
 LOCATION N1,160,865 E468,343
 Date Completed 10/23/81 Original Depth 46.0' (cored)
 Inspected By J. C. Isham Date 10/23/81
 Checked By _____ Date _____

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 Well No. D-61
 Aquifer Grimsby-
 Power Glen Contact
 Elev. Interval 421.4-441.4'



GROUND WATER OBSERVATION WELL REPORT

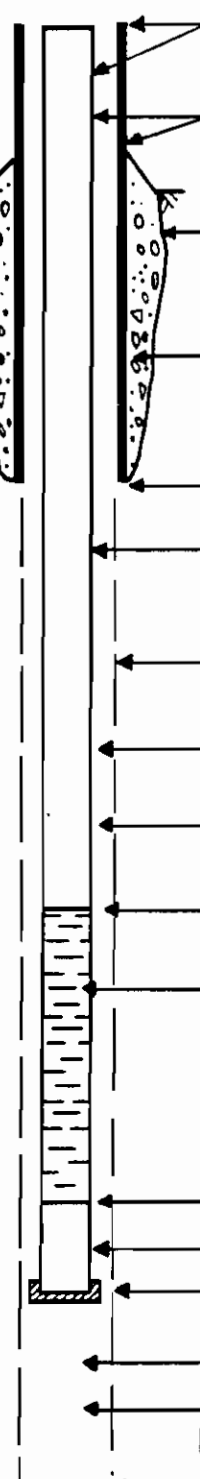
PROJECT <u>Somerset Railroad - Van De Mark</u>		Page <u>14</u> of <u>23</u>
LOCATION <u>N1,160,878 E468,358</u>		Well No. <u>D-62</u>
Date Completed <u>10/29/81</u>	Original Depth <u>59.3'</u>	Aquifer <u>Power Glen</u>
Inspected By <u>D. L. Middleton</u>	Date <u>10/29/81</u>	Whirlpool Contact
Checked By _____	Date _____	Elev. Interval <u>409.7-422.7'</u>

Ground Elevation 469.0

Grimsby Power Glen Contact 438.1

417.3

Power Glen - Whirlpool Contact 414.4



Elevation of top of surface casing / riser pipe.	<u>471.16/471.04'</u>
Height of top of surface casing / riser pipe above ground surface.	<u>2.3/2.18'</u>
Depth of surface seal below ground surface	<u>43.3'</u>
Type of surface seal: <u>Cement</u>	
I.D. of surface casing.	<u>4"</u>
Type of surface casing: <u>Cast iron</u> with lock cap	
Depth of surface casing below ground	<u>3'</u>
I.D. of riser pipe.	<u>2"</u>
Type of riser pipe: <u>Sch 40 PVC</u>	
Diameter of borehole	<u>6"</u>
Depth of borehole	<u>59.1'</u>
Type of backfill: <u>Cement</u>	
Elev./depth top of seal.	<u>425.7/43.3'</u>
Type of seal: <u>Bentonite</u>	
Elev./depth bottom of seal.	<u>422.7/46.3'</u>
Type of sand pack: <u>Q-02 (fine to med. sand)</u>	
Depth of top of sand pack.	<u>46.3'</u>
Elev./depth top of screened section.	<u>420.2/48.8'</u>
Type of screened section: <u>Sch 40 PVC</u>	
Describe openings <u>0.010" machine</u> <u>Slot - horizontal slot</u>	
I.D. of screened section.	<u>2"</u>
Elev./depth bottom of screened section.	<u>410.9/58.1'</u>
Length of blank section.	<u>1'</u>
Elev./depth bottom of plugged blank section.	<u>409.9/59.1'</u>
Elev./depth bottom of sand column.	<u>409.9/59.1'</u>
Type of backfill below observation pipe. <u>Cuttings</u>	
Elev./depth of hole.	<u>408.7/60.3</u>

Generalized Stratigraphy and Water Level

GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>		Page <u>15</u> of <u>23</u>
LOCATION <u>N1.160.674</u> <u>E468.453</u>		Well No. <u>D-63A</u>
Date Completed <u>10/28/81</u>	Original Depth <u>101'</u>	Aquifer <u>Whirlpool-Queenston Contact</u>
Inspected By <u>R. L. Blodnikar</u>	Date <u>10/28/81</u>	Elev. Interval <u>368.6-404.6'</u>
Checked By _____	Date _____	

Generalized Stratigraphy and Water Level		Elevation of top of surface casing / riser pipe. 471.73/471.63' Height of top of surface casing / riser pipe above ground surface. 2.13/2.03' Depth of surface seal below ground surface 61' Type of surface seal: <u>Cement</u> I.D. of surface casing. 4" Type of surface casing: <u>Cast iron with lock cap</u> Depth of surface casing below ground 3.17' I.D. of riser pipe. 2" Type of riser pipe: <u>Sch 40 PVC</u> Diameter of borehole 6" Depth of borehole 101' Type of backfill: <u>Cement</u> Elev./depth top of seal. 400.6/61' Type of seal: <u>Bentonite</u> Elev./depth bottom of seal. 404.6/65' Type of sand pack: <u>Q-02 (fine to med. sand)</u> Depth of top of sand pack. 65' Elev./depth top of screened section. 397.3/72.3' Type of screened section: <u>Sch 80 PVC</u> Describe openings: <u>0.010" machine slot - horizontal slot</u> I.D. of screened section. 2" Elev./depth bottom of screened section. 369.4/100.2' Length of blank section. 0.8' Elev./depth bottom of plugged blank section. 368.6/101' Elev./depth bottom of sand column. 368.6/101' Type of backfill below observation pipe. <u>None</u> Elev./depth of hole. 368.6/101'
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GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>	Page <u>16</u> of <u>23</u>
LOCATION <u>NL.160.713 E468.448</u>	Well No. <u>D-64</u>
Date Completed <u>10/23/81</u> Original Depth <u>47.7'</u>	Aquifer <u>Grimsby-</u>
Inspected By <u>D. L. Middleton</u> Date <u>10/23/81</u>	Power Glen Contact
Checked By _____ Date _____	Elev. Interval <u>421.4-437.1'</u>

Generalized Stratigraphy and Water Level		Elevation of top of surface casing / riser pipe. <u>471.55/471.37'</u>
	Height of top of surface casing / riser pipe above ground surface. <u>2.5/2.32'</u>	
	Depth of surface seal below ground surface <u>29'</u> Type of surface seal: <u>Cement</u>	
	ID of surface casing. <u>4"</u> Type of surface casing: <u>Cast iron</u> <u>with lock cap</u>	
	Depth of surface casing below ground <u>3'</u>	
	I.D. of riser pipe. <u>2"</u> Type of riser pipe: <u>Sch 40 PVC</u>	
	Diameter of borehole <u>6"</u> Depth of borehole <u>47.7'</u>	
	Type of backfill: <u>Cement</u>	
	Elev./depth top of seal. <u>440.1/29'</u> Type of seal: <u>Bentonite</u>	
	Elev./depth bottom of seal. <u>437.1/32'</u> Type of sand pack: <u>Q-02 (fine to med. sand)</u>	
	Depth of top of sand pack. <u>437.1/32'</u>	
	Elev./depth top of screened section. <u>432.2/36.9'</u> Type of screened section: <u>Sch 40 PVC</u> Describe openings: <u>0.010" machine slot - horizontal slot</u>	
	I.D. of screened section. <u>2"</u>	
	Elev./depth bottom of screened section. <u>422.4/46.7'</u> Length of blank section. <u>1'</u>	
	Elev./depth bottom of plugged blank section. <u>421.4/47.7'</u> Elev./depth bottom of sand column. <u>421.4/47.7'</u> Type of backfill below observation pipe. <u>N/A</u> Elev./depth of hole. <u>421.4/47.7'</u>	

GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>	Page <u>17</u> of <u>23</u>
LOCATION <u>N1,160,735 E468,433</u>	Well No. <u>D-65</u>
Date Completed <u>10/24/81</u> Original Depth <u>63'</u>	Aquifer <u>Power Glen-</u>
Inspected By <u>D. L. Middleton</u> Date <u>10/24/81</u>	Whirlpool Contact
Checked By _____ Date _____	Elev. Interval <u>406.1-422.1</u>

Generalized Stratigraphy and Water Level		Elevation of top of surface casing / riser pipe. 471.43/471.33' Height of top of surface casing / riser pipe above ground surface. 2.2/2.1' Depth of surface seal below ground surface 43.2' Type of surface seal: <u>Cement</u> I.D. of surface casing. 4" Type of surface casing: <u>4" Cast iron with lock cap</u> Depth of surface casing below ground 3' I.D. of riser pipe. 2" Type of riser pipe: <u>2" Sch 40 PVC</u> Diameter of borehole 6" Depth of borehole 63' Type of backfill: <u>Cement</u> Elev./depth top of seal: 425.9/43.2' Type of seal: <u>Cement</u> Elev./depth bottom of seal. 422.1/47' Type of sand pack. <u>Q-02 (fine to med. sand)</u> Depth of top of sand pack. 47' Elev./depth top of screened section. 416.9/52.2' Type of screened section: <u>Sch 40 PVC</u> Describe openings <u>0.010" machine slot - horizontal slot</u> I.D. of screened section. 2" Elev./depth bottom of screened section. 407.1/62' Length of blank section. 1' Elev./depth bottom of plugged blank section. 406.1/63' Elev./depth bottom of sand column. 406.1/63' Type of backfill below observation pipe. _____ Elev./depth of hole. 406.1/63'
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GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>	Page <u>18</u> of <u>23</u>
LOCATION <u>NL.160.859 E468.567</u>	Well No. <u>D-66</u>
Date Completed <u>10/28/81</u> Original Depth <u>38.0'</u>	Aquifer <u>Grimsby-</u>
Inspected By <u>J. C. Isham</u> Date <u>10/28/81</u>	Power Glen Contact
Checked By _____ Date _____	Elev. Interval <u>426.4-440.4'</u>

Generalized Stratigraphy and Water Level		Elevation of top of surface casing / riser pipe. <u>466.53/466.33</u>
	Height of top of surface casing / riser pipe above ground surface. <u>2.2/2.0'</u>	
	Depth of surface seal below ground surface <u>20.8'</u>	
	Type of surface seal: <u>Cement</u>	
	I.D. of surface casing. <u>4"</u>	
	Type of surface casing: <u>Cast iron with lock cap</u>	
	Depth of surface casing below ground <u>3.0'</u>	
	I.D. of riser pipe. <u>2"</u>	
	Type of riser pipe: <u>Sch 40 PVC</u>	
	Diameter of borehole <u>38.0'</u>	
	Depth of borehole <u>38.0'</u>	
	Type of backfill: <u>Cement</u>	
	Elev./depth top of seal. <u>443.6/20.8'</u>	
	Type of seal: <u>Bentonite</u>	
	Elev./depth bottom of seal. <u>440.4/24.0'</u>	
Type of sand pack. <u>Q-02 (fine to med. sand)</u>		
Depth of top of sand pack. <u>440.4/24.0'</u>		
Elev./depth top of screened section. <u>437.0/27.4'</u>		
Type of screened section: <u>Sch 40 PVC</u>		
Describe openings <u>0.010" machine slot - horizontal slot</u>		
I.D. of screened section. <u>2"</u>		
Elev./depth bottom of screened section. <u>427.4/37.0'</u>		
Length of blank section. <u>1'</u>		
Elev./depth bottom of plugged blank section. <u>426.4/38.0'</u>		
Elev./depth bottom of sand column. <u>426.4/38.0'</u>		
Type of backfill below observation pipe. _____		
Elev./depth of hole. <u>426.4/38.0'</u>		

GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>		Page <u>19</u> of <u>23</u>
LOCATION <u>N1,160,874</u> <u>E468,575</u>		Well No. <u>D-67</u>
Date Completed <u>10/30/81</u>	Original Depth <u>100'</u>	Aquifer <u>Whirlpool-</u>
Inspected By <u>J. Stone</u>	Date <u>10/30/81</u>	Queenston Contact
Checked By _____	Date _____	Elev. Interval <u>362.9-408.9'</u>

Ground Elevation 462.9

Grimsby-Power Glen Contact 435.0

412.8

Power Glen-Whirlpool Contact 416.5

Whirlpool-Queenston Contact 401.9

Elevation of top of surface casing / riser pipe. 466.21/465.91'

Height of top of surface casing / riser pipe above ground surface. 2.0/1.7'

Depth of surface seal below ground surface 52'

Type of surface seal: Cement

I.D. of surface casing. 4"

Type of surface casing: Cast iron with lock cap.

Depth of surface casing below ground 3'

I.D. of riser pipe. 2"

Type of riser pipe: Sch 40 PVC

Diameter of borehole 6"

Depth of borehole 100'

Type of backfill: Cement

Elev./depth top of seal. 410.9/52'

Type of seal: Bentonite

Elev./depth bottom of seal. 408.9/54'

Type of sand pack. Q-02 (fine to med. sand)

Depth of top of sand pack. 54'

Elev./depth top of screened section. 405.9/57'

Type of screened section: Sch 40 PVC

Describe openings. 0.010" machine slot - horizontal slot

I.D. of screened section. 2"

Elev /depth bottom of screened section. 363.9/99.0'

Length of blank section. 1'

Elev./depth bottom of plugged blank section. 362.9/100'

Elev./depth bottom of sand column. N/A

Type of backfill below observation pipe. N/A

Elev./depth of hole. 362.9/100'

Generalized Stratigraphy and Water Level

GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>	Page <u>20</u> of <u>23</u>
LOCATION <u>N1,160,838</u> <u>E468,555</u>	Well No. <u>D-68A</u>
Date Completed <u>10/30/81</u> Original Depth <u>58'</u>	Aquifer <u>Power Glen</u>
Inspected By <u>D. L. Middleton</u> Date <u>10/30/81</u>	Whirlpool Contact
Checked By _____ Date _____	Elev. Interval <u>407.2-421.2'</u>

Generalized Stratigraphy and Water Level		Elevation of top of surface casing / riser pipe. <u>467.8/467.55'</u> Height of top of surface casing / riser pipe above ground surface. <u>1.9/1.65'</u> Depth of surface seal below ground surface <u>36.0'</u> Type of surface seal: <u>Cement</u> I.D. of surface casing. <u>4"</u> Type of surface casing: <u>Cast iron with lock cap</u> Depth of surface casing below ground <u>3'</u> <u>2"</u> I.D. of riser pipe. <u>2"</u> Type of riser pipe: <u>Sch 40 PVC</u> Diameter of borehole <u>6"</u> Depth of borehole <u>58'</u> Type of backfill: <u>Cement</u> Elev./depth top of seal. <u>429.2/36.0'</u> Type of seal: <u>Bentonite</u> Elev./depth bottom of seal. <u>421.2/44.0'</u> Type of sand pack. <u>Q-02 (fine to med. sand)</u> Depth of top of sand pack. <u>421.2/44.0'</u> Elev./depth top of screened section. <u>417.5/47.7'</u> Type of screened section: <u>Sch 40 PVC</u> Describe openings. <u>0.010" Machine slot - horizontal slot</u> I.D. of screened section. <u>2"</u> Elev./depth bottom of screened section. <u>408.2/57'</u> Length of blank section. <u>1'</u> Elev./depth bottom of plugged blank section. <u>407.2/58'</u> Elev./depth bottom of sand column. <u>407.2/58'</u> Type of backfill below observation pipe. <u>N/A</u> Elev./depth of hole. <u>407.2/58'</u>
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Ground Elevation 465.2

Grimsby-Power Glen Contact 436.1

417.8

Power Glen-Whirlpool Contact 412.8

GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad - Van De Mark</u>		Page <u>21</u> of <u>23</u>
LOCATION <u>N1,160,836</u> <u>E468,601</u>		Well No. <u>D-69</u>
Date Completed <u>10/28/81</u>	Original Depth <u>18'</u>	Aquifer <u>Grimsby-Soil-</u>
Inspected By <u>C. F. Wall</u>	Date <u>10/28/81</u>	Landfill
Checked By _____	Date _____	Elev. Interval <u>446.4-458.4</u>

Ground Elevation 464.4

Fill: clayey f. to med. SAND and multi-colored plastic, fibers, metal

458.6

454.9

v. fine to fine clayey SAND

451.7

SANDSTONE: sl. to com. weathered, w/shale interbed and clay coating.

Elevation of top of surface casing / riser pipe.	466.56/466.11
Height of top of surface casing / riser pipe above ground surface.	2.2/1.75'
Depth of surface seal below ground surface	4.2'
Type of surface seal: <u>Cement</u>	
I.D. of surface casing.	4"
Type of surface casing: <u>Cast iron with lock cap</u>	
Depth of surface casing below ground	3"
I.D. of riser pipe.	2"
Type of riser pipe: <u>Sch 40 PVC</u>	
Diameter of borehole	10" to 11.4"
Depth of borehole	6" to 18.0'
Type of backfill: <u>Cement</u>	
Elev./depth top of seal.	460.2/4.2'
Type of seal: <u>Bentonite</u>	
Elev./depth bottom of seal.	458.4/6.0'
Type of sand pack <u>Q-02 (fine to med. sand)</u>	
Depth of top of sand pack.	6.0'
Elev./depth top of screened section.	456.65/7.75'
Type of screened section: <u>Sch 40 PVC</u>	
Describe openings <u>0.010" machine slot - horizontal slot</u>	
I.D. of screened section.	2"
Elev./depth bottom of screened section.	447.25/17.15'
Length of blank section.	0.25'
Elev./depth bottom of plugged blank section.	447/17.4'
Elev./depth bottom of sand column.	447/17.4'
Type of backfill below observation pipe. <u>Natural material</u>	
Elev./depth of hole.	446.4/18.0'

Generalized Stratigraphy and Water Level

GROUND WATER OBSERVATION WELL REPORT

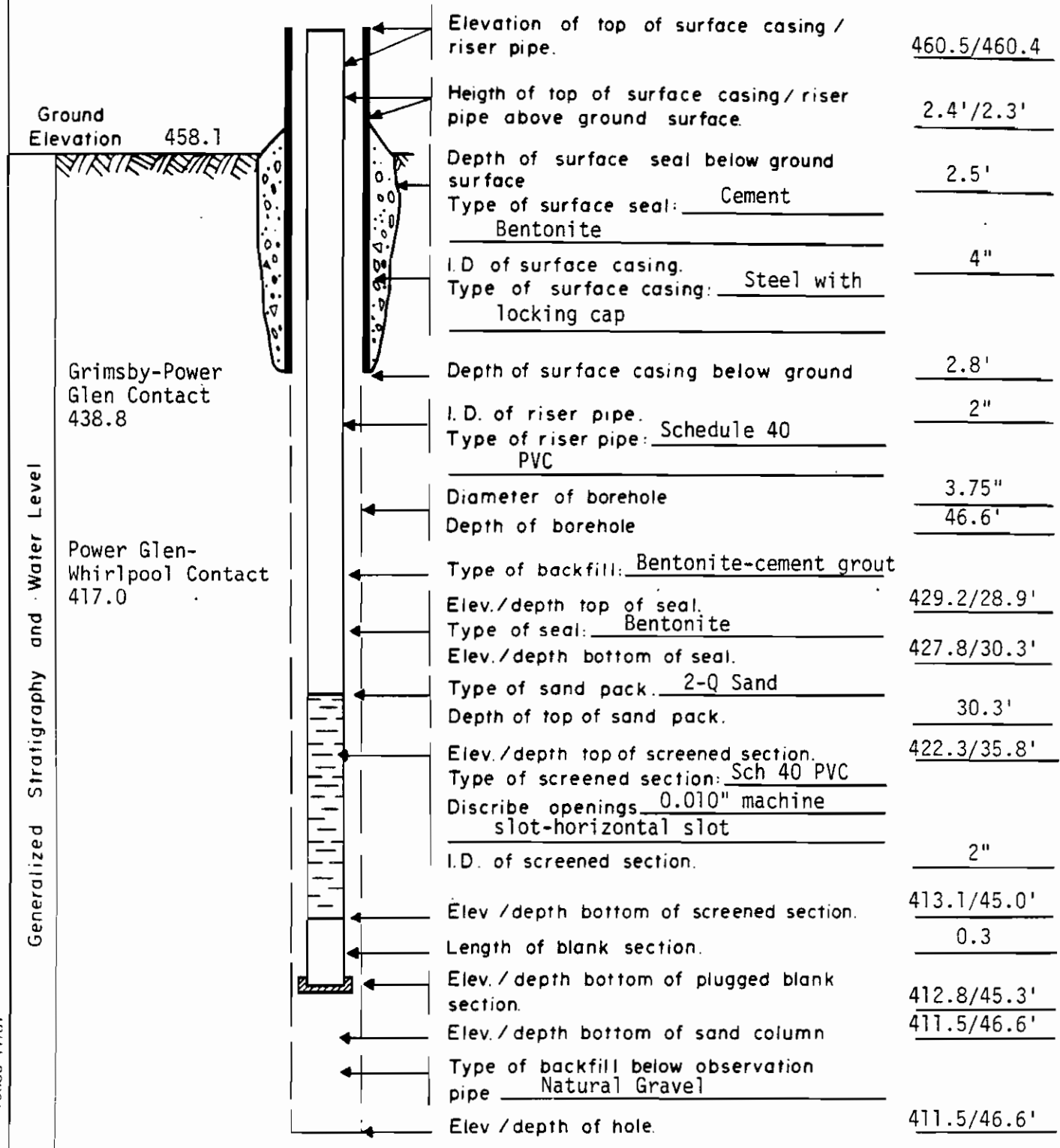
PROJECT <u>Somerset Railroad - Van De Mark</u>	Page <u>22</u> of <u>23</u>
LOCATION <u>N1,160,737</u> <u>E468,696</u>	Well No. <u>D-70</u>
Date Completed <u>10/29/81</u> Original Depth <u>19.4'</u>	Aquifer <u>Grimsby-Soil</u>
Inspected By <u>J. C. Isham</u> Date <u>10/29/81</u>	Landfill
Checked By _____ Date _____	Elev. Interval <u>446.9-458.3'</u>

Ground Elevation <u>466.3</u> 459.6 Fill: clayey med. Sand and multi-colored plastic. 456.3 clayey fine grained sand 452.3 siltstone sl. to completely weathered, w/shale interbeds Generalized Stratigraphy and Water Level		Elevation of top of surface casing / riser pipe. <u>468.35/468.10'</u> Height of top of surface casing / riser pipe above ground surface. <u>2.2/1.95'</u> Depth of surface seal below ground surface <u>3.0'</u> Type of surface seal: <u>Cement</u> I.D. of surface casing. <u>4"</u> Type of surface casing: <u>Cast iron with lock cap</u> Depth of surface casing below ground <u>3.0'</u> I.D. of riser pipe. <u>2"</u> Type of riser pipe: <u>Sch 80 PVC</u> Diameter of borehole <u>6"</u> Depth of borehole <u>19.4'</u> Type of backfill: <u>Cement</u> Elev./depth top of seal. <u>461.3/5.0'</u> Type of seal: <u>Bentonite</u> Elev./depth bottom of seal. <u>458.3/8.0'</u> Type of sand pack. <u>Q-02 (fine to med. sand)</u> Depth of top of sand pack. <u>8.0'</u> Elev./depth top of screened section. <u>456.6/9.7'</u> Type of screened section: <u>Sch 40 PVC</u> Describe openings <u>0.010" machine slot - horizontal slot</u> I.D. of screened section. <u>2"</u> Elev./depth bottom of screened section. <u>447.2/19.1'</u> Length of blank section. <u>.3'</u> Elev./depth bottom of plugged blank section. <u>446.9/19.4'</u> Elev./depth bottom of sand column. <u>446.9/19.4'</u> Type of backfill below observation pipe. _____ Elev./depth of hole. <u>446.9/19.4'</u>
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GROUND WATER OBSERVATION WELL REPORT

PROJECT <u>Somerset Railroad</u>	Page <u>23</u> of <u>23</u>
LOCATION <u>Danielewicz Route - Sta. 51+810</u>	Well No. <u>D-7</u>
Date Completed <u>9/25/81</u> Original Depth <u>46.6</u>	Aquifer <u>Whirlpool-</u>
Inspected By <u>C. F. Wall</u> Date <u>9/25/81</u>	<u>Power Glen</u>
Checked By <u>D. L. Middleton</u> Date <u>1/20/82</u>	Elev. Interval <u>428.7-413.1</u>

NOTE: December 15, 1981, Dry Hole

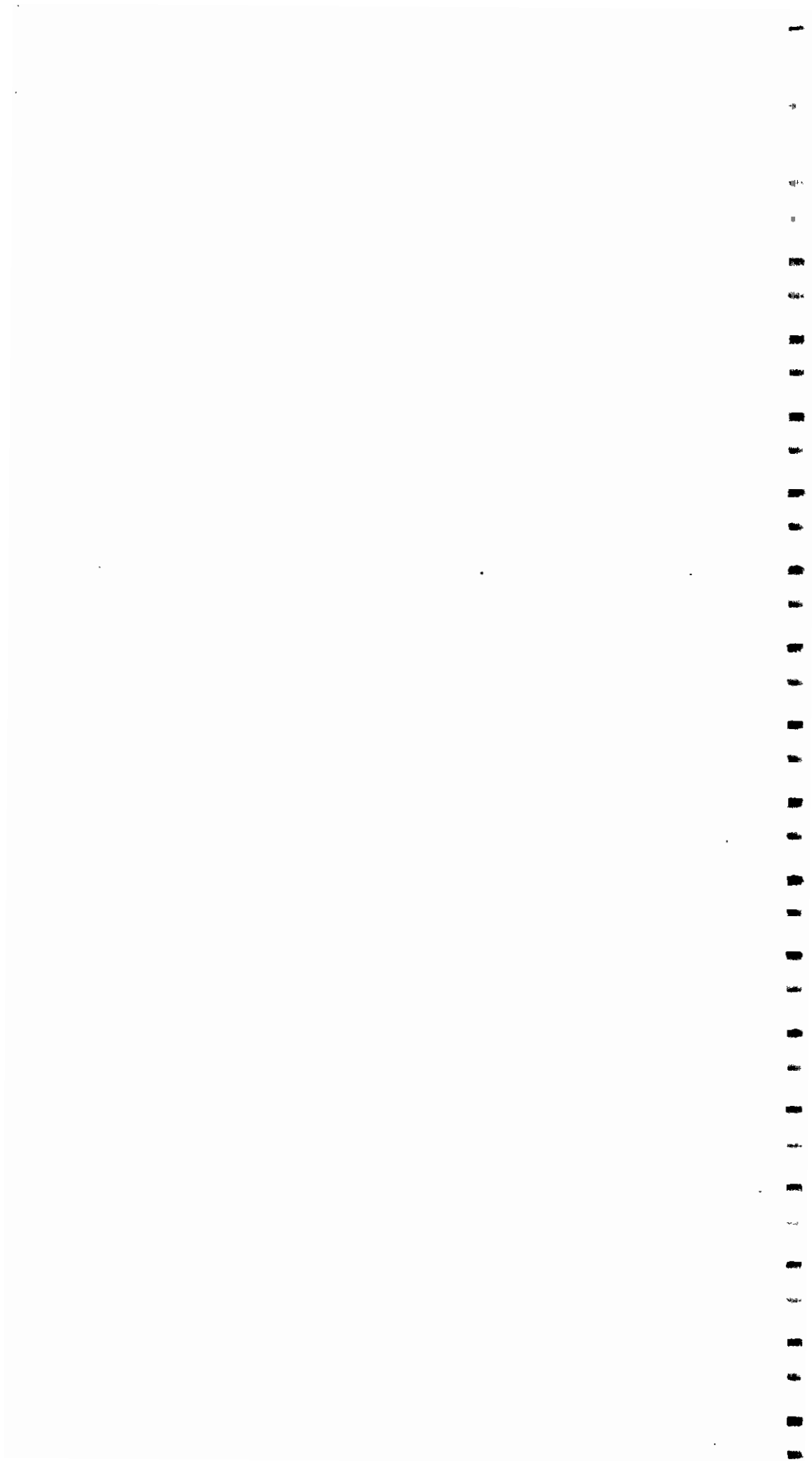


APPENDIX C-1

CHEMICAL ANALYSES OF GROUND WATER SAMPLES

DATA SHEETS FROM RECRA RESEARCH, INC.

FIRST ROUND ANALYSES



ANALYTICAL RESULTS
BECHTEL CIVIL & MINERALS, INC.

Report Date: 11/11/81

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		D-49A (11/3/81)	D-49B (11/3/81)	D-50A (11/2/81)	D-50B (11/2/81)
pH (field)	Standard Units	8.85	9.00	11.90	11.90
Specific Conductance (field)	µmhos/cm	283	305	1,830	1,830
Temperature (field)	°C	11.5	12	12	11.5
Total Organic Carbon	mg/l	1.1	1.3	4.5	5.7
Total Filterable Residue (180°C)	mg/l	290	290	790	750
Chloride	mg/l	20	20	33	33
Total Iron	mg/l	16	8.8	0.91	0.90
Total Recoverable Oil and Grease	mg/l	<5	<5	<5	<5

COMMENTS: Comments pertain to data on all pages of this report. Samples were collected by Recra personnel on 11/2/81 and 11/3/81. The specific date of collection is located under the sample identification.

FOR RECRA RESEARCH, INC.

DATE

R. V. Finner
11/11/81



RECRA RESEARCH, INC.

I.D. #81-1000

ANALYTICAL RESULTS

BECHTEL CIVIL & MINERALS, INC.

Report Date: 11/11/81

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		D-51A (11/3/81)	D-51B (11/3/81)	D-52A (11/2/81)	D-52B (11/2/81)
pH (field)	Standard Units	6.90	7.15	6.35	7.15
Specific Conductance (field)	μ mhos/cm	295	295	3,000	2,690
Temperature (field)	$^{\circ}$ C	12.5	12	12.5	12
Total Organic Carbon	mg/l	2.4	5.2	8.8	9.6
Total Filterable Residue (180 $^{\circ}$ C)	mg/l	260	260	2,700	2,300
Chloride	mg/l	28	27	1,100	910
Total Iron	mg/l	6.1	14	1.4	0.70
Total Recoverable Oil and Grease	mg/l	<5	<5	30	6

COMMENTS: Analyses were performed according to U.S. Environmental Protection Agency methodologies.

FOR RECRA RESEARCH, INC.

DATE

R. V. Finn
11/11/81



RECRA RESEARCH, INC.

I.D. #81-1000

ANALYTICAL RESULTS

BECHTEL CIVIL & MINERALS, INC.

Report Date: 11/11/81

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		D-53A (11/2/81)	D-53B (11/2/81)	D-54A (11/3/81)	D-54B (11/3/81)
pH (field)	Standard Units	6.65	6.75	9.50	9.65
Specific Conductance (field)	$\mu\text{mhos/cm}$	353	360	1,480	1,480
Temperature (field)	$^{\circ}\text{C}$	12	12	11	11
Total Organic Carbon	mg/l	8.1	4.2	2.4	6.4
Total Filterable Residue (180 $^{\circ}\text{C}$)	mg/l	280	340	1,400	1,400
Chloride	mg/l	32	32	290	270
Total Iron	mg/l	3.8	2.5	22	49
Total Recoverable Oil and Grease	mg/l	<5	<5	<5	<5

COMMENTS: pH, Specific Conductance, and Temperature analyses were performed on site by Recra personnel.

FOR RECRA RESEARCH, INC.

DATE

R. V. Finn
11/11/81



RECRA RESEARCH, INC.

I.D. #81-1000

ANALYTICAL RESULTS

BECHTEL CIVIL & MINERALS, INC.

Report Date: 11/11/81

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		D-55A (11/2/81)	D-55B (11/2/81)	D-56A (11/3/81)	D-56B (11/3/81)
pH (field)	Standard Units	6.55	6.80	10.45	10.70
Specific Conductance (field)	umhos/cm	430	430	500	600
Temperature (field)	°C	12	11.5	11	11
Total Organic Carbon	mg/l	4.8	4.7	6.4	5.0
Total Filterable Residue (180°C)	mg/l	370	360	460	480
Chloride	mg/l	37	37	79	79
Total Iron	mg/l	7.1	4.8	5.6	7.2
Total Recoverable Oil and Grease	mg/l	<5	<5	<5	<5

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

FOR RECRA RESEARCH, INC.

DATE

R. J. Finn
11/11/81



RECRA RESEARCH, INC.

I.D. #81-1000

ANALYTICAL RESULTS
BECHTEL CIVIL & MINERALS, INC.

Report Date: 11/11/81

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		D-57A (11/3/81)	D-57B (11/3/81)	D-59A (11/2/81)	D-59B (11/2/81)
pH (field)	Standard Units	8.10	8.15	8.30	8.25
Specific Conductance (field)	μ mhos/cm	483	415	249	251
Temperature (field)	$^{\circ}$ C	10	10	10.5	10.5
Total Organic Carbon	mg/l	3.8	3.7	4.5	7.9
Total Filterable Residue (180 $^{\circ}$ C)	mg/l	540	660	220	220
Chloride	mg/l	39	40	22	22
Total Iron	mg/l	9.8	11	2.6	2.8
Total Recoverable Oil and Grease	mg/l	<5	<5	<5	<5

COMMENTS: Refer to pages 1 through 4.

FOR RECRA RESEARCH, INC.

DATE

O. V. Finn
11/11/81



RECRA RESEARCH, INC.

I.D. #81-1000

ANALYTICAL RESULTS
BECHTEL CIVIL & MINERALS, INC.

Report Date: 11/11/81

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		D-60A (11/2/81)	D-60B (11/2/81)	D-61A (11/3/81)	D-61B (11/3/81)
pH (field)	Standard Units	7.35	7.55	6.65	6.75
Specific Conductance (field)	µmhos/cm	1,680	1,700	420	510
Temperature (field)	°C	10.5	10.5	10	10
Total Organic Carbon	mg/l	8.1	7.3	6.0	10
Total Filterable Residue (180°C)	mg/l	1,700	1,800	410	390
Chloride	mg/l	36	30	36	36
Total Iron	mg/l	16	2.9	2.0	11
Total Recoverable Oil and Grease	mg/l	<5	<5	26	<5

COMMENTS: Refer to pages 1 through 4.

FOR RECRA RESEARCH, INC.

DATE

R. V. Farn
11/11/81



RECRA RESEARCH, INC.
I.D. #81-1000

ANALYTICAL RESULTS

BECHTEL CIVIL & MINERALS, INC.

Report Date: 11/11/81

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		D-62A (11/3/81)	D-62B (11/3/81)	D-63AA (11/3/81)	D-63AB (11/3/81)
pH (field)	Standard Units	9.95	10.25	9.65	9.80
Specific Conductance (field)	umhos/cm	510	505	255	275
Temperature (field)	°C	10	10	12	11
Total Organic Carbon	mg/l	3.3	1.5	5.6	5.8
Total Filterable Residue (180°C)	mg/l	550	520	270	270
Chloride	mg/l	19	19	23	24
Total Iron	mg/l	17	18	4.7	3.0
Total Recoverable Oil and Grease	mg/l	6	<5	<5	<5

COMMENTS: Refer to pages 1 through 4.

FOR RECRA RESEARCH, INC.

DATE

Q. V. Finn11/11/81

RECRA RESEARCH, INC.

I.D. #81-1000

ANALYTICAL RESULTS
BECHTEL CIVIL & MINERALS, INC.

Report Date: 11/11/81

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		D-64A (11/2/81)	D-64B (11/2/81)	D-65A (11/2/81)	D-65B (11/2/81)
pH (field)	Standard Units	8.20	8.45	7.85	8.30
Specific Conductance (field)	µmhos/cm	244	242	1,290	1,290
Temperature (field)	°C	11.5	13	11.5	11.5
Total Organic Carbon	mg/l	5.7	6.8	4.5	9.5
Total Filterable Residue (180°C)	mg/l	180	170	1,200	1,100
Chloride	mg/l	24	23	37	37
Total Iron	mg/l	1.8	21	4.8	3.3
Total Recoverable Oil and Grease	mg/l	8	<5	<5	<5

COMMENTS: Refer to pages 1 through 4.

FOR RECRA RESEARCH, INC.

DATE

O. V. Frim
11/11/81



RECRA RESEARCH, INC.

I.D. #81-1000

ANALYTICAL RESULTS

BECHTEL CIVIL & MINERALS, INC.

Report Date: 11/11/81

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		D-66A (11/3/81)	D-66B (11/3/81)	D-67A (11/3/81)	D-67B (11/3/81)
pH (field)	Standard Units	7.50	7.45	10.65	10.75
Specific Conductance (field)	µmhos/cm	1,040	1,000	540	530
Temperature (field)	°C	13	12.5	13	12.5
Total Organic Carbon	mg/l	4.0	4.4	3.2	2.0
Total Filterable Residue (180°C)	mg/l	860	830	410	410
Chloride	mg/l	200	190	33	33
Total Iron	mg/l	8.0	1.6	3.1	3.5
Total Recoverable Oil and Grease	mg/l	<5	<5	<5	15

COMMENTS: Refer to pages 1 through 4.

FOR RECRA RESEARCH, INC.

DATE

R. V. Finner11/11/81

RECRA RESEARCH, INC.

I.D. #81-1000

ANALYTICAL RESULTS

BECHTEL CIVIL & MINERALS, INC.

Report Date: 11/11/81

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		D-68A (11/3/81)	D-68B (11/3/81)	D-69A (11/3/81)	D-69B (11/3/81)
pH (field)	Standard Units	8.75	8.95	6.70	6.80
Specific Conductance (field)	µmhos/cm	255	258	800	780
Temperature (field)	°C	12	12	14	14
Total Organic Carbon	mg/l	1.8	2.5	6.8	8.7
Total Filterable Residue (180°C)	mg/l	230	240	670	730
Chloride	mg/l	19	20	29	29
Total Iron	mg/l	8.4	6.7	7.4	89
Total Recoverable Oil and Grease	mg/l	<5	<5	14	<5

COMMENTS: Refer to pages 1 through 4.

FOR RECRA RESEARCH, INC.

DATE

Q. V. Finn
11/11/81



RECRA RESEARCH, INC.

I.D. #81-1000

ANALYTICAL RESULTS

BECHTEL CIVIL & MINERALS, INC.

Report Date: 11/11/81

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		D-70A (11/3/81)	D-70B (11/3/81)
pH (field)	Standard Units	6.85	6.80
Specific Conductance (field)	μ mhos/cm	640	540
Temperature (field)	$^{\circ}$ C	14.5	13
Total Organic Carbon	mg/l	24	33
Total Filterable Residue (180 $^{\circ}$ C)	mg/l	570	590
Chloride	mg/l	31	32
Total Iron	mg/l	120	260
Total Recoverable Oil and Grease	mg/l	73	31

COMMENTS: Refer to pages 1 through 4.

FOR RECRA RESEARCH, INC.

Or V. Finn

DATE

11/11/81

RECRA RESEARCH, INC.

I.D. #81-1000

APPENDIX C-2

CHEMICAL ANALYSES OF GROUND WATER SAMPLES

DATA SHEETS FROM RECRA RESEARCH, INC.

SECOND ROUND ANALYSES

ANALYTICAL RESULTS
BECHTEL CIVIL AND MINERALS, INC.

Report Date: 11/18/81
Date Received: 11/13/81 - 11/17/81

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION			
		D-51	D-53	D-55	D-61
pH (field)	Standard Units	7.15	6.15	6.85	6.25
Conductance (25°C)	umhos/cm	480	430	430	500
Chloride	mg/l	74	42	42	47
Fluoride	mg/l	0.50	0.36	0.54	0.30
Total Organic Carbon	mg/l	10	3.7	2.8	7.3
Total Cyanide	ug/l	<10	<10	<20	<20
Total Zinc	mg/l	0.226	0.212	0.161	0.266
Soluble Zinc	mg/l	0.054	0.189	0.198	0.118
Soluble Antimony	mg/l	<0.3	<0.3	<0.3	<0.3
Total Recoverable Oil and Grease	mg/l	<5	<5	<5	<5

COMMENTS: Samples were collected by Recra personnel on 11/13/81, 11/16/81, and 11/17/81. Analyses were performed according to U.S. Environmental Protection Agency methodologies.

FOR RECRA RESEARCH, INC.

DATE

A. V. Finn
11/18/81



RECRA RESEARCH, INC.

I.D. #81-1051

ANALYTICAL RESULTS

BECHTEL CIVIL AND MINERALS, INC.

Report Date: 11/18/81
 Date Received: 11/13/81 - 11/17/81

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION			
		D-64	D-66	D-69	D-70
pH (field)	Standard Units	6.75	7.30	6.40	6.15
Conductance (25°C)	µmhos/cm	670	810	615	490
Chloride	mg/l	84	100	31	36
Fluoride	mg/l	0.33	0.36	0.39	0.26
Total Organic Carbon	mg/l	33	8	7.6	7.6
Total Cyanide	µg/l	<10	<10	<10	<20
Total Zinc	mg/l	0.083	0.235	1.4	3.4
Soluble Zinc	mg/l	0.099	0.125	0.443	0.533
Soluble Antimony	mg/l	<0.3	<0.3	<0.3	<0.3
Total Recoverable Oil and Grease	mg/l	<5	<5	<5	7

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

FOR RECRA RESEARCH, INC.

DATE

R. V. Finn11/18/81

RECRA RESEARCH, INC.

I.D. #81-1051

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