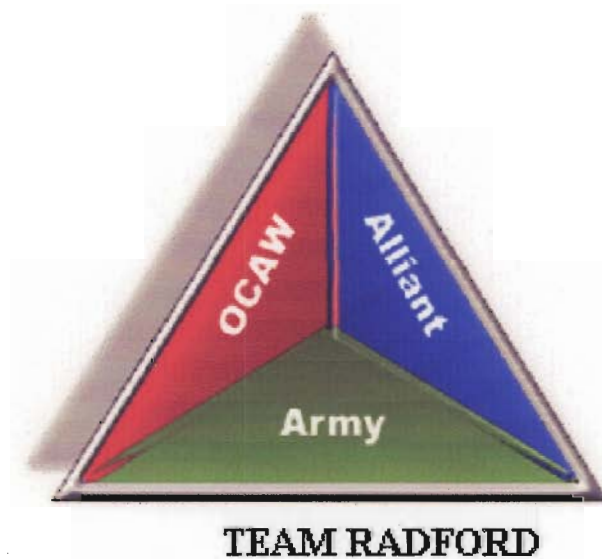

RFI AND VI FIELD BORINGS (1991)



RADFORD ARMY AMMUNITION PLANT RADFORD, VIRGINIA

August, 2000

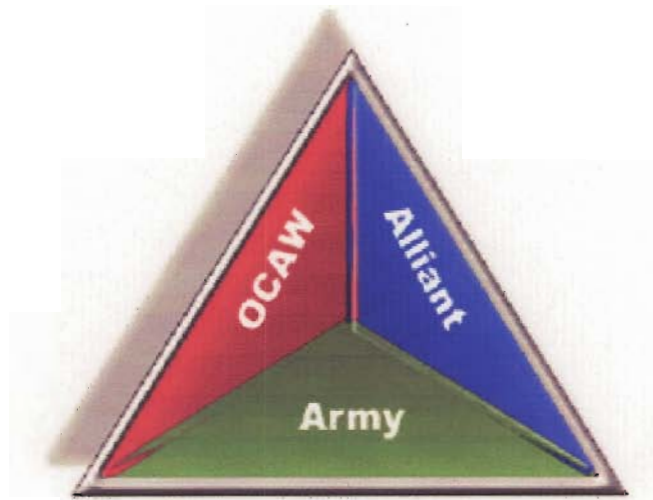
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5540 Falmouth Street, Suite 201
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RFI AND VI FIELD BORINGS (1991)



TEAM RADFORD

RADFORD ARMY AMMUNITION PLANT RADFORD, VIRGINIA

August, 2000

URS

Dames & Moore

5540 Falmouth Street, Suite 201
Richmond, Virginia 23230
(804) 965-9000 and (804) 965-9764 fax

SWMU 6

4

28.1 (3) (REV. 11-80)

John Spanglin

DATE 4/5/91 CHK'D BY

169930

DRILLING CONTR. 10017

Theresa Spanglin & Partner

Dames & Moore

5

LOCATION OF BORING				JOB NO. 16102-017		CLIENT USATAMA		LOCATION PAAP	
				DRILLING METHOD:				BORING NO. 6557	
				SAMPLING METHOD:				SHEET 2 OF 2	
								DRILLING	
				WATER LEVEL		START TIME		FINISH TIME	
				TIME		10:03		10:10	
				DATE		DATE		DATE	
						4/8/91		4/8/91	
DATUM				ELEVATION		CASING DEPTH			

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
1005	20		1005		20	mc	Gravelly (10%) clay, red, with the yellowish brown, red clayey sand, mostly mud.	
			1015		1			
			Sample - 120.5' 10:20			2		Terminated 'Drilling' at 200' due to water cut
						3		
					4			
					5		This boring was not as visible, sludgy as GSP2.	
					6			
					7		Took sample at lower depth (18') because it was anticipated this portion of sample would be desired. This area did not exhibit the same sludge, local boulders that GSP2 did.	
					8			
					9			
					30			
					1			
					2			
					3			
					4			
					5			
					6			
					7			
					8			
					9			
					10			

169933 DRILLING CONTR. 6-17 7/2/91, 8/11/91, 8/24/91

John Spangler DATE 4/8/91 CHK'D BY

Dames & Moore

6

LOCATION OF BORING		JOB NO.	CLIENT	LOCATION
		06702-077	USATHAMA	RAAP
DRILLING METHOD: 4 1/4 HSA				BORING NO.
				65B2
SAMPLING METHOD: Moss Sampler, Continuous core				SHEET
				1 OF 2
WATER LEVEL				DRILLING
				START TIME
				2:45
DATE				DATE
				11/4/91
CASING DEPTH				

DATUM ELEVATION

SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
Moss	5.0	0	1		245	0	
	5.0					1	SC
						2	
						3	
						4	
Moss	5.0	5	2		252	5	GM
	2.0		5-10			6	No Rec
						7	
						8	SC
						9	GM
						10	SC
						11	MC
						12	
						13	
						14	
						15	SC/MC
						16	
						17	
						18	
						19	
						20	

SURFACE CONDITIONS:

And A. 0.2

Red soil, clay, up to 10-8, 2.5 x 4 1/8 R.L., no p.d.

grading, redder to 2.5 x 4 1/8 Red at 2' Small black specks Homogenous red sandy, clayey sand fill

At 4.7, becoming gravel sand and soil mixture, 2.5 x 4 1/8 string brown, no p.d.

only 2.0' Recovery do not know how lost recovery from 10' Assume lost at 5-7.1 7.5-10.0 No p.d. flights must Red 2.5 x 4 1/8 clayey sand, up to 10 x 7/8 yellow (5% mottling) At 9.0 another gravel zone, below which sand becomes clayey, black

10-15 7.5 x 4 1/8 yellow with fine very soft, fine sandy soil, light plastic at 10 x 4 1/8 yellowish brown, clayey, sandy clayey sand at 14.0' chem. sample at 14.0' at 2.30

15-20 - only 2.5' Recovery at 11 10 x 4 1/8 yellow to green soft clayey sand, fine, moderate to coarse, but clayey, still 2.0' of recovery counter section 7.5 x 4 1/8 yellowish brown at 7.5 x 4 1/8 yellowish brown at 5.0' also

DRILLING CONTR. EDZ
T. Lynch, B. Ph.D., D. DeLeon

169930

John Spangler

DATE 11/4/91 CHK'D BY

25.1 (3) (REV. 11-80)

Dames & Moore

7

25.1 (3) (REV. 11-80) *The Spangler* DATE 11/4/80 CHK'D BY DATE 11/4/80 DRILLING CONTR. EDT 169930 711000 13th 11/4/80 Q Date

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION	
										06702-077		USATNAMA		RAAP	
										DRILLING METHOD:				BORING NO.	
														LSB 2	
														SHEET	
														2 of 2	
										SAMPLING METHOD:				DRILLING	
										WATER LEVEL				START	
														TIME	
										TIME				TIME	
										DATE				DATE	
										CASING DEPTH				11/4/80	
DATUM										ELEVATION					
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:					
								0		Soft sandy clayey silt 2 cy 4 1/2 diameter water. Gravel to 5 x 3/4 diameter clayey sandy silt at 22' at 22' No other sampling there is sticks + twigs at 21 foot which indicate fill material but this area does not look stained or sludgey. Transition to boring at 22 foot then to Rock!					
								1							
								2							
								3							
								4							
								5							
								6							
								7							
								8							
								9							
								0							
								1							
								2							
								3							
								4							
								5							
								6							
								7							
								8							
								9							
								0							

SWMU 10

Dames & Moore

9

NO. 169868
 DRILLING CONTR. CDI
 BY John Spangler DATE 8/14/91 CHK'D BY Tom Lynn

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION					
										06702-058		USATHAMA		RAAP					
										DRILLING METHOD: HSA 65/8 ID				BORING NO.					
														10MW 1					
										SAMPLING METHOD: SS				SHEET					
														1 OF 2					
														DRILLING					
														START		FINISH			
										WATER LEVEL				TIME		TIME			
														732					
										DATE				DATE		DATE			
										CASING DEPTH				8/14/91					
DATUM										ELEVATION									
SAMPLER TYPE	PORTER'S DRIVEN HATCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS: Back and Hnd 2.8										
SS	2.0	0	1	0.2	2.4	3.16	7.32	ML	0-1.0 to 80d. sand material, silt to sand (35%), remaining soft 7.5YR 7/2 d. brown, At 1.6, coal chips stain. The soil to 7.5YR N/3 very dark gray. Soil contains abundant (25%) coal chips. Coal chips grade out at 2.0 but soil is still v.d. brown. Cuttings PID 3. & moist										
							2												
							3												
							4												
SS	2.0	5	2	5.7	2.4	5.5	7.47	ML	clayey silt (10% clay) trace of sand, 7.5YR 7/4 dark brown, 20% mica, soft, moist, no pip at spoon										
							6												
							7												
							8												
							9												
SS	2.0	10	3	10.2	2.4	4.4	7.53	ML	Same clay inc to 25%, moist no pip at spoon, fg sand decreases, soft										
							1												
							2												
							3												
							4												
							5												
SS	2.0	15	4		2.4	2.2	8.04	ML	7.5YR 4/4 d. brown; some CS above. same at 15.7 become mottled w/ 7.5YR 4/4 d. brown (50%). AT 16.7 become 7.5YR 4/2 d. brown. AT 16.9 is saturated, 10YR 4/1 d. gray fg sand, 25% mica, 50% silt. Water Table at 16.5										
							7	SM											
							8												
							9												
							0		Encountered bedrock at 18.0 ground thru bedrock to 20.0 with core to advance										

Dames & Moore

10

LOCATION OF BORING					JOB NO. 06702-058		CLIENT USATHAMA		LOCATION RAAP	
					DRILLING METHOD: HSA 65/8 NX CORE		BORING NO. 10MW1			
					SAMPLING METHOD: SS NX CORE		SHEET 2 OF 2		DRILLING	
							START TIME 9:13		FINISH TIME 12:00	
					WATER LEVEL				DATE 8/16/91	
					TIME				DATE 8-16-91	
					DATE				DATE	
					CASING DEPTH					

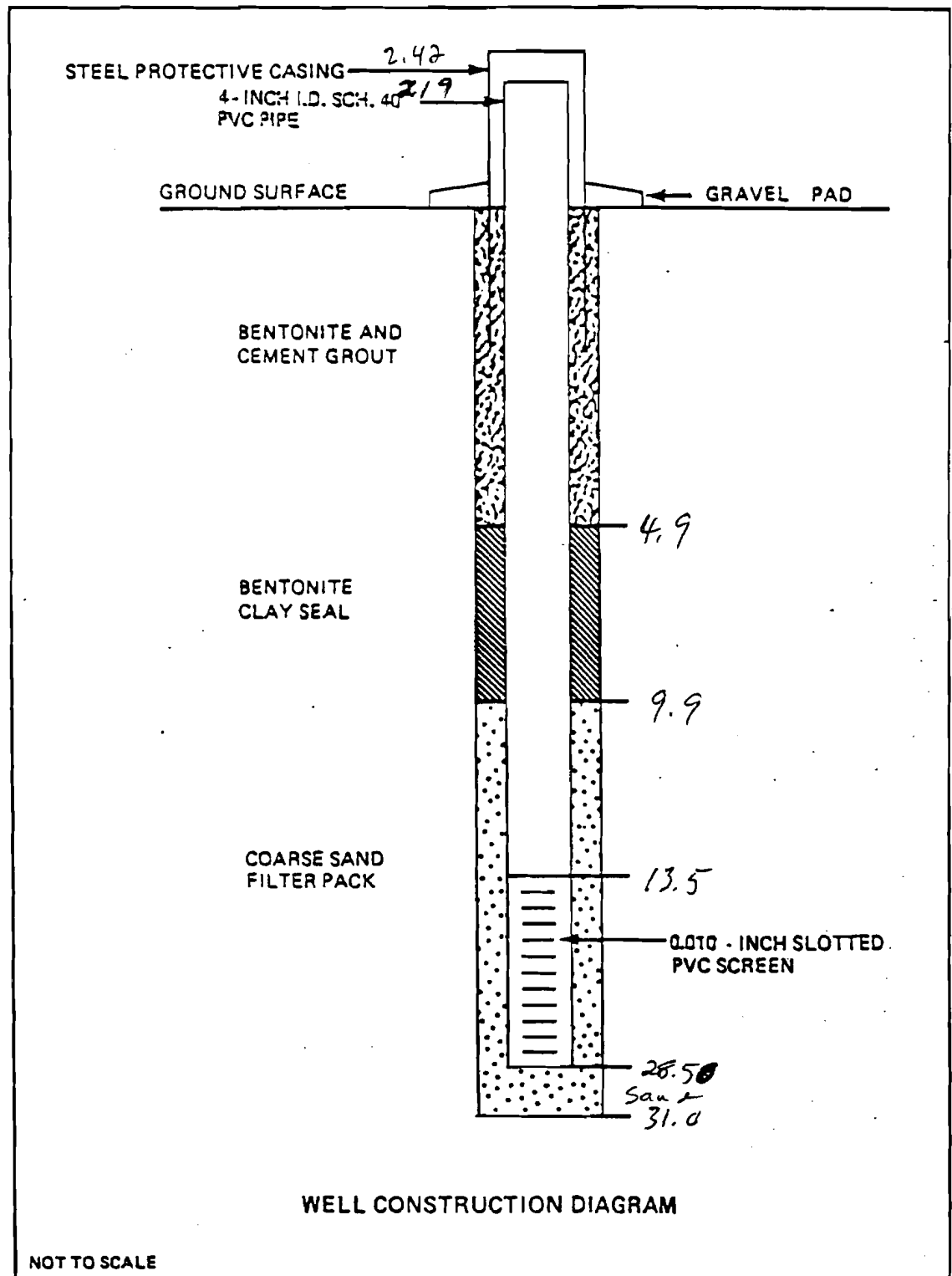
DATUM				ELEVATION								
FT CORRECTION	% REC	Run	% REC	Time								

SAMPLER TYPE	INCHES SAMPLED	DEPTH OF CASING	SAMPLE NO	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:			
NX	50	70%	1	20.0-25.0	9:13	20		20 - 20.5: Rubblized LS, 104R711 Light gray, w/ 104R 8/6 yellow limonite staining, soft, calcite crystals abundant on highly weathered surfaces, and in small pits & vugs. Small white cracks infilled w/ calcite abundant. At 20.6, limonite staining ends, LS is highly pitted w/ abundant calcite, and many thin healed fractures (w/ white calcite). AT 22.0' becoming 104R 5/2 light brownish grayish brown, healed fractures becoming thicker. Fractures as shown occur along clay partings. AT 23.0' pyrite appears (20%) along cracks & at clay partings. Large calcite filled solution channel at 23.8' below 23.0' becoming more clayey, and more fragile.			
						1					
						2					
						3					
						4					
NX			2	25.0-	9:38	5		Drilled to 31.0 feet. Will set well at this location with a 15 foot well screen			
					9:41	6					
						7					
						8					
						9					
						30					
						1					
						2					
						3					
						4					
						5					
						6					
						7					
						8					
						9					
						0					

DRILLING CONTR. NO. 109869

BY _____ DATE _____ CHK'D BY _____

Location: 10MW1
Installation Date: 8/16/91
Surface Elevation:
Top of Casing Elevation:



SWMU 13

Dames & Moore

13

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION	
										06702-058		USA THAMA		RAAP	
										DRILLING METHOD: 8 1/4" MSA				BORING NO.	
														13MW1	
										SAMPLING METHOD: Split Spoon				SHEET	
														1 of 2	
														DRILLING	
										WATER LEVEL				START	
														TIME	
										TIME				8:14	
										DATE				DATE	
										CASING DEPTH				8/24/91	

DATUM										ELEVATION									
SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO	BLOWS/FT. SAMPLER	NUMBER OF GRINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS: Ambient Air 66 Sunny, 60°											
SS	2.0	0	1	3.5	1.6	0	MC	No. 10 2.5yr 3/4 reddish brown silt, trace fg sand, no odor, sm. moist, 10% mica, soft,											
						2													
						3													
						4													
						5													
SS	2.0	5	2	2.4	1.0	6	MC	2.5yr 3/4 dusty red, more moist, pld spoon 1.8. More moist, softer, very slight plasticity (fine clay)											
						7													
						8													
						9													
						10													
SS	2.0	10	3	3.5	1.4	11	MC	PID 2.6 SAME. At 11.7 becomes silty clay, 10% silt, 10% mica, moist, no odor, soft											
						12	CL												
						13													
						14													
						15													
SS	2.0	15	4	4.5	1.8	16	SM	silty (20%) 5yr 4/4 reddish brown fg sand, very moist, soft, grading clayey. At 16.6 becomes CH, highly plastic, micaceous, w/ occasional lenses of silt or vfg sand.											
						17	CH												
						18	SM	At 16.8 becomes fg sandy clay 5yr 2 1/2, dark reddish brown, no odor, very moist, AT 17.0 grades back to sand, mg, 2.5yr 5/6 strong brown											
						19													
SS	0.7	19	5	100		20													
ARV		19				21		Encountered Bedrock at 19.0'											

DRILLING CONTR.

No. 169874

CHK'D BY

DATE

8.1 (3) (REV. 11-80)

Dames & Moore

14

LOCATION OF BORING		JOB NO. 06702-058	CLIENT USATHAMA	LOCATION RAAP
DRILLING METHOD: 8 1/4" HSA NX Core Air Rotary Ream.		BORING NO. 13MW1		
SAMPLING METHOD: Split Spoon NX Core		SHEET 2 of 2		
WATER LEVEL		DRILLING		
TIME		START TIME 9:45		
DATE		FINISH TIME		
CASING DEPTH		DATE 8/20/91		

DATUM	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. DEPTH	BLOWS/FT -SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
19.0: 7.5 YRN 1/4 dark gray, brecciated Limestone partly cemented & highly pitted, soft spot no orange staining (oxidation), highly pitted (9:55) an apparent bedding. At 20.0', becomes better cemented, 19.2 ft. 20.5 becomes highly pitted & ruggy, good 1" permeability, due to cementation. At 21.7 very thin, bedded dipping 20° At 22.4 zone of highly weathered LS appears less weathered at 24.0 below 24.0 calcite veins become more apparent (+/-) and fractures occur along clay partings. Fractures as shown LS is clayey. N-H2O at	5.0 5.0	100%	1 19.24	11/6	9:45	20		22.0-22.5 will Ream further at 25 H2O
NX	5.0/4.3	86%	2 19.24		10:00	4		24.0: Same LS Many calcite veins represent healed fractures. 7.5 YRN 1/4 d. gray, no apparent bedding AT 25.1-25.5 calcite veins disappear, rock becomes slightly softer, lighter at 31.0' gray; At 25.7 becomes becomes the previously fractured LS (with healed calcite veins); occasional small calcite filled pits, fractures as shown
					10:59	9		
						0		
						1		
						2		12:40 T.D. 35.0'
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						0		

DRILLING CONTR.

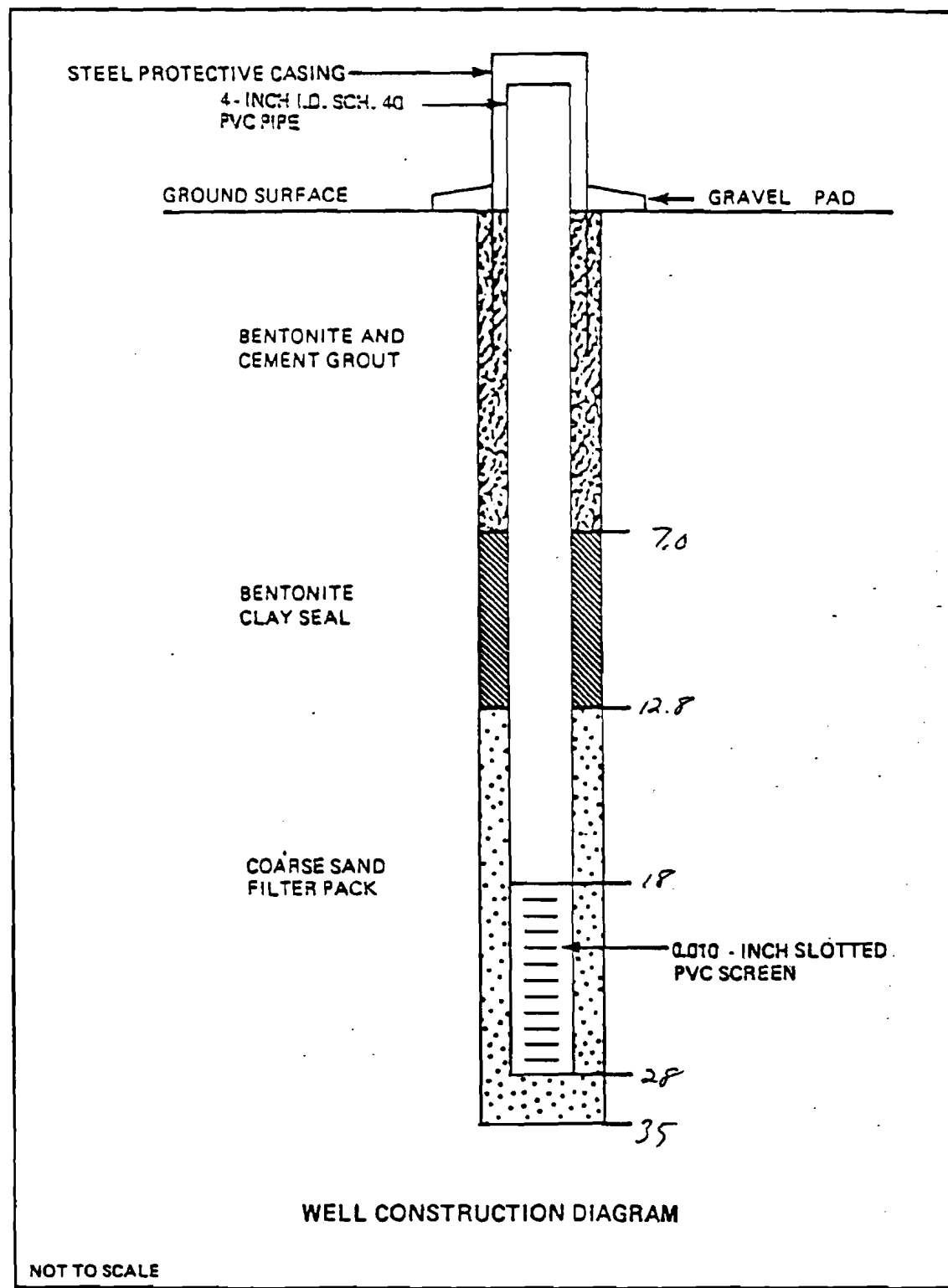
NO. 169877

CHK'D BY

DATE

8.1 (3) (REV. 11-80)

Location: 13MW1
Installation Date: 8/20/91
Surface Elevation:
Top of Casing Elevation:



16

§.1 (3) (REV. 11-80)

SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO. DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
						0		Grassy area, Amb. Air 0.8
SS	2.0 1.4	0	1 0.2	3.5 4.5		7.441	ML MC	7.5YR 3/4 d. brn, w/ roots, fg sandy silt, at 1.0 grades to 2.5YR 3/2 dusky red silt, micaceous, sl. moist, no odor, no pin cuttings
						2		
						3		
						4		
SS	2.0 1.5	5	2 5.7	2.3 3.6		7.565	SC	No pin cuttings 7.5YR 4/4 d brown sandy clay (35% fg sand), w/ occasional clay lenses w/ 5% mg sand, grades to silty clay w/ 5-10% fg sand, micaceous, 5YR 3/3 d. reddish brown, sl. moist, no odor
						6		
						7		
						8		
						9		
						10		
SS	2.0 1.5	10	3 10.2	3.6 7.8		8.10	ML	No deflection cuttings, 5YR 4/5 reddish brn clayey silt clayey silt, 20% micaceous, soft, sl. moist, no odor, w/ 10-20% vfg sand
						1		
						2		
						3		
						4		
						15		
SS	2.0 1.9	15	4 15.7	4.6 5.8		8.266	SM	no deflection cuttings vfg silty sand, 10-20% micaceous, 10YR 4/4 d. yellowish brn. Thin ls gravel seam at 16.8', 10YR 6/1 grey,
						7		
						8		
						9		
						20		Hit rock at 19.6'. Augered to 20.0' + took spoon. (100% refusal) Reared to 21.0', will begin coring at 21.0'

Dames & Moore

17

DRILLING CONTR. EDP

Ny 1000000

T Spangler

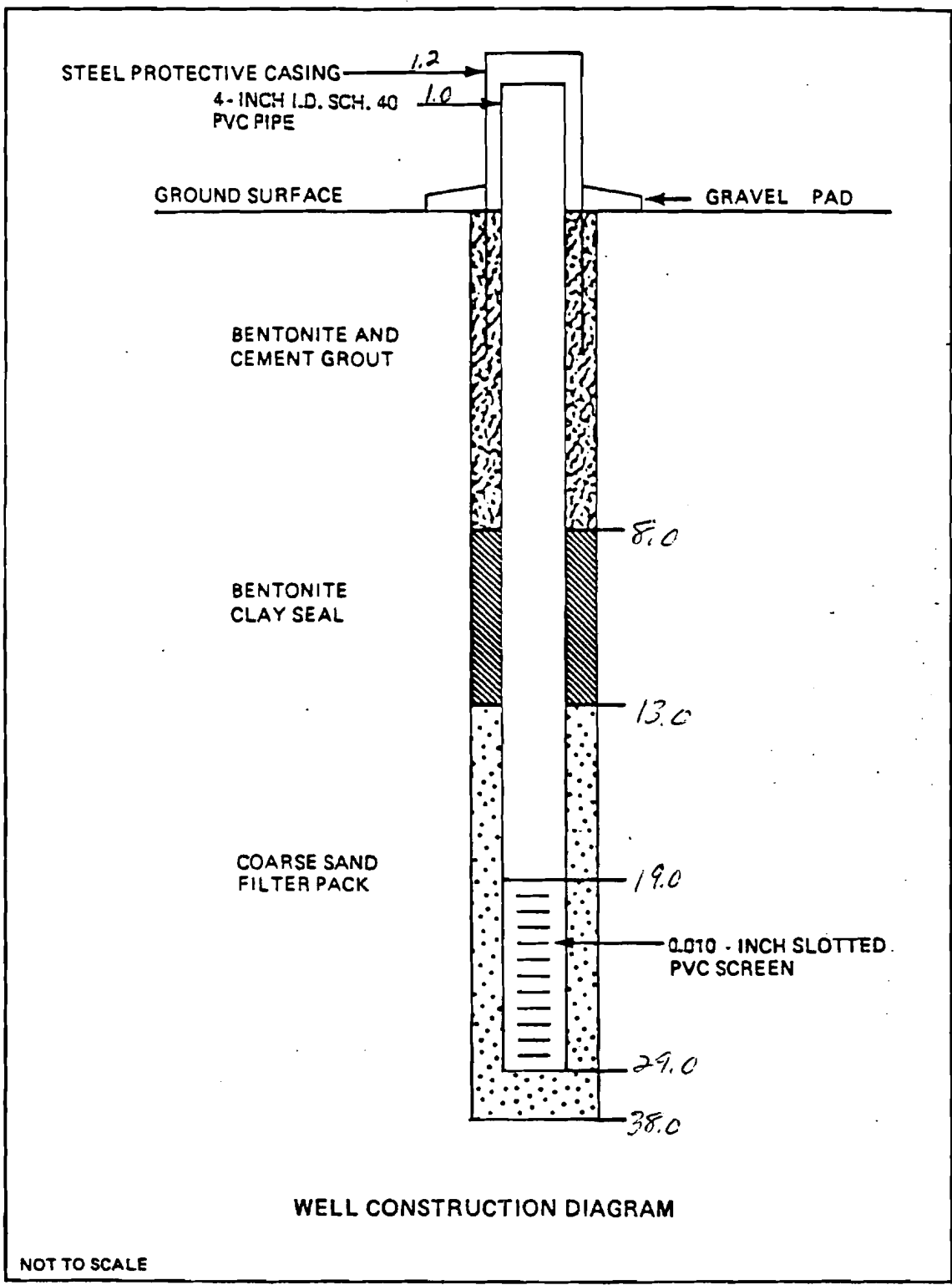
LOCATION OF BORING		JOB NO. 6702-058	CLIENT THAMA	LOCATION RAAF
DRILLING METHOD:			BORING NO. 13MW2	
SAMPLING METHOD:			SHEET 2 of 2	
WATER LEVEL			START TIME 8:37	FINISH TIME 9:39
TIME			DATE 8/24/91	DATE 8/29/91
CASING DEPTH				

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN	RECOVERED	DEPTH OF CASING	SAMPLE NO	DEPTH	BLOWS/FT	SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
		55	0.5'	0.1	20	5	20.0	100/6"			8.50		No recovery (Limestone chunk stuck in end of (1000) will core at 20.0'
		NX			0/0 Rec	Run		RQD	Time		1		LS 7.5' R. (1000) Horizontal fractures
		NX	5.0	2.6	50%	1	21.0-26.0	9:28			2		as shown, No staining. Thin calcite veins appear at 21.6'. Becomes mottled at 22.2' at 22.5' lost mottled. At 22.8' highly weathered 2.5' 5/8" L. calcite
					H2O Loss	Run 1 = 10 gal/s					3		brn, soft, & fairly cemented ss
											4		loosely, thinly spaced, then grades back to cl. gray LS, thinly bedded
											5		
											6		
											7		Same LS, pyrite visible at fractures at 26.5', where thick calcite veins appear. Also at 26.5' becomes limonite (orange-yellow) stained. At 27.1' becomes highly weathered, highly orange-yellow stained, re-cemented breccia, w/ thin zones of thin bedded highly weathered LS dipping ~20°. At 28' feet becomes less limonite stained, w/ less clay infilling. At 28.5' large clay filled fracture, as shown, below which staining (limonite) is infrequent. Becomes mottled at 30.5'
		NX	5.0	4.6	94%	2	26.31	60%	10:01		8		
											9		
											30		
											1		
											2		
											3		
											4		
											5		
											6		
											7		
											8		
											9		
											0		

Recovered to 38.0'

Set well to 29.0' ON 8/29/91

Location: 13MW2
 Installation Date: 8/24/91
 Surface Elevation:
 Top of Casing Elevation:



Dames & Moore

19

LOCATION OF BORING		JOB NO.	CLIENT	LOCATION
P28 P27		06707-058	USA THANA	RAMP
		DRILLING METHOD:	*6 5/8 ASA	BORING NO.
				13MW3
		SAMPLING METHOD	Split Spoon	SHEET
				1 of 2
				DRILLING
		WATER LEVEL		START TIME
		TIME		758
		DATE		8/27
		CASING DEPTH		FINISH TIME
				8/27

DATUM						ELEVATION		SURFACE CONDITIONS:	
SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH		
						0	PL	Humid, Drizzling Rain, Haze Background 1.0	
SS	2.0	0	1	3.4, 6.10	MD	0.51	SM	No deflection cuttings. 104R 4/3 d. brn silt grades at 0.14 to 104R 1/2 d. dark grayish brown silt. Small black stain @ 1.0; At 1.14 becomes 1 fg sand w/ silt; becomes varying zones of tan and fg sand w/ silt + clay, 5% moist no odor	
						2			
						3			
						4			
						5			
SS	2.0	5	2	4.6, 5.5	MD	5.17	SM	7.5R 3/4 d. Brown fg sand, 14% c.g. sand, grades to med c.g. sand at 6.8 (7.5R 4/4 d. brn, loose) w/ little fines. Gravel zone blacked full recovery of end of spoon; (each unit slightly higher), moist, no odor no def cuttings	
						6			
						7	SP		
						8	GM		
						9			
						10			
SS	2.0	10	3	7.6, 7.15	MD	8.31	SM	Cg. Sand w/ 5% pea size gravels, w/ from 9.6 to 11.0 feet; Spoon blacked w/ pebbles at 11.0 feet, no odor, moist	
						11			
						12			
						13			
SS	1"	14			MD	8.48		Encountered soft fracture at 13.0' Saturated on top of rock at 14.0'. Top of bit plug wet 1" Recovery; spoon wet 0.3' LS Bedrock	
						15			
						16			
						17			
						18			
						19			
						20			

DRILLING CONTR. E.D.T. Am Lyncel Drilling

No.

DATE 8/27/91

18.1 (3) (REV. 11-80)

At 13.5' prior to coring

Got well 13MW3 to a depth of 19.0' on 8/27/91

Dames & Moore

26

LOCATION OF BORING	JOB NO.	6702-058	CLIENT	THAMA	LOCATION	RAAP
	DRILLING METHOD:				BORING NO.	
					13MW3	
	SAMPLING METHOD:				SHEET	
					2 OF 2	
					DRILLING	
	WATER LEVEL				START	FINISH
	TIME				TIME	11:27
	DATE				DATE	8/27/91
	CASING DEPTH				8/27/91	8/27/91

DATUM _____ ELEVATION _____

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
NO CORING or sampling						20		
						1		
						2		Bottom of Ream hole 22.0'
						3		Set well to a depth of 19.0'
						4		ON 8/27/91
						5		
						6		
						7		
						8		
						9		
						30		
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						0		

DRILLING CONTR. FEI

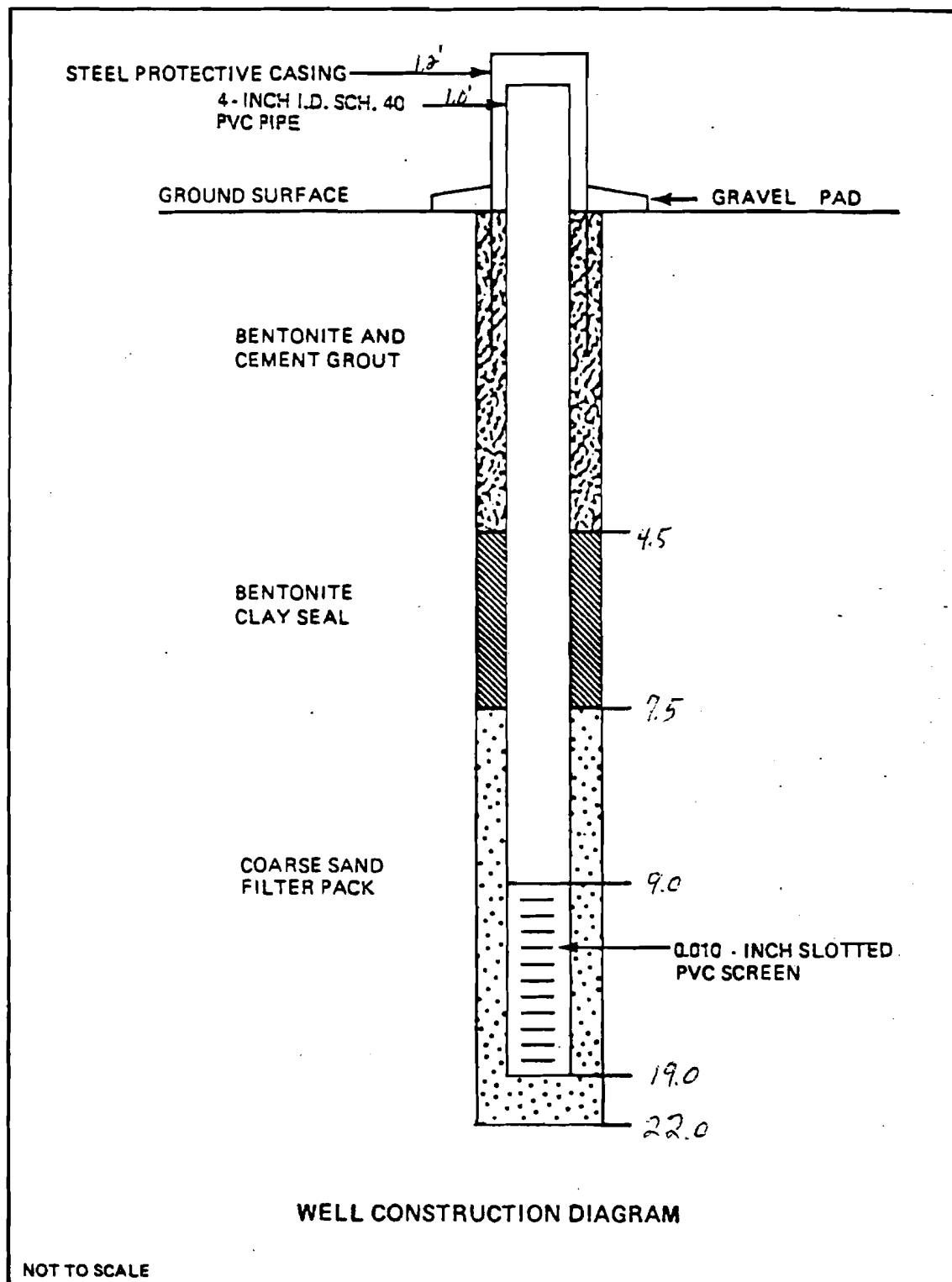
No 167272

John G. Spang

DATE _____ CHK'D BY _____

3.1 (3) (REV. 11-80)

Location: 13MW3
Installation Date: 8/27/91
Surface Elevation:
Top of Casing Elevation:



Dames & Moore

22

LOCATION OF BORING Pad 5 13MW4		JOB NO. 06702-05B	CLIENT USATHAMA	LOCATION RAAP
		DRILLING METHOD: 6 5/8 HSA 5 7/8 Ream Bit		BORING NO. 13MW4
		SAMPLING METHOD: Split Spoon NX Core		SHEET 1 of 2
NEW RIVER		WATER LEVEL		DRILLING
DATUM		TIME		START
ELEVATION		DATE		FINISH
		CASING DEPTH		DATE 8/28/91

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
								Fill area between pad 5 & 6 Amb Air 3.9 (V. humid)
SS	2.0 2.0	0	1.02	6.9, 6.8	MD	7.261	SP SM	104R 3/4 d. yellowish brown tipsoil, fgsand, loose, at 0.7' becomes 104R 3/2 v.d. greyish brown fgsand, silt, nonplastic, dry to moist; no odor or staining or bedding, micaceous.
						2		
						3		
						4		
						5		
SS	2.0 2.0	5	2.57	2.3, 2.3	MD	7.356	SM	104R 3/4 d. yellowish brown vfg ^{sandy silt} soft, micaceous, trace 104R 3/1 v.d. gray mottling at 6.6', moist no 110 cuttings
						7		
						8		Grading
						9		
						10		
SS	2.0 2.0	10	3.10	9.4, 5.4	MD	7.461	SP ML	Less silt, becoming, fgsand - fgsand. At 10.9-11.1 10.5vR 5/4 yellowish brown well sorted fgsand, loose, grading to clayey silt, 10.5vR 4/4 d. yellowish brown, w/ small spots of 104R 3/1 black mottling, (10-15%), moist, micaceous, no 110 cuttings
						2		
						3		
						4		Sand & Gravel encountered at 14.0'
						5		
SS	1.75 1.0	15	4.15-16.5	16.27, 35.100	NIP	7.596	GM GC	104R 4/4 d. yellowish brown silty sandy, Gravelly, no deflection PID water at 16.2 End of Spoon LS chips, w/ clayey gravel/clay Bedrock 16.4'
						7		
						8		54R 5/1 gray claystone (totally weathered) Augered to 16.0 claystone & grading to 56R 1/1 grayish Reamed to 17.1
						9		gray slightly less weathered but Begin Core 17.0
						10		still highly weathered, is 37.9 in c No Fluid Loss
						11		highly weathered, clayey almost during core
						12		totally broken down to clay Smooth Coring

DRILLING CONTR. EDI
Tom Lynch, Jr., John Phillips

No 167338

John Springer
ATE 8/28/91 CHK'D BY

1.1 (3) (REV 11-80)

Dames & Moore

23

LOCATION OF BORING	JOB NO.	6702-058	CLIENT	THAM4	LOCATION	RAPP.
	DRILLING METHOD:				BORING NO.	
					E13M44	
	SAMPLING METHOD:				SHEET	
					2 of 2	
					DRILLING	
	WATER LEVEL				START	FINISH
	TIME				8:58	11:09
DATE				8/28/91	8/28/91	
CASING DEPTH						

DATUM						ELEVATION		SOIL GRAPH	SURFACE CONDITIONS:
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET		
							20		
							1		
							2		
							3		
							4		
							5		
							6		
							7		
							8		
							9		
							30		
							1		
							2		
							3		
							4		
							5		
							6		
							7		
							8		
							9		

No Fluid Lost
During Reaming
or Coring

Reamed Hole to 25.0'

Set well to 24.6 feet on
8/28/91 @ 11:09

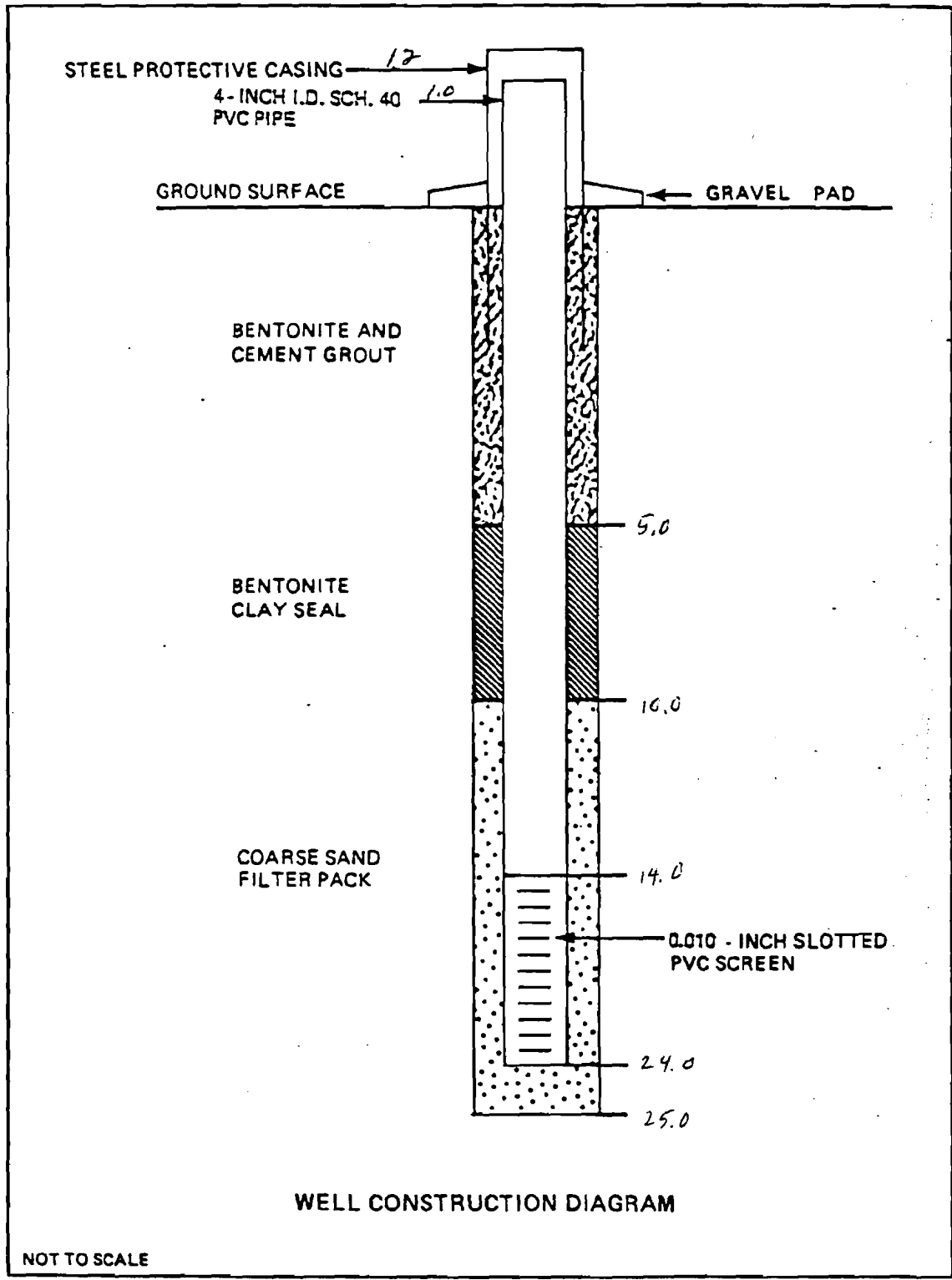
DRILLING CONTR. EOI

No 167339

ATE

1 (3) (REV. 11-80)

Location: 13MW4
Installation Date: 8/28/91
Surface Elevation:
Top of Casing Elevation:



Dames & Moore

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION	
13MWS New River										06702-058		USATHAMA		RAAP	
										DRILLING METHOD: 6 5/8 HSA				BORING NO.	
										5 7/8 Ream				13MWS	
										SAMPLING METHOD: SS				SHEET	
										NA				1 OF 2	
DATUM										WATER LEVEL		START		FINISH	
PID										TIME		TIME		TIME	
ELEVATION										DATE		DATE		DATE	
										CASING DEPTH		8/23/91		8/23/91	
SURFACE CONDITIONS:										Burning grounds in between Pads 3 & 4, E. Half PID background 1.0					
No pit cuttings										0-1.6: 7.5YR3/3 d. reddish brown fgy sandy silt (5% fgs sand), no odor, SL moist, at 1.5 becomes darker, 5YR2.5/2 d. reddish brown.					
No pit cuttings										7.5YR3/3 d. brown micaceous silt, occ. 2.5YR 4/6 Red mottling (3%) no odor moist, breaks 10% fgy sand, soft					
No defect PID silty (20%) fgy sand, 7.5YR4/4 d. brown, loose, no odor or staining micaceous															
PID spec 15.22										Same at 15.7 becomes 10YR4/2 d. grayish brown 5% clayey fgy sand, at 16.3 becomes 10YR5/3 brown mg sand w/ 5% cgy sand occ black specks, at 15.8 becomes GW, same color					
17.5 Rock. Grinding Through															
Next log -										No fluid lost during coring or					
for log										Remains					

No.169882

DRILLING CONTR.

BY _____

CHK'D BY _____

DATE _____

8.1 (3) (REV. 11-80)

Dames & Moore

26

LOCATION OF BORING		JOB NO.	CLIENT	LOCATION
		DRILLING METHOD:		BORING NO. 13MWS
				SHEET 2 of 2
		SAMPLING METHOD:		DRILLING
		WATER LEVEL		START TIME 9:05
		TIME		FINISH TIME 11:57
		DATE		DATE 8/23/91
		CASING DEPTH		DATE 8/23/91

DATUM

ELEVATION

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
						20		2.5x42 d. grayish brn
						1		19.0: very mudstone w/ abundant calcite veins. (Extremely weathered LS) Below 19.7' becomes highly weathered LS breccia, poorly cemented, w/ fractures as shown, forming no apparent bedding. 2% orange staining of calcite veins. Calcite veins grade to few at 21.0'. At 21.0' the LS becomes highly pitted and vuggy. Entire specimen looks like brecciated LS which has been re-cemented.
					9:25	3		Below 19.7, calcite is 100% white, LS chips are 100% 5/2 grayish brown, shades varying.
						4		Reamed to 25.0' set stainless steel well at 24.0 feet
						5		
						6		
						7		
						8		
						9		
						0		
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						0		

DRILLING CONTR.

No. 169837

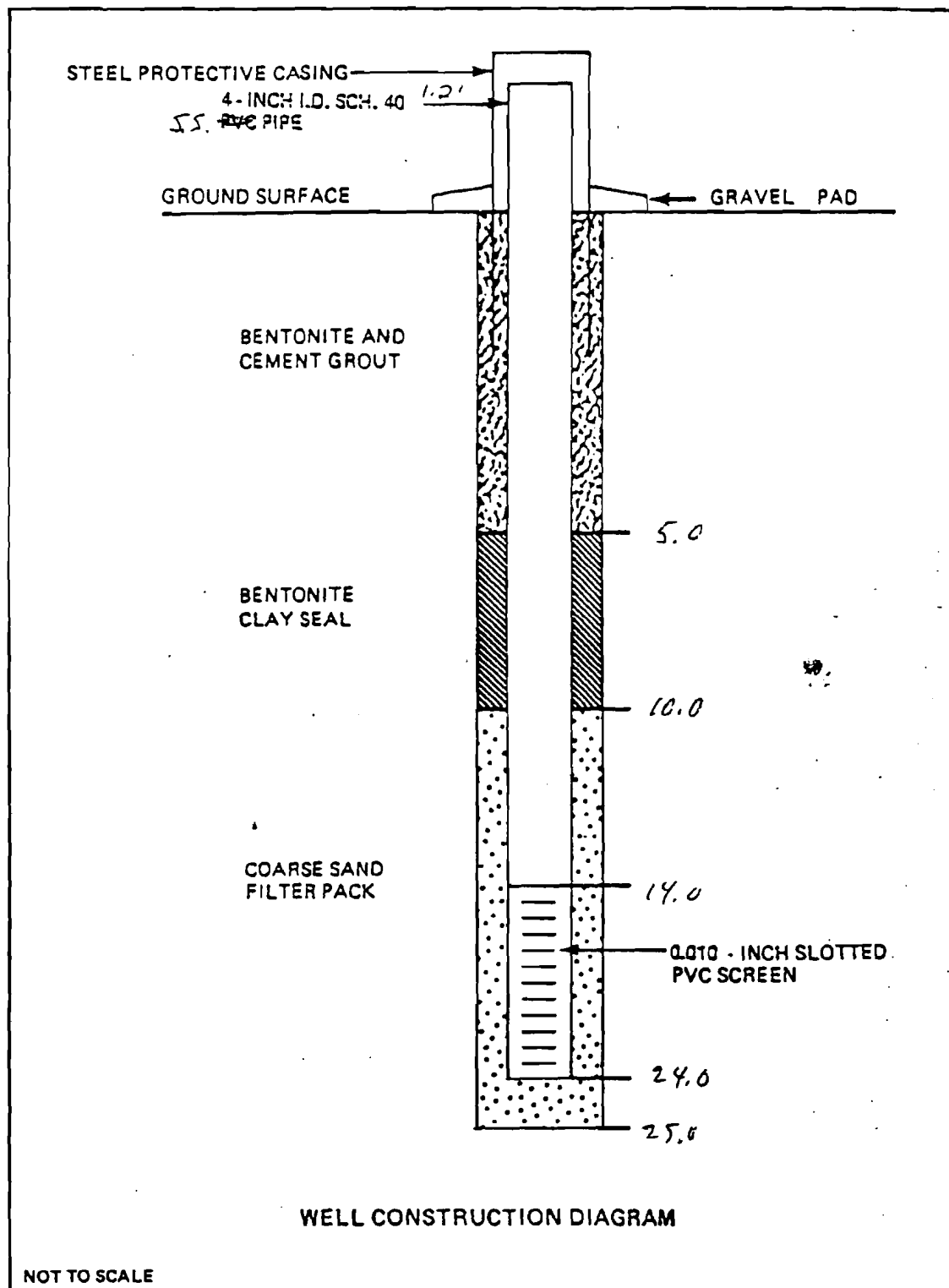
BY

CHK'D BY

DATE

8.1 (3) (REV. 11-80)

Location: 13MW5
 Installation Date: 8/23/91
 Surface Elevation:
 Top of Casing Elevation:



LOCATION OF BORING				JOB NO.		CLIENT		LOCATION	
				06702-058		USATHAM		RAAP	
				DRILLING METHOD: HSA-6 5/8"				BORING NO. 13MW6	
				SAMPLING METHOD: split spoon				SHEET 1 OF	
				WATER LEVEL				DRILLING	
				TIME				START TIME	
				DATE				FINISH TIME	
				CASING DEPTH				DATE	
								8/21/91	
DATUM				ELEVATION					
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO	BLOWS/FT	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
SS	2.0	1.8	0	1	310	9.9	0		Silty Sandy fill area between burning pads; Ambient Air 63
							1		0-1.0 Fill 100% 1/4 d yellowish brn fgy sand
							2		1.3-1.5: gravel fill
							3		1.5-2.0: 100% 3/4 d. brn silty fgy sand, micaceous
							4		Some mg sandy, no staining, no odor
							5		
							6		
							7		
							8		
							9		
							10		
SS	2.0	1.6	5	2	4.4	3.4	5.6		5.4 3/4 d. reddish brn fgy sand w/ 20% silt, micaceous, no odor, moist, no staining, no caving, soft
							7		
							8		
							9		
							10		
							11		
							12		
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DRILLING CONTR.

No. 169878

BY DATE CHK'D BY

Dames & Moore

29

LOCATION OF BORING					JOB NO.		CLIENT		LOCATION		
					DRILLING METHOD:		BORING NO. 137W6				
DATUM <i>Record</i>		DEPTH OF CASING		SAMPLE NO. 10:05		BLOWS/FT. SAMPLER		NUMBER OF RINGS		SHEET 2 of 2	
										DRILLING	
TIME		DATE		CASING DEPTH		SAMPLING METHOD:		START TIME 10:05		FINISH TIME 1:30	
						DATE		DATE 8/21/91		DATE 8/21/91	
SURFACE CONDITIONS:										ELEVATION	
<i>pieces. Calcite veins very thin 19.6-19.8 is w/ thicker calcite veins. AT 19.8 becomes shale, rubblized again</i> <i>Cored to 21.0 feet</i> <i>Terminated Ream here at 24.0 feet. Will set well to 25.0 feet on 8/21/91</i>											

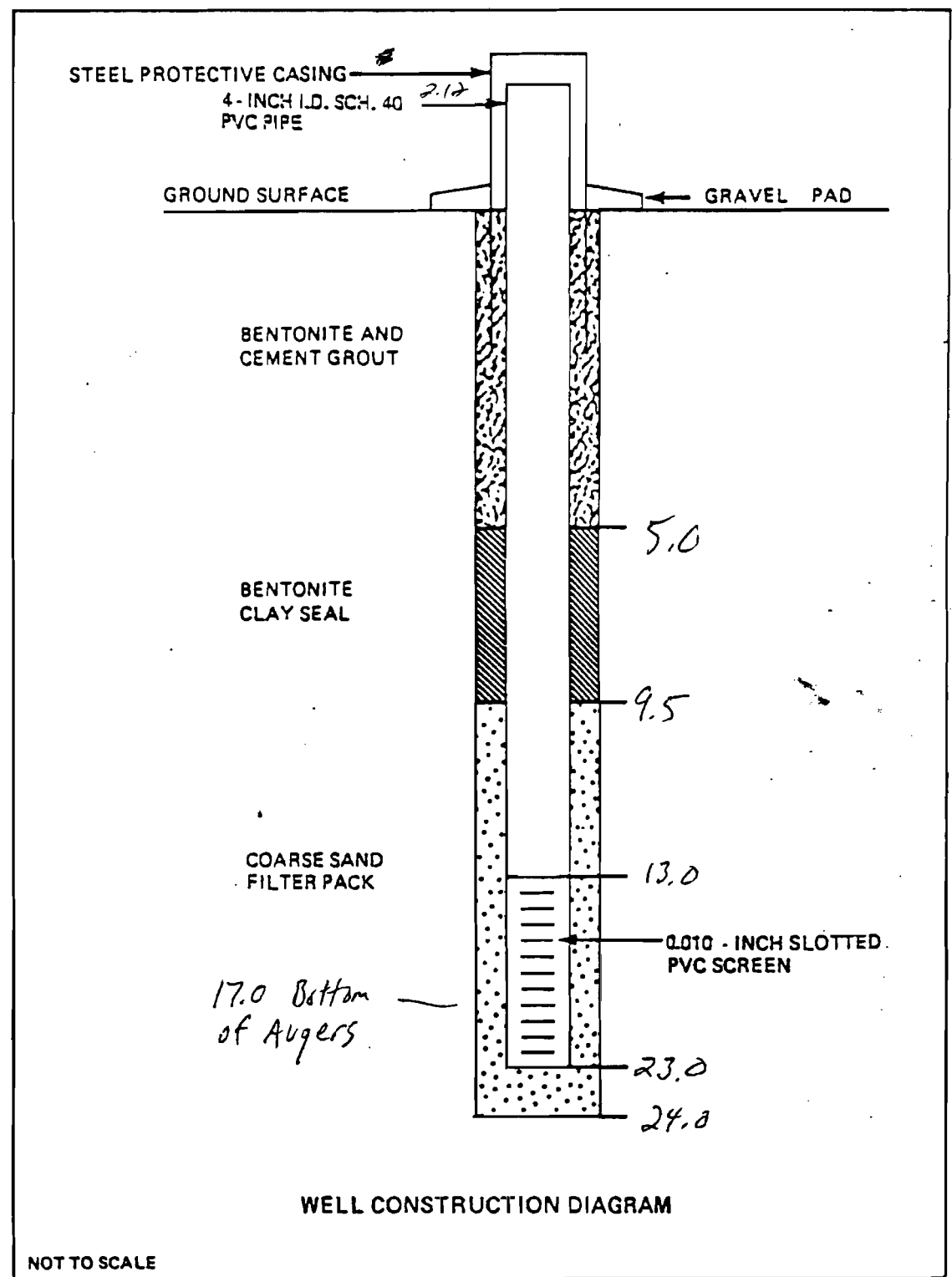
No. 169879

DRILLING CONTR.

CHK'D BY

DATE

Location: 13M606
 Installation Date: 8/21/91
 Surface Elevation:
 Top of Casing Elevation:



Dames & Moore

31

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION																																																																																																																																																									
										06702-058		USATHAMA		RAAP																																																																																																																																																									
										DRILLING METHOD: 6 3/8" HSA		BORING NO. 13MW 7		SHEET 1 OF 2																																																																																																																																																									
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SURFACE CONDITIONS: Background 0.4																																																																																																																																																																							
<table border="1"> <thead> <tr> <th>SAMPLER TYPE</th> <th>FEET DRIVEN</th> <th>DEPTH OF CASING</th> <th>SAMPLE NO.</th> <th>BLOWS/FT. SAMPLER</th> <th>NUMBER OF RINGS</th> <th>DEPTH IN FEET</th> <th>SOIL GRAPH</th> </tr> </thead> <tbody> <tr> <td>45</td> <td>2.0</td> <td>0</td> <td>1</td> <td>2.4</td> <td></td> <td>0</td> <td rowspan="5">50'</td> </tr> <tr> <td></td> <td>2.0</td> <td></td> <td>0.2</td> <td>7.7</td> <td></td> <td>1</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>4</td> </tr> <tr> <td>45</td> <td>2.0</td> <td>5</td> <td>2</td> <td>4.5</td> <td></td> <td>5</td> <td rowspan="5">40'</td> </tr> <tr> <td></td> <td>1.7</td> <td></td> <td></td> <td>4.4</td> <td></td> <td>6</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>7</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>8</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>9</td> </tr> <tr> <td>55</td> <td>2.0</td> <td>10</td> <td>3</td> <td>4.4</td> <td></td> <td>10</td> <td rowspan="5">30'</td> </tr> <tr> <td></td> <td>2.0</td> <td></td> <td></td> <td>5.4</td> <td></td> <td>11</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>12</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>13</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>14</td> </tr> <tr> <td>55</td> <td>2.0</td> <td>15</td> <td>4</td> <td>11.17</td> <td></td> <td>15</td> <td rowspan="5">20'</td> </tr> <tr> <td></td> <td>1.0</td> <td></td> <td></td> <td>13.22</td> <td></td> <td>16</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>17</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>18</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>19</td> </tr> </tbody> </table>										SAMPLER TYPE	FEET DRIVEN	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	45	2.0	0	1	2.4		0	50'		2.0		0.2	7.7		1							2							3							4	45	2.0	5	2	4.5		5	40'		1.7			4.4		6							7							8							9	55	2.0	10	3	4.4		10	30'		2.0			5.4		11							12							13							14	55	2.0	15	4	11.17		15	20'		1.0			13.22		16							17							18							19						
SAMPLER TYPE	FEET DRIVEN	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH																																																																																																																																																																
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Root mat to 0.5'																																																																																																																																																																							
1.0' to 5.4' 3/4 d. reddish brown f. sand w/ 10% silt, no clay, sl. moist, soft, (loam)																																																																																																																																																																							
cuttings 1.6 5/8 3/4 d. reddish brown micaceous silt, slight plasticity (v. slight) sl. moist, soft																																																																																																																																																																							
cuttings 0.8 5/8 1/2 d. reddish brown f. sand w/ 25% silt, no clay, sl. moist, soft, 15% mica																																																																																																																																																																							
same to 16.2. AT 16.2:																																																																																																																																																																							
Gravel w/ sands, both well graded, fine fines																																																																																																																																																																							
16.8' to 18.0' coarse graded sand w/ gravel, little fines, saturated at 16.0; 1' to 0.6 (cuttings)																																																																																																																																																																							

DRILLING CONTR.

No. 169880

CHK'D BY

DATE

9.5 (3) (REV. 11-80)

Dames & Moore

32

LOCATION OF BORING					JOB NO.		CLIENT		LOCATION	
					DRILLING METHOD:		BORING NO.			
							13MW7		SHEET	
							2 of 2			
					SAMPLING METHOD:		DRILLING			
							START		FINISH	
					WATER LEVEL		TIME		TIME	
							4:35		4:45	
					DATE		DATE		DATE	
							8/21		8/21	
					CASING DEPTH					

Jarred Sample
↓
110

DATUM				ELEVATION				SURFACE CONDITIONS:			
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH				
55	2.0 1.6	20	5 20-22	10,24 11,42		20		21.0: 7.54R 1/2 d. brown w/ 2.54R 1/3 brown mottling, clay, trace fgy sand (silt). At 21.6 in sand lens, then ground of limestone at 21.7'			
						1					
						2					
						3					
						4					
						5					
						6					
						7					
						8					
						9					
						0					
						1	Set well to 24.0 on 8/21/91				
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No. 109881

DRILLING CONTR.

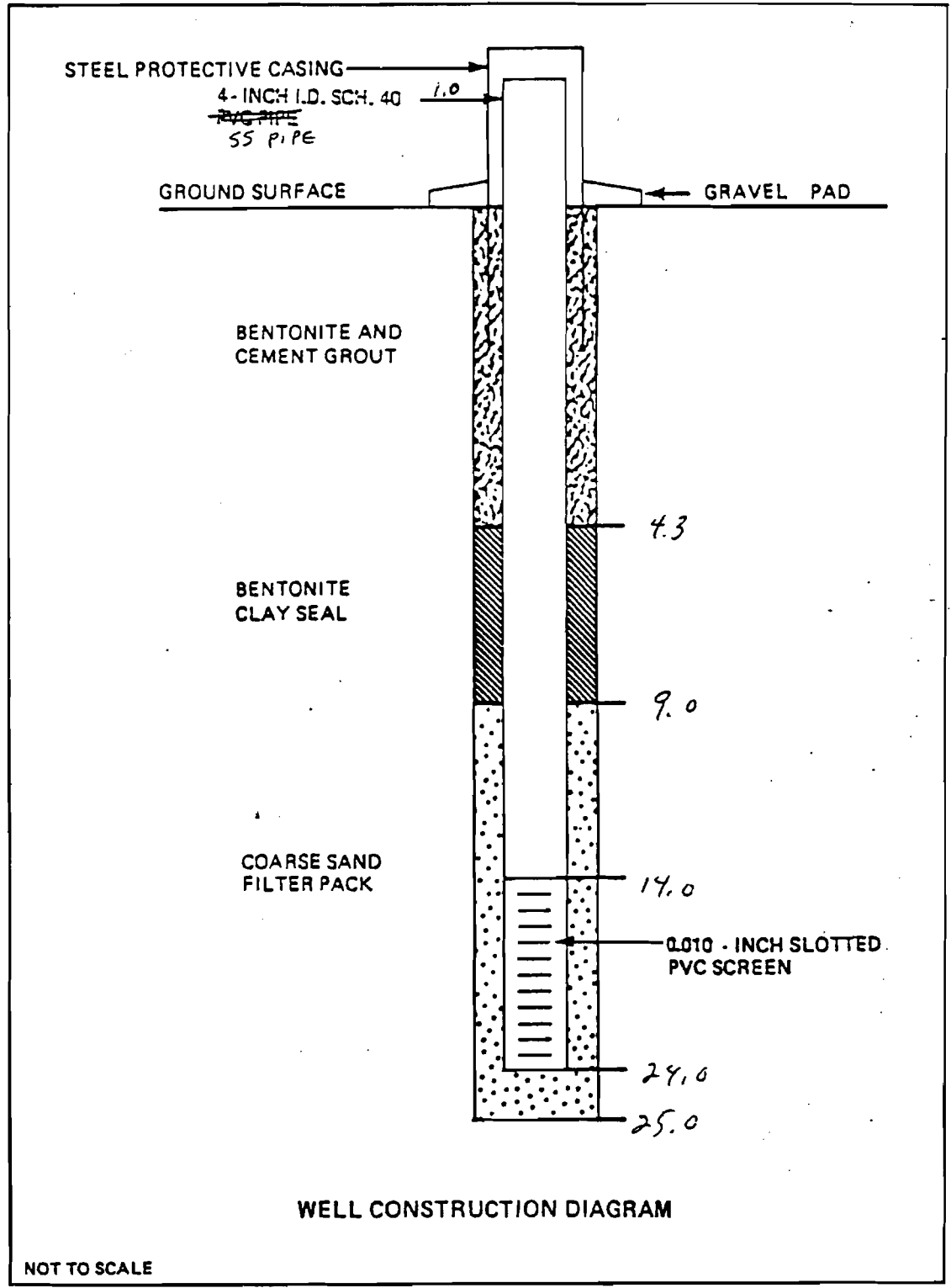
BY

CHK'D BY

DATE

5.1 (3) (REV. 11-90)

Location: RAAP 137W7
Installation Date: 8/22/91
Surface Elevation:
Top of Casing Elevation:



Dames & Moore

34

LOCATION OF BORING Swmu 13 → N				JOB NO. 06702		CLIENT USATHAMA		LOCATION SWMU 13													
Road (X) ← 13SB1 across from 2nd set of pens toe of slope				DRILLING METHOD: Hollow Stem Auger 6.25 ID Continuous flight drill				BORING NO. 13SB1													
				SAMPLING METHOD: M-Sample core				SHEET 1 OF 1													
				<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width: 20%;">WATER LEVEL</th> <th style="width: 20%;">TIME</th> <th style="width: 20%;">DATE</th> <th style="width: 20%;">CASING DEPTH</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>				WATER LEVEL	TIME	DATE	CASING DEPTH					DRILLING <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>START TIME</th> <th>FINISH TIME</th> </tr> <tr> <td>8:10</td> <td>9:03</td> </tr> <tr> <th>DATE</th> <th>DATE</th> </tr> <tr> <td>8-20-91</td> <td>8-20-91</td> </tr> </table>		START TIME	FINISH TIME	8:10	9:03
WATER LEVEL	TIME	DATE	CASING DEPTH																		
START TIME	FINISH TIME																				
8:10	9:03																				
DATE	DATE																				
8-20-91	8-20-91																				

DATUM				ELEVATION				SURFACE CONDITIONS:	
SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	grassy field flat, wet, RID amb = .3	
M	24 / 24	0	13SB1A .7		8:16 .3	0	ML		
						1		brown 10gr 5/3 clayey silt (ML) some organic + fine roots (alluvium)	
	24 / 24	1			8:28 .3	2		trace of fine sand	
						3		brown 10gr 5/3 fine sandy silt (ML) moist, massive structure (alluvium)	
					8:32	4		brown 7.5gr 5/4 clayey silt (ML) some	
M	24 / 20	5	13SB1B 50		8:45 .3	5		fine sand, very moist, micaceous, massive, low plasticity (alluvial)	
					8:39 .3	6		dark brown 7.5gr 4/4 silt with some sand (ML)	
M	24 / 24					7		very moist micaceous, massive, low plasticity (alluvial)	
					8:42 .3	8			
						9			
M	24 / 20	10	13SB1C 100		9:03 .3	10		boring terminated at 10.0 ft no water encountered	
						11			
						12			
						13			
						14			
						15			
						16			
						17			
						18			
						19			
						20			

DRILLING CONTR. **EDT**

Nu. 167253

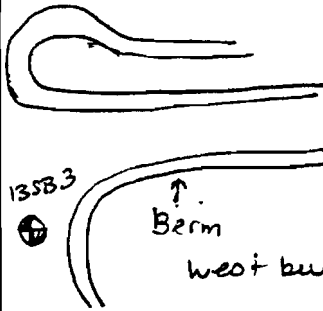
BY **James O. Spence**

DATE **8-20-91** CHK'D BY

35

25.1 (3) (REV. 11-80)

LOCATION OF BORING



JOB NO.

06702

CLIENT

USATHAMA

LOCATION

Swmu 13

DRILLING METHOD: B-57 model

4.75" hollow stem auger, contin
flight aug.SAMPLING METHOD: Moss sampler corl
3 1/4'

BORING NO.

135B3

SHEET

1 OF 1

DRILLING

START

TIME

11:50

FINISH

TIME

12:30

DATE

8-27-91

DATE

8-27-91

WATER LEVEL

TIME

DATE

CASING DEPTH

DATUM

ELEVATION

SURFACE CONDITIONS:

sloping grass area a 5% to the south,
Cloudy 74°, winds 5 to 8 mph SW
PID amb = .1

SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
M	24	18	0	135B3A 0.5	11:50	.1	0	OL
							1	sm
M	24	9			11:53	.1	2	ML
							3	
M	24	19		135B3B 5.0	12:00	.1	4	sm
			5				5	
M	24	22			12:20	.1	6	
							7	
M	24	12		135B3C 10.0	12:22	.1	8	
							9	
			10		12:30	.1	10	
							11	
							12	
							13	
							14	
							15	
							16	
							17	
							18	
							19	
							20	

organic surface layer, grass many fine roots and organic
brown 10YR 5/3 silty sand (sm) with
organics and many fine roots, slightly moist
very fine sand a 53%, PID = .1
Environmental sample taken at .5 ft (ss+sv)
par sample taken at .5 11:55
strong brown 7.5YR 4/6 sandy silt (ML)
fine sand silt a 65%, slightly moist, micaceous
some black mineral staining (magnetite) (.75 to 3.5)
dark brown 10YR 4/3 silty sand (sm), moist
fine sand a 54%, some black mineral staining
(magnetite), massive PID = .1 (environmental sample
taken at 5.0 ft + par sample)
moist soils encountered at 3.2 ft
gradation from 5.8 to 6.0 from fine sand a 54%
to fine to medium sand a 60% some black mineral
stains (magnetite) massive PID = .1
from 6.0 to 10.0 ft fine to medium sand a 56%-60%
some black mineral staining (magnetite) PID = .1
massive
3rd environmental sample taken at 10.0 ft (ss+sv) + par
sample

Drilling terminated at 10.0 ft

no water encountered

boring filled to -1' then capped with portland
cement type II

Pantabate monitor TWA = 0.00

DRILLING CONTR. EPI
John Mulley

N-167274

James O. Spencer
DATE 8-27-91 CHK'D BY

Dames & Moore

37

LOCATION OF BORING		JOB NO.	CLIENT	LOCATION
		06702	USATHAMA	SW MV 13
DRILLING METHOD: B-57 mobile, 4.25" hollow stem auger, dry continuous flight				BORING NO. 13584
SAMPLING METHOD: Mass Sampler Core 3 1/2"				SHEET 1 of 1
WATER LEVEL				DRILLING
TIME				START TIME
DATE				FINISH TIME
CASING DEPTH				DATE
				8-28-91 8-28-91

DATUM Berm ELEVATION

SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT SAMPLER	TIME
M	24/20	0	13584A	10:35	.1
M	24/19			10:40	.1
M	24/14		13584B	10:50	.1
M	24/18	5		11:00	.1
M	24/22		13584C	11:05	.1
		10		11:17	.1

DEPTH IN FEET	SOIL GRAPH
0	sm
1	sm
2	ml
3	ml
4	sm
5	sm
6	sm
7	sm
8	ml
9	ml
10	ml
11	ml
12	ml
13	ml
14	ml
15	ml
16	ml
17	ml
18	ml
19	ml
20	ml
21	ml
22	ml
23	ml
24	ml
25	ml
26	ml
27	ml
28	ml
29	ml
30	ml

SURFACE CONDITIONS:

PID amb = .1

104K 5/4 yellowish brown silty sand (sm), loose fine to med sand & 60% slight moist micaceous PID = .1

0 to .8, massive environmental sample taken at 70.425' (ss+sv) plus for sample

dark brown 104K 1/3 silty sand (sm) fine sand & 54% slightly moist, stained black (50%) from .8 to 1.1 ft PID = .1, some small pebble gravel < 1/2"

dark brown silty sand (sm) fine sand & 53% moist, occasional black mineral (mag) inclusions 1.1 to 1.5 ft

104K 4/3 dark brown sandy silt (ml), NP, silt & 60% moist, micaceous, some black mineral (mag) inclusions 1.5 to 3.8

104K 4/3 dark brown silty sand (sm), fine sand & 52% moist, micaceous, occasional black mineral inclusions 3.8 to 8.1 ft

2nd environmental samples taken at 5.0 ft (ss+sv)

jar sample at 5.0 (11:04)

104K 4/3 dark brown sandy silt (ml) silt & 60% moist, micaceous, PID = .1 8.1 to 10.0 ft

3rd environmental sample taken at 10.0 ft (ss+sv)

jar sample at 10.0 (11:18) PID = .1

Boring terminated at 10.0 ft, no water encountered

boring back filled and capped with 1 ft of portland cement type II

DRILLING CONTR
John Muller

No. 167277

James O. Spence

DATE 8-28-91

CHK'D BY

18.1 (3) (REV 11-80)

38

DRILLING CONTR. EPI

No. 167263

James O. Spencer

DATE 8-22-91 CHK'D BY

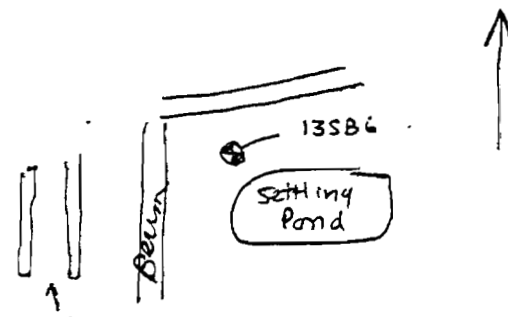
1 (3) (REV. 11-80)

SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	SAMPLE DEPTH	BLOWS/FT. SAMPLER	TIME	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:	
										WIND	TEMP
											Scattered area heavily flat between 2 and 3x0 Buen pan pairs at winds from the west at 10 to 12 Partly Sunny 80's PID ank = .2
M	24	23	0	B555	1.5	-	12:16 .2	0			
								1			
M	24	20					12:20 .2	2	Sm		dark brown 7.5 yr 4/4 silty sand (Sm) micaceous, moist, fine sand (58%) PID = .2 environmental sample taken at .5 ft (su+ss) jar sample taken at .5 ft (12:21)
								3			
M	24	22					12:25 .2	4			
				B555B				5			very moist
			5	5.0	-			6			environmental sample taken at 2:31 at 5.0 ft (su+ss) jar sample taken at 5.0 PID = .2
M	24	22					12:28 .2	7			
								8			
M	24	20					12:40 .2	9			dark brown 7.5 yr 4/4 silty sand (Sm) micaceous, very moist to wet, fine sand (55%) some reddish brown 7.5 yr 4/4 mineral concentrations and staining
M	24	23	10	B555C	10.0	-	12:49 .2	10			environmental sample taken @ 10.0 ft (sv+ss) (P) jar sample taken @ 10.0 ft PID = .2 boring terminated at 10.0 ft no water encountered
								11			
								12			
								13			Particulate Monitor TWA = 0.00 mg/m ³ for duration of work
								14			Backfill and cap top 1 ft w/ cement
								15			
								16			
								17			
								18			
								19			
								20			

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LOCATION OF BORING		135B6 Swmu 13		JOB NO.		06 702		CLIENT		USA THARMA		LOCATION		SWMU 13					
DRILLING METHOD: Mobile												BORING NO.				135B6			
B-57 - Hollow Stem 6.25 I.D.												SHEET				1 of 1			
Continuous flight auger												SAMPLING METHOD: Moss-sampler				(core)			
Pid amb = .2												DRILLING				START FINISH			
WATER LEVEL												TIME				TIME			
TIME												3:28				4:00			
DATE												DATE				DATE			
CASING DEPTH												8-21-91				8-21-91			



135B6

Settling Pond

North Arrow

DATUM	pad	Time	ELEVATION	SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS
							0	135B6	.5		3:28	0		Grassy field with some patches of sand
												1	sm	topping approx 2% to the South
												2		P. Summary 82. Pid Amb = .2
												3		organic surface layer, grass, many fine roots
												4		dark Brown 104R 4/3 silty sand (sm)
												5		slightly moist to moist, micaceous fine sand
												6		environmental sample taken at 0.5 ft (sv+ss) 54%
												7		dark Brown 104R 4/3 silty sand (sm)
												8		moist, micaceous fine sand (58%)
												9		
												10		environmental sample taken at 5.0 ft (sv+ss)
												11		jar sample
												12		
												13		
												14		
												15		
												16		
												17		
												18		
												19		
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												48		
												49		
												50		

BY Vin Spencer

DATE _____

CHK'D BY _____

Particulate monitor

TWA 0.00 mg/m³

1/3 bag of Portland Cement used

backfill and cap top 1 ft w/ cement

DRILLING CONTR. EPT

No. 167260

Dames & Moore

40

EDT

DRILLING CONTR

No. 167255

James O. Spencer

DATE 8-20-91 CHK'D BY

1 (3) (REV. 11-80)

LOCATION OF BORING						JOB NO.		CLIENT		LOCATION			
						06702		USA THAMA		Sumu 13			
						DRILLING METHOD:						BORING NO.	
						Hollow Stem Auger 6.25 ID						13SC1 E	
						Continuous Flight, dry						SHEET	
SAMPLING METHOD: H-sampler						1 OF 1		DRILLING					
Soil core						START		FINISH					
WATER LEVEL						TIME		TIME					
						12:00		12:25					
DATE						DATE		DATE					
CASING DEPTH						8-20-91		8-20-91					

SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
M	0	0	13SC1	12:00	.3	0	Sm	sandy open area sloping approx 2% towards south. Variably Cloudy 75° Winds 10 to 15 mph. PID amb = .3
M	24	25	13SC1	12:05	.3	1		dark brown 4.5 yr 4/4 silty sand (sm) slightly moist fine to medium sand, micaceous sand 25%
M	24	23	13SC1	12:09	.3	2		environmental composite sample with .5 of west (.5 ft)
M	24	20	13SC1	12:15	.3	3		
M	24	19	13SC1	12:20	.3	4		dark brown 4.5 yr 4/4 silty sand (sm) moist fine sand, micaceous alluvium sand 51%
M	24	18	13SC1	12:25	.3	5		environmental composite sample at 5.0 with west boring
M	24	17	13SC1	12:25	.3	6		dark brown 4.5 yr 4/4 silty sand (sm) very moist fine sand, micaceous sand 53%
M	24	16	13SC1	12:25	.3	7		alluvium
M	24	15	13SC1	12:25	.3	8		Brown 2.5 yr 5/2 silty sand (sm) moist medium sand, micaceous alluvium sand 60%-65%
M	24	14	13SC1	12:25	.3	9		auger boring terminated at 10.0 ft no water encountered
M	24	13	13SC1	12:25	.3	10		environmental composite sample at 10.0 ft with west boring
M	24	12	13SC1	12:25	.3	11		
M	24	11	13SC1	12:25	.3	12		
M	24	10	13SC1	12:25	.3	13		
M	24	9	13SC1	12:25	.3	14		
M	24	8	13SC1	12:25	.3	15		
M	24	7	13SC1	12:25	.3	16		
M	24	6	13SC1	12:25	.3	17		
M	24	5	13SC1	12:25	.3	18		
M	24	4	13SC1	12:25	.3	19		
M	24	3	13SC1	12:25	.3	20		
M	24	2	13SC1	12:25	.3	21		
M	24	1	13SC1	12:25	.3	22		
M	24	0	13SC1	12:25	.3	23		

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LOCATION OF BORING				JOB NO.		CLIENT		LOCATION			
Swmu 13 Burning Grounds				GG702 -		USATHAMA		SWMU 13			
				DRILLING METHOD:				BORING NO.			
				Hollow Stem Auger, 6.25 ID Continuous Flight Auger				13SCI W			
				SAMPLING METHOD:				SHEET			
				M - sampler soil core				1 OF 1			
				WATER LEVEL				DRILLING			
								START TIME		FINISH TIME	
				TIME				10:24		11:00	
				DATE				8-20-91		8-20-91	
CASING DEPTH											
SURFACE CONDITIONS:											
sandy open area sloping approx 2% towards south, Variably Cloudy, winds 10 to 15 mph 72°											
PID = .3											
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH				
M	2.0 2.0	0	① 13SCI A .5	-	10:24 .3	0	Sm	dark brown 4.5 yr 414 silty sand (sm)			
						1		moist (fine sand) ~51%			
						2		environmental comp sample taken at .5 ft			
						3		Soil volatile taken			
						4					
M	2.0 2.0				10:30 .3	5		dark brown 4.5 yr 414 silty sand (SM)			
		5	② 13SCI B 5.0	-		6		very moist (fine sand) ~53%			
						7		environmental comp sample taken @ 5.0 ft			
						8		Soil volatile (w/last boring)			
M	2.0 2.0				10:42 .3	9					
						10		auger boring terminated at 10.0 ft no water encountered			
M	2.0 1.9	10	③ 13SCI C 10.0	-	11:00 .3	11		environmental comp sample taken @ 5.0 ft			
						12		Soil volatile			
						13					
						14					
						15					
						16					
						17					
						18					
						19					
						20					

DRILLING CONTR. EDF

No. 167254

BY Jamie O. Spencer

DATE 8-20-91 CHK'D BY

Dames & Moore

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DRILLING CONTR EDI
No. 167256
BY James O. Spencer
DATE 8-21-91 CHK'D BY

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION	
SUMU 13				06702		USATHAMA		SUMU 13	
				DRILLING METHOD: B-57 mobile				BORING NO.	
				Hollow Stem 4.5" ID (Dry)				13SC2 E	
				Continuous Flight				SHEET	
DATUM				SAMPLING METHOD:				1 OF 1	
ELEVATION				M-sample core				DRILLING	
				WATER LEVEL				START	FINISH
				TIME				TIME	TIME
				DATE				DATE	DATE
				CASING DEPTH				8-21-91	8-21-91
SURFACE CONDITIONS:									
sandy area sloping 2% to South									
PIP amb = .2 Sunny 70° calm									
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO	BLOWS/FT SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	
M	24	20	0	13SC2A		7:20	0		dark brown 104R 4/3 silty sand (SM)
						.2	1	Sm	note moist (≈60% sand) fine to med sand
							2		environmental sample taken at .5 ft bgl (SV+SS)
M	24	0				7:25	3		Composite, jet sample taken at .5 ft
							4		2 to 4 ft no recovery
							5		4 to 6 ft no recovery
M	24	0	5			7:35	6	Sm	brown 104R 5/3 silty sand (SM)
	24	21		13SC2B		7:40	7		micaceous very moist (≈55% sand) fine sand
						.2	8		environmental sample taken at 6.0 ft bgl (SV+SS)
M	24	2				7:45	9		Composite, jet sample taken at 6.0 ft
							10		no recovery 8 to 10 ft gravel encountered
							11	?	
M	24	2	10			7:50	12		no recovery 10 to 12 ft
							13		
M	24	0				7:55	14	?	no recovery 12 to 14 ft
						8:12	15		
							16		no recovery 14 to 16 ft
M	24	0	15			8:16	17		boring terminated at 16.0 bgl
							18		no water encountered
						8:20	19		
							20		1/3 bags of portland cement used
							21		backfill and cap top 1 ft w/ cement
							22		

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LOCATION OF BORING SWMU 13 East Half		JOB NO. 06702	CLIENT USATHAMA	LOCATION SWMU 13
		DRILLING METHOD: B-57 mobile		BORING NO. 13SC 2 W
		Hollow stem 4.5 ft I.D (Dry)		SHEET 1 OF 1
		Continuous Flight		DRILLING
DATUM 13 SC 2 W		SAMPLING METHOD: M sample core		START TIME 9:02
ELEVATION		WATER LEVEL		FINISH TIME 9:30
		TIME		DATE 8-21
		DATE		DATE 8-21
		CASING DEPTH		

SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
M	24	18	0	1	-	9:02	0	Sm	sand area slope approx 2% to the south Partly Cloudy Pld amb = .2
						.2	1		
M	24	20				9:06	2		dark brown 104R 3/3 silty sand (sm) moist micaceous fine to med (55%) PID = .0 sand
						.2	3		environmental sample composited with east boring dark brown 104R 4/3 sandy silt (ml) silt (55%)
							4		moist, micaceous
M	24	16				9:10	5		dark brown 104R 3/3 silty sand (sm) moist fine sand (51-55%)
			5	3528	-		6		environmental sample @ 5.0 ft composited with east boring
M	24	20				9:28	7		dark brown 104R 3/3 sandy silt (ml) micaceous moist silt (58%) some fine sand
						.2	8	ML	dark brown 104R 3/3 sandy silt (ml) micaceous very moist silt (60%) some fine sand
							9		environmental sample (sv & ss) at 10.0 ft
M	24	19	10	3529	-	9:30	10		Boring terminated at 10.0 ft no water encountered
							1		
							2		Particulate Monitor 0.00 ng/m ³
							3		
							4		.25 bag of Portland Cement
							5		backfill and cap top 1 ft w/ cement
							6		
							7		
							8		
							9		

DRILLING CONTR. Ed

No. 167257

BY James O. Spencer

DATE 8-21-91

CHK'D BY

1 (3) (REV. 11-80)

Dames & Moore

44

LOCATION OF BORING <u>swmu 13</u>		JOB NO. <u>06702</u>	CLIENT <u>USA THANA</u>	LOCATION <u>13swmu</u>
Road 3x0 drilling pad 13SC3 E		DRILLING METHOD: <u>Hollow Stem 6.25 ID Continuous Flight (Dry)</u>		BORING NO. <u>13SC3 Eas</u>
		SAMPLING METHOD: <u>M-san</u>		SHEET <u>1 of 1</u>
DATUM		WATER LEVEL		START TIME <u>10:40</u>
ELEVATION		TIME		FINISH TIME <u>11:05</u>
		DATE		DATE <u>8-21-9</u>
		CASING DEPTH		DATE <u>8-21</u>

SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
M	24	20	0	13SC3	0.5	10:40	.2	0	Sm	Sandy open area sloped approx 2 PID amb .2
M	24	20				10:44	.2	1		dark brown 104R 3/3 silty sand (sm) moist micaceous fine to med sand (55-57%)
M	24	20						2		environmental sample taken at .5 ft (SV+SS)
M	24	12	5	13SC3	5.0	10:48	.2	3		jar sample taken at .5 ft
M	24	20				10:52	.2	4	Sm-ML	dark brown 104R 3/3 silty sand (sm-mc) fine sand (50%)
M	24	20						5		very moist, micaceous
M	24	20				10:58	.2	6		environmental sample taken at 5.0 ft (SV+SS)
M	24	16						7		jar sample taken at 5.0 ft
M	24	13	10	13SC3	10.0	11:05	.2	8	Sm	dark brown 104R 3/3 silty sand (sm) fine sand (52%)
								9		very moist, micaceous 55%
								10		environmental sample taken at 10.0 ft (SV+SS)
										boring terminated at 10.0 ft jar sample at 10.0 ft
										no water encountered
								1		
								2		
								3		
								4		1/3 bag of Portland cement used
								5		backfill and cap top 1 ft w/ cement
								6		
								7		
								8		
								9		

DRILLING CONTR. CDI

No. 167258

BY JAMES O. SPENCER

CHK'D BY

(3) (REV. 11-80)

Dames & Moore

45

LOCATION OF BORING SWMU B SC3 W

JOB NO.

06702

CLIENT

USATHAMA

LOCATION

SWMU B

DRILLING METHOD:

B-57 mobile Hollow stem auger
6.25 I.D. Continuous Flight, dia 4 5/8"

BORING NO.

13SC3 West

SHEET

1 of 1

SAMPLING METHOD: Bl - sampler

soil core

DRILLING

WATER LEVEL

TIME

DATE

CASING DEPTH

START

TIME

12:30

FINISH

TIME

1:05

DATE

8-21-91

DATE

8-21-91

DATUM

ELEVATION

SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO	DEPTH OF SAMPLE	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
M			0	1	0.5	12:30 .2	0	
M	24	20				12:35 .2	2	
M	24	22				12:40 .2	4	
M	24	22	5	2	5.0	12:45 .2	6	
M	24	16				12:52 .2	8	
M	24	21	10	3	10.0	1:05 .2	10	

SURFACE CONDITIONS:

Sandy area sloping approx 2% to the south
Partly cloudy 80°
PIP amb = .2

dark brown 10gr 3/3 silty sand (SM)
moist, micaceous fine to med sand (58-60%)
environmental sample taken at .5 ft (SS)
composited w/ root boring
dark brown 10gr 3/3 silty sand (SM)
micaceous, moist fine sand (52-54%)
dark brown 10gr 3/3 sandy silt (ML)
moist, micaceous fine sand - (45%)
environmental sample taken at 5.0 ft, composited
SS, for sample taken at 5.0 ft
dark brown 10gr 3/3 silty sand - (SM-ML)
very moist fine sand (50%)
micaceous
dark brown 10gr 3/3 silty sand (SM)
very moist fine sand 51%-54%
micaceous
environmental sample taken at 10.0 ft
boring terminated at 10.0 ft
no water encountered

Particulate monitor

1.18 hr TWA 0.00 mg/m³

1/3 bag of Portland Cement used

backfill and cap top 1 ft w/ cement

DRILLING CONTR. ERT

No. 07259

BY James O. Spencer

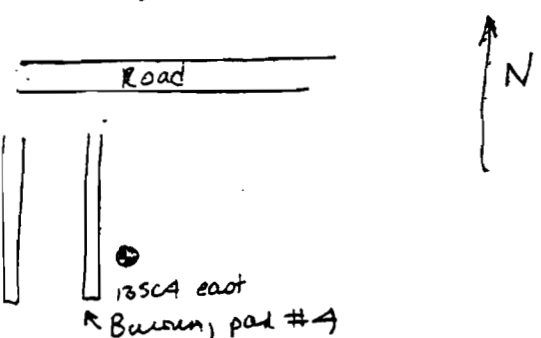
DATE 8-21-91 CHK'D BY

Dames & Moore

46

LOCATION OF BORING: East Half of SWMU 13 SC4 East

JOB NO. 06702-	CLIENT USATHAMA	LOCATION SWMU 13
DRILLING METHOD: B-57 mobile rig Hollow Stem 8.5" I.D, continuous flight, dry		BORING NO. 13SC4 East
SAMPLING METHOD: Moss Sample (core)		SHEET 1 of 1
DRILLING		
WATER LEVEL		START TIME 8:16
TIME		FINISH TIME 8:50
DATE		DATE 8-22-91
CASING DEPTH		DATE 8-22-91



DATUM: River ELEVATION

SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
			0	13SC4A	1	8:16	0	sm
						8:16	1	
M	24	20				8:20	2	
						8:20	3	
M	24	22				8:25	4	
			5	13SC4B		8:25	5	
M	24	19				8:30	6	
						8:30	7	
M	24	20				8:45	8	
						10.0	9	
M	24	22	10	13SC4C		8:50	10	
						12.0	11	
							12	
							13	
							14	
							15	
							16	
							17	
							18	
							19	
							20	

SURFACE CONDITIONS: heavily level sandy area with patches of grass adjacent to Bureau, pad 4 east, Foggy 59°
PTD amb = .2

dark brown 10 yr 3/3 silty sand (sm)
slightly moist, micaceous, fine sand (55%)
PID = .2, trace gravel 2/3
particulate 0.00
environmental sample 8:23 SV + SS comp @ 0.5 ft
jar sample @ 5.0
moist

dark brown 10 yr 3/3 silty sand (sm)
moist, micaceous, fine sand (50%)
PID = .2
environmental sample 8:35 SV + SS comp @ 5.0 ft
jar sample @ 5.0 ft

PID = 10.0 @ 7.0 ft for sample

environmental sample taken at 8:50 SV + SS @ 9.5 ft
jar sample @ 9.5 to 10. ft
PID = 12.0 @ 9.5 to 10 ft for sample
particulate reading 0.0
boring terminated at 10.0 ft
no water encountered
grouted to ground surface

1/3 bag of Portland Cement
backfill and cap top 1 ft w/ cement

EDJ
DRILLING CONTR.
No. 167261

BY James O. Spencer
DATE 8-22-91 CHK'D BY
131 (REV. 11-80)

Dames & Moore

47

LOCATION OF BORING SWMU 13 13SC4 West East Half of		JOB NO. 06702	CLIENT USATHAMA	LOCATION SWMU.13
		DRILLING METHOD: B-57 mobile		BORING NO. 13SC4 West
		4 5/8" hollow stem auger, continuous flight, dry		SHEET 1 OF 1
		SAMPLING METHOD: Moss sampler (core)		DRILLING
DATUM		WATER LEVEL		START TIME 1055
ELEVATION		TIME		FINISH TIME 1124
		DATE		DATE 8-22-91
		CASING DEPTH		DATE 8-22-91

SAMPLER TYPE	INCHES ENTERED INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT SAMPLER	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
M	24 20	0	1055	.2	0	SM	Sandy area between two burning piers (set 4) Slope of 2-5% towards South Mostly Sunny PI = .2
M	24 19		1059	.2	1		dark Brown silty sand (SM) moist, micaceous fine to med sand (60%) PI = .2
M	24 20	5	11:05	.2	2		environmental sample @ .5 ft composite with SS east sample jar taken .5 ft
M	24 22		11:08	.2	3		2.0 to 4.0 ft very moist PI = .2
M	24 21		11:18	.2	4		4.0 to 6.0 ft very moist PI = .2 (11:25)
		10	11:24	.2	5		environmental sample @ 5.0 ft composite with SS east sample jar taken @ 5.0 ft
					6		6.0 to 8.0 ft very moist PI = .2
					7		very moist 8.0 to 10. ft PI = .2 (11:25)
					8		environmental sample @ 10.0 ft composite with SS east sample jar taken @ 9.5 ft - 10.0
					9		drilling terminated @ 10.0 ft no water encountered
					10		TWA of particulate monitor during boring, 0.000 mg/m ³
					11		Backfill and cap top 1 ft w/ cement

Ed I

DRILLING CONTR

NU. 167262

BY James O. Spencer

DATE 8-22-91 CHK'D BY

Dames & Moore

48

LOCATION OF BORING SWMU 13 West

JOB NO. 06702	CLIENT USATHAMA	LOCATION SWMU 13
DRILLING METHOD: 4 5/8" Hollow Stem Continuous Flight Drill Mobile B-57		BORING NO.: 13SC5 East
SAMPLING METHOD: Moss Sampler		SHEET 1 of 1
WATER LEVEL		DRILLING
TIME	DATE	START TIME 8:15
DATE	DATE	FINISH TIME 8:45
CASING DEPTH	DATE	8-26-91

Road

13SB5 East

Burn Pad

DATUM former location of pad ELEVATION

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
M	24 20	0	13SC5A 0.5		8:15 .1	0	
M	24 17				8:20 .1	1	
M	24 13					2	
M	24 13	5	13SC5B 5.0		8:32 .1	3	
M	24 20				8:38 .1	4	
M	24 21				8:40 .1	5	
M	24 10	10	13SC5C 10.0		8:45 .1	6	
						7	
						8	
						9	
						10	
						11	
						12	
						13	
						14	
						15	
						16	
						17	
						18	
						19	
						20	

SURFACE CONDITIONS:
Grass + sand between burn pad 1 & 2 nearly level
cloudy 70°, winds 8-10 mph NW
PID and = .1

yellow brown 10 yr 5/4 silty sand (sm) Dry some
fine roots and organics 0 - 0.3 ft
dark brown 10 yr 4/3 silty sand (sm) Dry
trace fine roots to 1.0 ft micaceous fine sand 45%
environmental sample taken at .5 ft (sv+ss)
jar sample at .5 ft slightly moist at 2.7 ft to 2.9 ft
at 2.5 ft moist, trace fine roots (8:35)
environmental sample taken at 5.0 ft (ss+sv) jar sample
at 5.0 ft moist from 2.5 to 6.0 ft
very moist at 6.0 ft to 10 ft
silty sand (sm) fine sand 45%, micaceous
massive structure, trace black magnetite staining
silty sand (sm) at 8.0 to 10.0 ft fine sand 45%
micaceous, massive structure
environmental sample taken at 10.0 ft (sv+ss)
jar sample (8:45)

Boring terminated at 10.0 ft
No water encountered
Boring filled ^{also} and capped with 1 ft of
Portland Cement type II
Particulate Monitor 0.00 TWA

DRILLING CONTR. EUL
John Muller

No. 167288

James O. Spencer

CHK'D BY

DATE

28.1 (3) (REV. 11-80)

Dames & Moore

49

LOCATION OF BORING		JOB NO. 06702	CLIENT USATHAMA	LOCATION Swimu 13
		DRILLING METHOD: Hollow Stem 4 5/8" Continuous Flight, Dry Auger	BORING NO. 13SC5 west	
		Mobile B-57	SHEET 1 of 1	
		SAMPLING METHOD: Moss Sample	DRILLING	
		Core	START	FINISH
		WATER LEVEL	TIME	TIME
		TIME	9:46	10:15
		DATE	DATE	DATE
		CASING DEPTH	8-26-91	8-26-91

DATUM Outline of former pit ELEVATION

SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	SAMPLE DEPTH	BLOWS/FT. SAMPLER	TIME	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
M	24	20	0	13SC5B	.5	-	9:46	0	sm	Sand + grass area betw Burn pad 1 & 2 Nearly level, Cloudy 73°, Wind 10 to 15 mph NW PID amb = .1
M	24	22					9:50	2		dark brown to yr 4/3 silty sand (sm) fine sand 2 55%, slightly moist, micaceous, some organic + trace fine roots, massive structure, environmental sample taken (9:50) at .5 ft ss+sv composited w/ 13SC5B
M	24	17					9:53	4	ML	par sample taken at .5 ft PID = .1 At 2.0 ft moist dark brown sandy silt (ML) 10 yr 4/3 silt + 25% fine sand, massive structure, NP, micaceous
M	24	19	5	13SC5B	5.0	-	9:58	5		black mineral (magnetite) staining at 4 to 5 ft grading to 25% silt, fine sand, very moist
M	24	19					9:58	6		at 6.2 ft massive structure, micaceous environmental sample taken at 5.0 ft (ss+sv) composited w/ 13SC5 east, etc.
M	24	22					10:08	8		grading from sandy silt (ML) to silty sand (sm) 6 to 9 ft dark brown silty sand (sm)
M	24	22					10:12	9		10 yr 4/3 fine to med sand (53%) micaceous environmental sample at 10.0 ft (ss+sv) composited with 13SC5 east
M			10	13SC5B	10.0	-	10:12	10	sm	
								1		Boring terminated at 10.0 ft no water encountered
								2		begin filled and capped w 1 ft of Portland Cement type II
								3		Particulate Monitor 0.00 mg/m ³
								4		
								5		
								6		
								7		
								8		
								9		
								0		

EDT John Muller

DRILLING CONTR.

No. 107289

James O. Spencer

DATE 8-26-91 CHK'D BY

Dames & Moore

50

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION	
				06202		USF-TYAMA		SW MU 13	
DRILLING METHOD: B-57-mobile 4.25" hollow stem auger continuous flight, dry SAMPLING METHOD: Moss sample core 3 1/2"				BORING NO.		SHEET		DRILLING	
				13SC6 E		1 OF 1		START FINISH	
				TIME		TIME		DATE DATE	
				8:06		9:00		8-27-91 8-27-91	
WATER LEVEL				DATE		DATE		DATE DATE	
TIME				DATE		DATE		DATE DATE	
DATE				DATE		DATE		DATE DATE	
CASING DEPTH				DATE		DATE		DATE DATE	
ELEVATION				DATE		DATE		DATE DATE	
SURFACE CONDITIONS:				Sandy area between burning pin set #2					
				approx 2% slope towards south, Cloudy Drizzle to PID amb = 1 calm					
SAMPLER TYPE				brown 104R 5/3 silty sand (sm)					
INCHES DRIVEN				micaceous, loose, dry med sand 26.8%					
INCHES RECOVERED				massive structure 0 to .8 environmental sample taken					
DEPTH OF CASING				dark brown 104R 3/3 silty sand (sm)					
SAMPLE NO				trace small gravel, black mineral stained layer					
SAMPLE DEPTH				1/2" thick some black mineral (magnetite inclusions)					
BLOWS/FT SAMPLER				from .8 to 2 ft, slightly moist, fine sand 2.54%					
TIME				very moist at 2.4 ft to 4.0 ft					
RINGS				very moist to wet from 4.5 to					
P				some black mineral (magnetite stains)					
0				environmental sample taken at 5.0 ft (ss+sv) comp					
1				in sample (8:48)					
2				4 to 5.1 ft brown 104R 4/3 silty sand (sm)					
3				moist, micaceous; medium sand (62%)					
4				5.1 to 8.0 ft dark brown 104R 3/3 silty sand (sm)					
5				very moist, micaceous, faint black mineral (magnetite)					
6				stains, massive fine sand 52%					
7				8 to 9.0 ft fine to med sand 2.56%, massive					
8				structure, very moist					
9				9.0 to 10.0 ft fine sand 2.53%, massive structure					
10				environmental sample taken at 10.0 ft (ss+sv)					
1				composite sample very moist					
2				far sample at 10.0 ft					
3				boring terminated at 10.0 ft					
4				no water encountered					
5				Portulacati monitor TWA 0.00					
6				Boring filled + capped w/ 1.0 ft of portland					
7				cement type II					
8									
9									

DRILLING CONTR. John Muller

No 167270

BY Tanner Spencer
8-27-91

CHK'D BY

Dames & Moore

51

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION			
Diagram showing boring locations #3 and #2 relative to a road and north arrow.				06702		USA-THAMA		JMWU 13			
				DRILLING METHOD: 57 - mobile						BORING NO.: 13SC6 West	
				4.25" hollow stem auger, continuous flight, dry						SHEET 1 OF 1	
				SAMPLING METHOD: Mass sample core 3 1/2"						DRILLING	
				WATER LEVEL						START	
DATE				TIME		DATE		TIME			
CASING DEPTH				DATE		DATE		DATE			
DATUM				ELEVATION		8-27-91		8-27-91			
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS		
M	24	24	0	13SC6B	0.5	4:59	0	sm	Light yellowish brown 10YR 6/4 silty sand (SM) fine to medium sand 25%, moist, loose reddish brown 2.5YR 4/4 and black mineral staining 0.0 to 0.75 ft		
M	24	23				9:55	1	ML	Environmental sampling composite ss at .5 ft PID = .1		
M	24	17				10:10	2	sm	Very dark grayish brown 2.5Y 4/2 very fine silty sand (SM) very fine sand 25%, moist, block structure to massive, micaceous .75 ft to 2.2 ft grading from SM to sandy silt at 2.0 ft (ML)		
M	24	19	5	13SC6B	5.0	10:17	3		dark brown sandy silt (ML) 10YR 3/3 moist, blocky massive structure, silt 26%, micaceous, 2.2 to 4.0		
M	24	13.5				10:25	4		yellowish brown 10YR 5/4 very fine silty sand (SM) very fine to fine 25% to fine from 4.0 to massive, moist, micaceous		
M			10	13SC6B	10.0	10:31	5		environmental sample taken at 5.0 ft (ss composite) (10:21) PID = .4		
							6		occasional black mineral (magnetite) staining from 6.2 to 10.0 ft		
							7		PID = .3		
							8		Environmental sample taken at 10.0 ft (ss) composite PID = .1		
							9		10:35		
							10		boring terminated at 10.0 ft		
							11		no water encountered		
							12		boring backfilled to -1' ft, capped with Portland Cement type II W/S		

DRILLING CONTR. EPI John Muller

No. 167273

James O. Spencer

DATE 8-27-91 CHK'D BY

Dames & Moore

1-2

LOCATION OF BORING		JOB NO.	CLIENT	LOCATION
		06702	USATHAMA	SWMU 13
DRILLING METHOD: B-57 mobile				BORING NO:
4.25" hollow stem auger, cont flight				13SC7 East
dry				SHEET
SAMPLING METHOD: Moss sampler core				1 of 1
3 1/2'				DRILLING
WATER LEVEL				START TIME
				8:36
TIME				FINISH TIME
				8:20
DATE				DATE
				8-28-91
CASING DEPTH				8-28-91

SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	DEPTH	BLOWS/FT. SAMPLER	TIME	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
M	24	20	0	1	0.5		7:30	0	sm	Sandy area sloping ~2% to South, cloudy, patchy fog 50's, calm
M	24	21					7:43	2		PID and = .1
M	24	12	5	2	5.0		7:50	4		yellowish brown 10 yr 5/4 silty sand (sm) fine to med sand ~60%, slightly moist, loose, massive some small pebble gravel (UDOT stone) PID=3.0
M	24	22					7:59	6		0 to 1.3 ft micaceous dark brown 10 yr 4/4 silty sand (sm) fine sand ~53%, moist, massive, blocky, 1.3 ft → environmental sample taken at .5 ft (ss+sv) for comp jar sample taken at .5 (7:48) very moist at 2.3 ft to 4.0 ft
M	24	18	10	3	10.0		8:20	10		brown 10 yr 5/3 silty sand (sm) fine sand ~57% moist, massive, micaceous environmental sample from 5.0 ft (ss+sv) for comp jar sample at 5.0 ft moist from 4 to 5.3 ft
								1		dark brown 10 yr 4/4 silty sand (sm) fine sand ~54% very moist 5.8 to 10.0, massive, micaceous some black mineral stains (magnetite), rounded 2 inch diameter gravel included
								2		micaceous, moisture with depth
								3		3rd environmental sample from 10.0 ft (ss+sv) for comp jar sample at 10.0 ft (8:25)
								4		boring terminated at 10.0 ft
								5		heavy encrustation
								6		boring drilled to -1' ft, capped with 1' of portland cement type II
								7		particulate monitor = TWA = 0.00 mg/m3
								8		
								9		
								0		

DRILLING CONTR. EPI John Muller

No. 107275

James O. Spencer DATE 8-18-91

CHK'D BY

Dames & Moore

53

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION																																																																																																																																																																																																							
				06702		USATHAMA		Sumu 13																																																																																																																																																																																																							
				DRILLING METHOD: Mobile B-57, 4.25"						BORING NO.																																																																																																																																																																																																					
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SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT	TIME	DEPTH IN FEET	SOIL GRAPH																																																																																																																																																																																																							
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				yellowish brown 104R 5/4 silty sand (Sm) fine to med sand ~65%, loose, massive, slightly moist, 0 to 1.1 ft PID = .1 some small pebble gravel Environmental sample taken at .5 ft (ss comp w/ 135C 7 West) (9:12) dark brown 104R 4/3 silty sand (Sm) 1.1 to 2.5 ft fine sand ~54%, massive, moist, small pebble gravel, reddish brown 2.5R 5/4 and black including black mineral staining, at 1.1 to 2.5 ft (margin) Some yellow 104R 8/8 mineral inclusions dark grayish brown 104R 3/2 silty sand (Sm) fine sand ~54%, massive moist (2.5 ft to 4.5 ft) micaceous PID = .3 Dark yellowish brown 104R 4/6 silty sand (Sm) fine sand ~56%-58%, massive, moist, micaceous (4.5 ft to 6.0 ft) 2nd environmental sample taken (ss comp) at 5.0 ft (9:26) PID = .1 Increasing moisture with depth Dark Brown 104R 4/3 silty sand (Sm), very moist massive, micaceous, some 2" gravel (rounded) at 6.0 to 7.0 ft increasing moisture at 6.0 ft to very moist occasional 1/4" pebble at 8.0 to 10.0 ft 3rd environmental sample (ss for comp) taken at 10.0 ft (9:45) PID = .1 Boring terminated at 10.0 ft no water encountered Boring filled to -1' ft and capped w/ Portland Cement type II Particulate Monitor TWA 0.00 mg/m³																																																																																																																																																																																																											

DRILLING CONTR. EAT John Muller

No. 167276

CHK'D BY James O. Spencer

DATE

15.1 (3) (REV. 11-80)

Dames & Moore

54

LOCATION OF BORING				JOB NO.	CLIENT	LOCATION
				06702	USATHAMA	SWML 13
				DRILLING METHOD: B-57 mobile		BORING NO.
				#25 hollow stem auger, continuous flight dry		1358 East
				SAMPLING METHOD: Moss sample cores		SHEET
				3 1/2		1 of 1
						DRILLING
				WATER LEVEL		START
				TIME		TIME
				DATE		DATE
				CASING DEPTH		DATE
						8-29-91 8-29-91

DATUM		ELEVATION		SURFACE CONDITIONS:	
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS
M	24 15	0	15	7:52	.1
M	24 20			7:59	.1
M	24 17			8:15	.1
M	24 15	5	50	8:30	.1
M	24 22			8:40	.1
M	24 10	10	100	8:44	.1

DEPTH IN FEET	SOIL GRAPH	DESCRIPTION
0	GM	light gray silty gravel (6m) 5 yr 7/1 dry
1	ML	(graded fill - VDOT #56-59 gravel) (0 to 0.5 ft)
2	sm	dark brown 10 yr 4/3 clayey silt (ml) trace fine sand with some reddish brown 2.5 yr 4/14 stains (.5 to 1.5 ft) massive, blocky, slightly moist PID = 6
3		1st environmental sample taken at .5 to 1.0 ft (SS+SV) plus jar sam
4		dark brown 10 yr 4/3 silty sand (sm) fine sands & 5% massive, micaceous, moist friable (1.5 to 5.0 ft) occasional heavy black mineral stains (magnetite) PID = 1
5	SW	dark brown 10 yr 3/3 silty sand (sm) fine to med sand & 62% massive, moist, friable 5.0 ft general increasing grain size from 1.5 to 5.0 ft PID = 1
6		2nd environmental sample taken at 5.0 ft (SS+SV) to be composited (8:30) jar sample also taken
7	Sm	light brownish yellow 10 yr 6/14 sand well graded gravelly sand (sm) little fine pebble gravel of chert, dolomite and limestone. sub rounded to rounded gravel 5.2 to 8.0 ft
8		grayish brown 10 yr 5/12 silty sand (sm) very fine to fine sand & 5% - 62% moist massive, occasional heavy black mineral staining (magnetite) some pebble gravel of chert, dolomite and limestone (8.0 to 10.0 ft)
9		Boring terminated at 10.0 ft no water encountered
10		Particulate monitor PWA 0.00 mg/l m3 with soil
11		Boring drilled to 1' below grade (capped w/ Portland Cement type II)

DRILLING CONTR. EPI
John Muller

No 10/2001

JAMES C. SPENCER
DATE 8-29-91 CHK'D BY

Dames & Moore

55

LOCATION OF BORING				JOB NO.	CLIENT	LOCATION
				06702	USATHAMA	SWMU 13
				DRILLING METHOD: B-57 mobile		BORING NO.
				4.25" hollow stem auger		13SC8 West
				continuous flight		SHEET
				SAMPLING METHOD: Mass sample-core		1 of 1
				3 1/2"		DRILLING
				WATER LEVEL		START
				TIME		FINISH
				DATE		TIME
				DATE		DATE
				CASING DEPTH		8-29-91 8-29-91

DATUM				ELEVATION				SURFACE CONDITIONS:	
SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT.	TIME	DEPTH	SOIL GRAPH	Gravel (VDET #16-17) + sand area behind fan #8	
								Fog + clouds 60°S. Calm	
								PID amb = .1	
M	24	0	13SC8A		9:32	0	GC	light gray silty gravel (GM) 54R 7/1	
	23				.1	1	ML	dry (fill-graded fill) (C.O to C.5 ft)	
M	24				9:38	2		Dark reddish brown 2.54x 3/4 sandy silt (ML)	
	22				.1	3	SM	silt & 50-51% blocky - massive, slightly moist	
						4		trace organics 1st environmental sample taken at .5 ft (ss +) PID = .1	
M	24				9:45	5		composite w 13SC8 east	
	21		13SC8B		.1	6	SW	Dark Brown 7.54x 4/2 silty sand (SM) moist	
		5	50			7		massive, occasional heavy black mineral stains	
M	24				9:53	8		(magnetite) very fine to fine sand (52%) PID = .1	
	23				.1	9		general coarsening of sand to 5.8 ft	
						10	SM	gradation at 4 to 5.2 ft ± 54-56%	
M	24		13SC8C		9:57	11		2nd environmental sample taken @ 50 ft (ss) (9:55)	
	21		10.0		.1	12		composite with 13SC8 east	
						13		light brownish yellow 104x 6/4 well graded	
M		10			10:10	14		gravelly sand (SW) little fines pebble gravel of	
						15		chert, dolomite and limestone. Sub rounded to rounded gravel	
						16		moist, PID = .1 (5.2 to 6.1 ft)	
						17		grayish brown 104x 3/2 silty sand (SM)	
						18		very fine to fine sand & 58% increasing moisture -	
						19		moist, massive, concentrations and thin layers	
						20		of heavy black minerals (mag + mica) at 8.5 to	
						21		9.2 ft	
						22		environmental sample taken at 10.0 ft (ss composite	
						23		(3AP) with east (10:11)	
						24			
						25			
						26		Boring terminated at 10.0 ft	
						27		no water encountered	
						28		Particulate monitor 0.00 mg/lm3	
						29		spilled to 1' below surface with soil	
						30		and capped with 1' of portland cement type II	

DRILLING CONTR. EPT
John Muller

No. 107280

James C. Spencer
DATE 8-29-91

SWMU 17

Dames & Moore

57

LOCATION OF BORING Flexing Area		JOB NO. 06702-077	CLIENT USATHAMA	LOCATION RAMP
DRILLING METHOD: 4 1/4" HSA		BORING NO. 175B1		
SAMPLING METHOD: Rust Sampler continuous cut		SHEET 1 OF		
WATER LEVEL		DRILLING		
TIME		START TIME		
DATE		FINISH TIME		
CASING DEPTH		DATE		

DATUM ELEVATION

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
175B2	5.0	0	1.5	1139		0	
						1	
						2	
						3	
						4	
175B1	4.0 3.0	5	2.5	1140		5	
						6	
						7	
						8	
						9	
						0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						0	

SURFACE CONDITIONS: A-B-A-A-A

V. Poor Recovery - 0.31 only - Gravel and silt - Could not obtain a chemical sample here
layer of brownish yellow gravel, sand silt, clay, to 2.0'

Chem sample 8.0' 11:50

Increased 7.5 M/S ft strong brown silt, clay at 7.0', w/ gravels.

Chem sample 9.0' 12:00

Refusal at 9.0 feet

From 5.0 - 9.0, Recovered 2.0' for section and oil stained (see P.D.) probable cave - a from above.

No. 169930

BY John Spangler
DATE 4/5/01

28.1 (3) (REV. 11-90)

Dames & Moore

58

LOCATION OF BORING		JOB NO.	CLIENT	LOCATION
N → Flashing Area Excavated fuel oil tanks 17502 17501		DL702-077	USATHAMA	RAMP
DRILLING METHOD: 4 1/4 HSA			BORING NO. 175A2	
SAMPLING METHOD: Moss Sampler Continuous core			SHEET 1 OF 1	
WATER LEVEL			START TIME	FINISH TIME
TIME			12:05	12:25
DATE			DATE	DATE
CASING DEPTH			11/5/91	11/5/91

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
		Moss	5.0	0.4	0	1	0.5	1205	0	GM	Amb A. 0.2
									1		
									2		
									3		
									4		
		Moss	5.0	0.4	5	2	5.0	1213	5		Very poor recovery - 0.4'
									6		General; silty, silty, 75% A/V6
								1217	7		Strong brown, no pit out slight
									8		odor
									9	GC	
									10		
									1		
									2		5.0' 12:20 sample
									3		
									4		
									5		Very poor recovery - 0.4'
									6		0.1' slumped silty, full silty, highly
									7		gravelly, bit present recovery, slight
									8		moist
									9		
									10		
									1		10.0' 12:30 sample
									2		75% A/V6 strong brown silty
									3		mixture of gravels, sand silt, slight
									4		moist
									5		
									6		
									7		
									8		
									9		
									10		

DRILLING CONTR. 602

7 Lynch, D. Muller, D. Dale

169933

John Stanger

DATE 11/5/91

CHK'D BY

28.1 (3) (REV. 11-80)

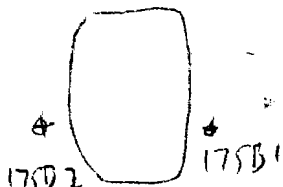
Dames & Moore

59

LOCATION OF BORING

Flashing, (ground)

17503



JOB NO.

06702-077

CLIENT

USATHAMA

LOCATION

RAAP

DRILLING METHOD:

424 HSA

BORING NO.

17503

SHEET

1 OF 1

SAMPLING METHOD:

Mass Sampler

Continuous Core

DRILLING

START TIME

12:56

1:15

DATE

11/5/91

WATER LEVEL

TIME

DATE

CASING DEPTH

DATUM

ELEVATION

SURFACE CONDITIONS:

Amb Air 03

SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
17502	5.0	2.0	0	1		128	0	
							1	
							2	GM
							3	
							4	CL
17503	2.0	1.5	5	2		102	5	
							6	ML
						105	7	
							8	
							9	
							0	
							1	
							2	
							3	
							4	
							5	
							6	
							7	
							8	
							9	
							0	

0-2.5 - poor recovery - 0.5'

dry, sandy, silt, 75% silt, strong, wavy;

poor recovery due to generally firm

2.5-5.0 Full Recovery

17503A Sample 2.5-5.0 1:10

2.5-5.0 75% silt, strong, wavy, and hard

slightly silty, no clay no sand

17503B Sample 1:30 5.5-7.0'

Soft, moist, 75% silt, reddish, yellow, wavy

fine, sandy, and silty, no clay no sand

Refusal at 7.0 feet

Termination of 7.0'

DRILLING CONTR. E.T.F. 169930 T. Lynch, B. Phillips, D. Johnson

John Spangler DATE 11/5/91 CHK'D BY

25.1 (3) (REV. 11-90)

60

25.1 (3) (REV. 1)

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS: Ambient Air 0.2
SS	23 0.6	0	1 0-2	15, 13 21, 18		0 1 2		No deflection at spread 101R 7/4 v pole line. depths only 5 ft. 4 ft. also, same earth, - very stiff no other, no stone.
						3 4 5	Rock	Rock at 3 feet - drill down to 4 feet then change over to 8" Air Hammer. With Air Hammer to 28" + begin coring at 30.0'
cut			2 6.5		330	6 7 8 9		5:45/1 grey dolomite fr. hard Drilling is slow, in places very dusty
cut			3 10.5		314	0 1 2		At 10.5 some red dirt & some 2 1/2 ft yellowish brown dolomite to 15 ft. no ph. & drilling time considerable delay
cut			4 12.5		315	3 4 5 6 7 8 9 0		12.5' hard 5 1/2 ft. of yellow grey dolomite to 25 ft. 1/2 pole cut spotted , not imp. to hammer perfect condition. 4:00 - 4:30 (SD hammering for repair). 4:45 at 16' 4:54: 175 - \$17.0 - soft 1 secum, possible void - will add 5' before end and if we can proceed hard ground at 20.0'

Dames & Moore

61

DRILLING CONTR. FDZ
T. Lynch, B. Phillips, A. Valera
John Spangler
 DATE 10/30/91 CHK'D BY

LOCATION OF BORING		JOB NO.	CLIENT	LOCATION
		DRILLING METHOD:		BORING NO. 17PZ1
				SHEET 2 OF 7
		SAMPLING METHOD:		DRILLING
				START TIME
				FINISH TIME
		WATER LEVEL		4:59
		TIME		DATE
		DATE		10/30/91
		CASING DEPTH		DATE

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
								20		4:59 At 20' After hitting void from 12.5-20.0' Hard, drilling stopped
								1		
								2		
								3		
		cut.			5/24.0		500	4		5:02 At 24'; Went hard then soft, possible altering b.s. became mostly soft from 22-24.0'
								5		
								6		
								7		10/31/91 still soft to 29'
								8		
								9		29.0' Hard Again. 7 ft Rock stays hard, will core
								10		
								11		
								12		
								13		
								14		
								15		
								16		
								17		
								18		
								19		
								20		
								21		
								22		
								23		
								24		
								25		
								26		
								27		
								28		
								29		
								30		
								31		
								32		
								33		
								34		
								35		
								36		
								37		
								38		Begin Coring at 38 feet very dark grey, dolomite, at 42.2 ft corer hit Fractures at showed thin layers with some porosity every 2 ft, which are 10-12 ft yellow. Well cemented. No pits or voids found.
								39		
								40		

Dames & Moore

62

DRILLING CONTR. E.D.I.
T. Lynch, E. Phillips, D. Polak

16741

John Spangler

DATE 10/21/01 CHK'D BY

18.1 (3) (REV. 11-80)

LOCATION OF BORING		JOB NO. 06702-077	CLIENT USATMA, TA	LOCATION RAAP
DRILLING METHOD:			BORING NO. 17P21	
SAMPLING METHOD:			SHEET 3 OF 7	
WATER LEVEL			START TIME	FINISH TIME
TIME			10:40	
DATE			DATE	DATE
CASING DEPTH			10/21/01	

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
								40		At 40.0 becomes highly fractured, rubbleized, highly weathered limestone, grading to silt grey; much solution charactering, starts with fracture surfaces; stained yellow.
								1		
		NX	5.0 5.0	100	2 41.5 46.5	31/60 524		2		At 41.7 becomes dolomite, light grey, w/ calcite vein at 41.9. At 50.0 becomes sand stone w/ calcite cementation, poorly to moderately cemented w/ good primary and secondary permeability due to cementation and abundant fractures. Is highly weathered, 2.5, 717 pale yellow. At 42.5 becomes dolomite again, highly weathered, 5/16 light olive grey w/ thin pale yellow red stain. 2 5/16 red vertical lined fracture striking end of 45.0. Siltstone or siltstone seam from 45.5 - 46.0; grades back to dolomite w/ calcite veins from 46.0 - 46.5. 46.5 - 48.5 - 100% fine pale grey dolomite, highly fractured; occasional thin calcite veins; thin siltstone seams; primary permeability poor, secondary good.
								3		
								4		
								5		Stop casing at 48 feet due to excessive H2O loss - 7800 GALS while casing was tried to core as much as was reasonably possible; water loss was not a concern for later development purposes, per USATMA because this is a piezometer.
								6		
								7		
								8		
								9		
								10		
								1		
								2		
								3		2:05 - 51-52' - void, still no return cuttings.
								4		2:15 - 54 feet; hard rock again
								5		
								6		
								7		
								8		2:32 At 58', rock continues to be hard
								9		
								10		2:41 60' - same

LOCATION OF BORING		JOB NO. 06702-077	CLIENT USATHAMA	LOCATION RAAP
DRILLING METHOD:			BORING NO. 17PZ1	
SAMPLING METHOD:			SHEET 4 OF 7	
WATER LEVEL			START TIME	FINISH TIME
TIME			2:42	
DATE			DATE	DATE
CASING DEPTH			10/31/01	

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
								60		
								1		
								2		
								3		
								4		
								5		Rock is on and off between soft and hard.
								6		
								7		
								8		2:58 At 68 feet, drilling action still indicates rock is on and off soft and hard
								9		
								70		
								1		
								2		
								3		3:10 72 feet. No exceptionally soft seams, but drilling is fast
								4		
								5		
								6		
								7		
								8		~311 void, or soft seam from 77 feet to 79.5 feet.
								9		
								80		3:22 At 79.5 feet, Rock is very soft

DRILLING CONTR. EDZ
T. Lynch, R. P. Hill, J. S. D. Deland

167419

John Spangler
DATE 10/31/01 CHK'D BY

Dames & Moore

64

DRILLING CONTR. ED L
T. L. Smith, B. Phillips, D. D. Ladd

C.N. 167420

Taka Spanglet
 DATE 10/21/91 CHK'D BY

281 (3) (REV. 11-80)

LOCATION OF BORING						JOB NO.		CLIENT		LOCATION	
DATUM ELEVATION						06702-077		USATAMA		RAAP	
						DRILLING METHOD:				BORING NO.	
										17P21	
						SAMPLING METHOD:				SHEET	
										5 OF 7	
										DRILLING	
WATER LEVEL				START		FINISH					
TIME				TIME		TIME					
DATE				DATE		DATE					
CASING DEPTH				10/31/91							
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:		
							80				
							1				
							2		3:49 At 82 feet Hard and soft zones, as reflected by slow and fast drilling.		
							3		3:53 83 feet		
							4		Becoming softer. No cuttings.		
							5		Retract		
							6				
							7				
							8				
							9				
							90				
							1				
							2		4:06 92 feet still no cuttings Retract.		
							3				
							4				
							5				
							6		4:19 96 feet		
							7				
							8		4:22 98 feet		
							9				
							100		4:28 100 feet		

Dames & Moore

65

167421
DRILLING CONTR. EDI
T. L. V. H. B. Phillips, D. D. L. S.

John Spangler
DATE 10/31/91
CHK'D BY
S. 1 (3) (REV. 11-90)

LOCATION OF BORING				JOB NO.	CLIENT	LOCATION
				06702-077	USA THAMA	RAAP
				DRILLING METHOD:		BORING NO.
						17021
				SAMPLING METHOD:		SHEET
						6 of 7
						DRILLING
				WATER LEVEL		START TIME
				TIME		4:28
				DATE		DATE
				CASING DEPTH		10/31/91

DATUM				ELEVATION				SOIL GRAPH	SURFACE CONDITIONS:
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET			
						100			
						1			
						2			
						3			
						4		4:38 104'	
						5			
						6			
						7			
						8			
						9		4:48 109' End Shift	
						110		Resume 11/1/91 7:35	
						1		7:45 At 111' Fast Easy Drilling	
						2			
						3			
						4		7:50 Getting Harder at 114'	
						5			
						6		8:01 Soft Again at 115'	
						7		8:04 At 117' Few Cuttings at Surface	
						8			
						9		8:10 At 119' Very few cuttings at surface	
						120			

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LOCATION OF BORING		JOB NO. 06702-077	CLIENT USATHAMA	LOCATION RAAP
DRILLING METHOD:			BORING NO. 17 PZ 1	
SAMPLING METHOD:			SHEET 7 of 7	
			DRILLING	
WATER LEVEL			START TIME	FINISH TIME
TIME			8:13	1:20
DATE			DATE	DATE
CASING DEPTH			11/1/91	11/1/91

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
									120		
									1		8:15 continued soft at 121' with occasional hard seams
									2		
									3		8:20 AT 123' still soft easy drilling
									4		
									5		8:23 void from 125-125.5 feet
									6		8:25 AT 126 feet
									7		
									8		8:38 very soft at 128' poss. 64 void from 127-128'
									9		
									130		8:41 AT 130 feet
									1		
									2		8:45 AT 132 feet. Rock hard again Drilling is slower
									3		
									4		2:52 AT 133 feet. Rock still hard, drilling slower. No cuttings returned past 128 feet. Place lost circulation of all air, probably in one of the lost soft seams as voids are encountered
									5		
									6		
									7		200 Gallons lost today; lost 3800 gals previously for total loss of 4000 gals.
									8		Terminate drilling at 133 feet.
									9		
									140		Set 4" permeator to 132.5 on 11/1/91 No H ₂ O table encountered.

DRILLING CONTR. E.D.I.
T. Lynch, D. Phillips, J. Polak

C'n. 167420

John Spangler

DATE 11/1/91 CHK'D BY

25.1 (3) (REV. 11-90)

SWMU 28

Dames & Moore

68

DRILLING CONTR. *EOT*
T. Lynch, R. Phillips, D. Deland

167308

John Spangler
DATE *9/24/91* CHK'D BY

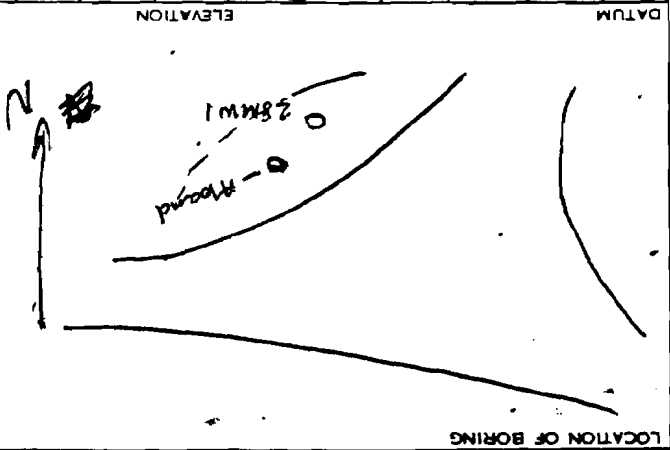
LOCATION OF BORING <i>NA</i>		JOB NO. <i>06702-077</i>	CLIENT <i>USATHAMA</i>	LOCATION <i>RAAP</i>
		DRILLING METHOD: <i>6 5/8 HSA</i>		BORING NO. <i>28MW1</i>
		SAMPLING METHOD: <i>Split spoon</i>		SHEET <i>1 OF 1</i>
DATUM		WATER LEVEL	TIME	START TIME
		TIME	DATE	FINISH TIME
		CASING DEPTH	DATE	DATE

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
						0		<i>Beam, at 2 way intersection.</i>
<i>SS</i>	<i>2.0 / 2.0</i>	<i>0</i>	<i>1 / 0.2</i>	<i>7.8, 9.10</i>		<i>1.56</i>	<i>SM</i>	<i>Ambient Air 0.2; cloudy, overcast, imminent rain.</i>
						2		
						3		
						4		<i>4' cobbles skewed Augers</i>
						5		
<i>SS</i>	<i>2.0 / 2.0</i>	<i>5</i>	<i>2 / 5.7</i>	<i>4.4, 4.3</i>		<i>20.3</i>	<i>SM</i>	<i>Same; grading more moist; becoming looser at end of spoon, amount of silt decreasing at end of spoon also. No PID deflection at spoon tip</i>
						7		
						8		
						9		
						10		
<i>SS</i>	<i>2.0 / 2.0</i>	<i>10</i>	<i>3 / 10-12</i>	<i>5.8, 6.7</i>		<i>21.91</i>	<i>SM</i>	<i>7.5 ft 5/8 strong brown mg sand w/ silt (10%) silt slightly moist only, no PID deflection. At 11.0' black staining increases to 20-25% (looks "fatty") 10-20% micaceous loose</i>
						2		
						3		
						4		<i>2:21 cobbles at 13.0'</i>
						5		
						6		
						7		<i>2:33 At 15.0' No spoon taken due to cobbles, will try to auger through cobble zone</i>
						8		
						9		
						10		
						11		<i>2:45 No penetration. Driller can not go further.</i>
						12		<i>7:50 9-25-91 Begin Air Ream attempt thru cobble zone</i>
						13		<i>8:10 At 16.5' - Sand chunks on-y</i>
						14		<i>8:15 At 17' - quartz fragments, sandstone fragments; continued boulders, gravel, and cobbles</i>
						15		<i>8:20 Through cobble zone at 20.0'; Can not penetrate</i>

8.1 (31) (REV. 11-80)

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JOB NO.		06702-77		CLIENT		USATRAKMA		LOCATION		KAT, VA	
BORING NO.		28 MW 1		SHEET		1 of 5		DRILLING		-	
START		11:25		FINISH		-		DATE		10-2-91	
TIME		-		DATE		-		CASING DEPTH		-	
WATER LEVEL		-		DATE		-		DATE		-	
DRILLING METHOD: mud rotary 5 1/8"		3" coarse cone drill, rock on hammer		SAMPLING METHOD: 1/2" 55 sample 5 ft		interval, than 1/2" 5 ft runs		DRILLING		-	
LOCATION OF BORING		N		ELEVATION		-		SURFACE CONDITIONS		-	



area of water cut out - 1 ft
 sandy clay 4' North of (abandoned) boring
 and cut = 1

easy drilling 0 - 12 ft

Boring started @ 1 ft from abandoned 28 MW 1 location
 sampling was on abandoned boring @ 5 ft intervals
 from 0 to 12 ft. Using HSA - not able to drill
 through cobble-gravel layer with this drilling method.
 Commence drilling on 28 MW 1 w/ mud rotary 5 7/8"
 bit - will not 55 - interval prev sampled on
 by John Spangler Dames & Moore on abandoned boring

Added casing at 10 ft

encounter thin layer of cobbles-gravel at 12.0 ft

encounter layer of gravel-cobbles
 difficult drilling

SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
N4	1	1	1	1	1	1	1	0	
N4	1	1	1	1	1	1	1	1	
N4	1	1	1	1	1	1	1	2	
N4	1	1	1	1	1	1	1	3	
N4	1	1	1	1	1	1	1	4	
N4	1	1	1	1	1	1	1	5	
N4	1	1	1	1	1	1	1	6	
N4	1	1	1	1	1	1	1	7	
N4	1	1	1	1	1	1	1	8	
N4	1	1	1	1	1	1	1	9	
N4	1	1	1	1	1	1	1	10	11.38
N4	1	1	1	1	1	1	1	11	11.41
N4	1	1	1	1	1	1	1	12	-
N4	1	1	1	1	1	1	1	13	-
N4	1	1	1	1	1	1	1	14	11.42
N4	1	1	1	1	1	1	1	15	12.06
N4	1	1	1	1	1	1	1	16	-
N4	1	1	1	1	1	1	1	17	-
N4	1	1	1	1	1	1	1	18	-
N4	1	1	1	1	1	1	1	19	-
N4	1	1	1	1	1	1	1	20	-

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LOCATION OF BORING		JOB NO. 06702-77	CLIENT USATHAMA	LOCATION LAAP, VA
		DRILLING METHOD: mud rotary 5 7/8" bit		BORING NO. 28 MW1
		SAMPLING METHOD: SS sampling 5 interval from 20 to 25		SHEET 2 OF 5
		WATER LEVEL		DRILLING START TIME 12:10 DATE 10-2-91
		TIME		FINISH TIME 12:23 DATE
		DATE		
		CASING DEPTH		

DATUM ELEVATION

SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO	BLOWS/FT. SAMPLER	TIME	DEPTH IN FEET	SOIL GRAPH
INCHES RECOVERED	SAMPLE DEPTH						
SS	24		1	12:10	20		
	24		2	12:11	21		
			3	12:12	22		
			4		23		
			5		24		
SS	12		37	12:19	25		
			38	12:20	26		
			39	12:23	27		
			40		28		
			41		29		
			42		30		
			43		31		
			44		32		
			45		33		
			46		34		
			47		35		
			48		36		
			49		37		
			50		38		
			51		39		
			52		40		

SURFACE CONDITIONS:

Med stiff reddish yellow 4.5 yr 618 silt with fine sand and clay (ml), moist, highly weathered fragments of limestone, grading to sandy silt (ml) with highly weathered fragments of limestone and black mineral stains

Hard, light greenish gray 5 6 4 71, highly weathered fragments of limestone rock w/ black mineral stains. finely laminated horizontal layers some silt and sand included as seams ss refusal at 28.0 thin will ream out hole at 25.0 set casing and rock bore

1:35 begin reaming with 10" bit will continue to 25.0 ft

2:32 finished reaming with 10" bit remove casing and lower 8" PVC casing - remove easily will continue reaming with 10" bit

DRILLING CONTR. EPI

109895

James O. Spencer

DATE 10-2-91 CHK'D BY

71

DRILLING CONTR. ED I
Same

70997

James O. Spencer

DATE 10-3-91 CHK'D BY _____

72

DRILLING CONTR. Ed I
Same

五、

DATE 10-3-91 CHK'D BY _____

Dames & Moore

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LOCATION OF BORING	JOB NO. 06702-77	CLIENT USATHAMA	LOCATION RAAP, VA SWMU 28	
	DRILLING METHOD: 8" air hammer Tucson bit. (ream)		BORING NO. 28MW1	
	SAMPLING METHOD:		SHEET 5 of 5	
			DRILLING	
	WATER LEVEL		START TIME 7:45	FINISH TIME 8:34
	TIME		DATE	DATE
DATE		DATE		
CASING DEPTH		10-49		10-49

DATUM _____ ELEVATION _____

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
						0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						0	

SURFACE CONDITIONS:

7:45 Start reaming out hole from 25.0 ft
with 8" tucson air hammer bit.

8:34 Stop reaming at 63.5 ft well check
water level, - at 9:10 DN 44 ft bgl

Well construction

screen 63 to 43 ft
sand pack 43 to 30 ft
Bentonite seal 30 to 25 ft
Grout from 25 to 0 ft

Materials used during Construction of well

8.25 bags of sand
2 pairs of Bentonite
12 bags of Portland Cement type II
1 Bentonite powder bags (granular)
H₂O

DRILLING CONTR. EDI

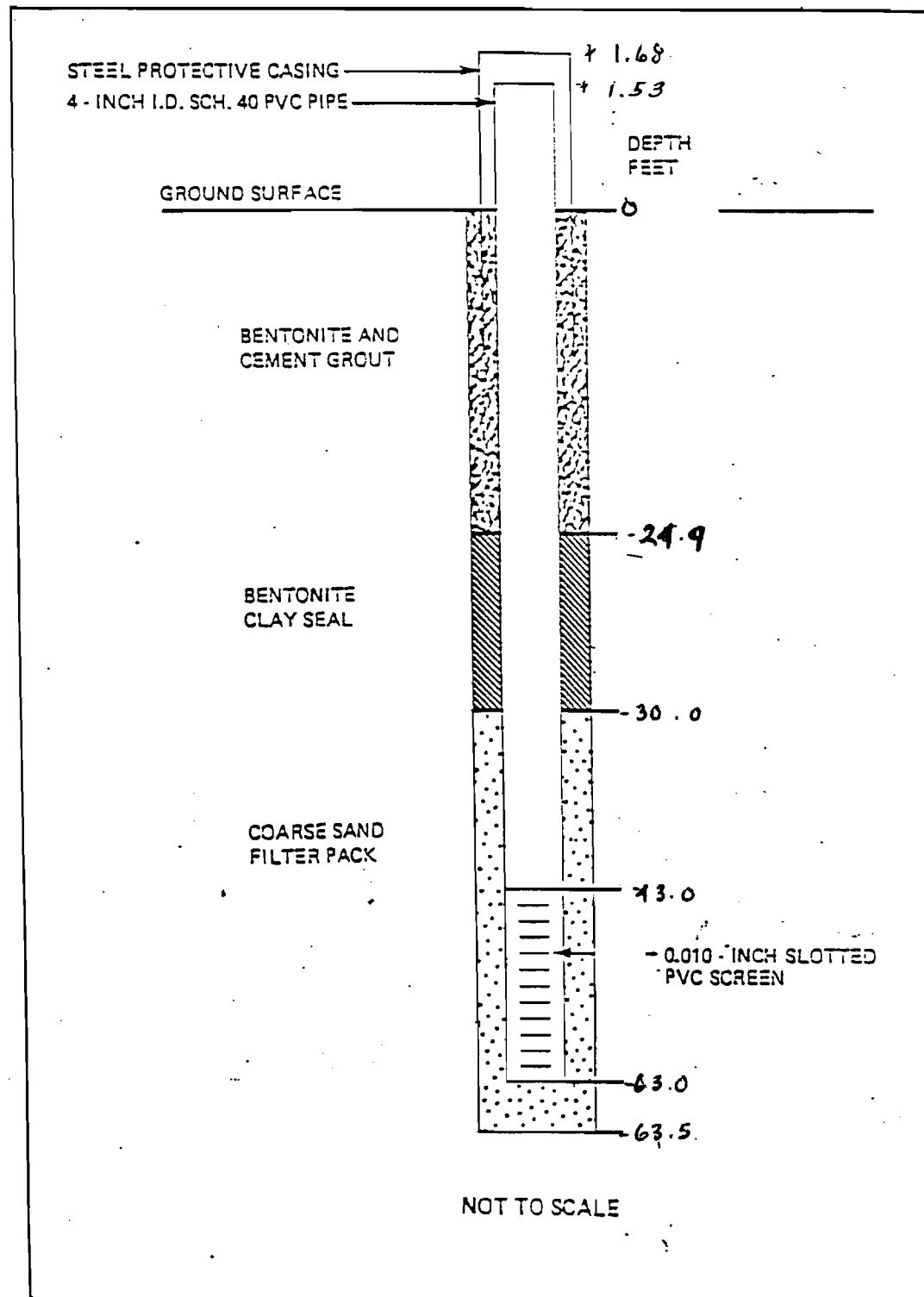
100000

James O. Spencer
DATE 10-4-91 CHK'D BY _____

WELL INSTALLATION DIAGRAM
FOR
REMEDIAL INVESTIGATION

Bedrock well

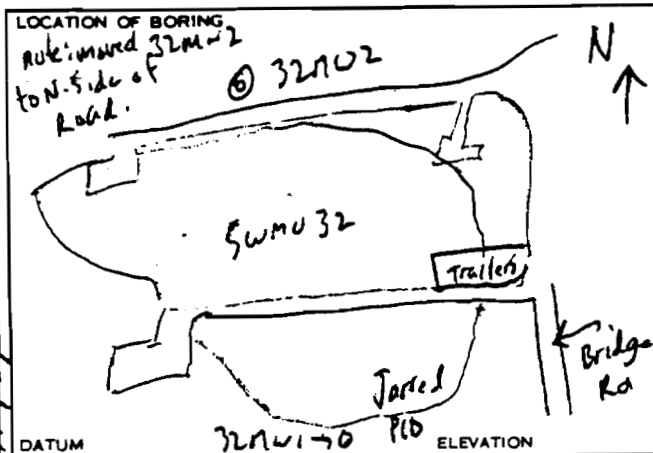
Location: **28 MW1**
Installation Date: **90-4-91**
Surface Elevation:
Top of PVC Elevation:



SWMU 32

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JOB NO. 06702-077		CLIENT USATHAMA	LOCATION RAAP
DRILLING METHOD: 6 5/8 HSA NX Core 57 1/2 Room - Air		BORING NO. 32MW#	
SAMPLING METHOD: Split Spoon 1 1/2 Core 57 1/2 Room		SHEET 1 of 5	
WATER LEVEL		START TIME 2:30	FINISH TIME
TIME		DATE 9/25/91	DATE
DATE			
CASING DEPTH			

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
SS	2.0 1.3	0	1	8,14 10,10	0.6	227	4M
						2	
						3	
						4	
						5	
						6	
SS	2.0 1.3	5	2	3,5, 10,18	0.4	248	GP
						7	
						8	
						9	
						10	
SS	2.0 1.3	10	3	22,22 30,23	MD	255	GM
						20	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						20	

SURFACE CONDITIONS: Ambient Air 0.3,
Raining,

Topsoil: Small coal pieces, 10YR 2/1, black sandy silt, grades 10YR 2/6 yell. brn
5YR 5/8 yellowish red fine silty (15%) f.g.
Sand: black staining appears at 1.0', similar to a
coal or tar-type stain - very small; in 25% mica
in form of white flakes; homogeneous

Same; grades to m-cg sand and gravel
zone at 6.5'. Relatively few fines, 5%
in the cg sandy gravel. Slightly moist
only

No deflection Speed: Gravel/Sand/Silt mixture
slightly moist to moist; 10YR 4/4 d. yellowish
brown w/ 25% 6/4 light yellowish brown
silt (50%) Gravels are well graded, sand
well graded MS.

slow penetration. Large-Cobble seam
at 13.5-14.0'. Auger 1 kicked out at 14'
Trying to shift rig to straighten Auger
3:19 Adding Auger at 15.0' No sample due to cobbles

Boat through Gravels at 16.0'

NO SAMPLE
TAKEN

DRILLING CONTR. EOI
T. Lyach, D. H. Hays, D. D. Lach

167307

John Spangle
DATE 9/25/91 CHK'D BY

Jarred!
818

REAMED 35'-87'
LOGGED FROM
REAM CUTTINGS

DRILLING CONTR.

0167310

CHK'D BY:

DATE _____

8.1 (31 (REV. 11-80)

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28

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION	
				DRILLING METHOD:				BORING NO.	
								3217W4	
				SAMPLING METHOD:				SHEET	
								3 of 5	
				DRILLING					
				WATER LEVEL				START	FINISH
				TIME				TIME	
				DATE				DATE	
				CASING DEPTH				9/26/91	

DATUM				ELEVATION				SURFACE CONDITIONS:			
-------	--	--	--	-----------	--	--	--	---------------------	--	--	--

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	
						40		Dry and dusty; 5G6/1 Greenish Gray Limestone
						1		
						2		
						3		
						4		
						5		10:45 Still very dusty conditions. Sample (45') taken of cuttings is very slightly moist, softer, some color, with some pieces of the harder limestone
						6		
						7		After this run will stop reaming for a while and let well sit and check for water again
						8		
						9		10:54 Continued dusty and fast reaming at 49.0
						50		
						1		10:57 Sample at 50.0' 10YR 4/1 dark gray. Soft silty clay cuttings will wait to see if can tag H2O
						2		11:26 will pull
						3		11:35 begin air reaming again at 52.0 ft. rods to try and tag H2O
						4		
						5		11:52 Only a few inches of water at bottom. Bottom of pit not wet, but rods were where the small amount of water was trickling in from above, wetting the rod & from 30 feet on down.
						6		11:45 55' Sample Greenish Gray 5G6/1 Limestone choncs washed some cuttings in go. in water + washed silt away and is LF ch. 15
						7		
						8		
						9		
						60		60' Sample 11:56 on next page for desc. 11:56

DRILLING CONTR.

167312

CHK'D BY

DATE

5.1 (3) (REV. 11-80)

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79

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION	
				DRILLING METHOD:				BORING NO.	
								32741	
				SAMPLING METHOD:				SHEET	
								4 OF 5	
				DRILLING				START	
				WATER LEVEL				TIME	
				TIME				DATE	
				DATE				DATE	
				CASING DEPTH				9/24/9	

DATUM		ELEVATION						SURFACE CONDITIONS:	
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH		
						0		11:56 Sample of 60' cut & silt pieces washed by moist - very slightly. Washed samples of cuttings reveal a 566/1 v. gray siltstone and 104R3/1 v.d. gray limestone w/ abundant small calcite pieces/crystals	
						1			
						2			
						3			
						4		Becoming hard at 64' per Driller	
						5			
						6		12:25 65' 2.5YR/4 v. gray limestone, siltstone calcitic; easily broken by hand pressure, still; some lump of clay, 566/1 gray	
						7			
						8			
						9			
						70		12:44 70.0'; many fines; rock chips are much smaller now; All rock specimens are easily broken by hand/finger pressure. 2.5YR/3 v.d. gray and 2.5YR/5 gray chips ~ 50% of each. & some clay lumps, 7.5YR/5 gray. Are v. soft limestone or siltstone	
						1			
						2			
						3			
						4		12:48 pull rods at 72.0' to check for then 1:34 only a few inches on bottom - still just a trickle from above. will lean to 82.	
						5			
						6		77' - 1:41 104R4/1 v. gray silty v. fine sand and siltstone; little dust	
						7			
						8		77' - 1:44 - wet - no dust - cuttings wet.	
						9		Cuttings began not to appear at surface	
						0			

DRILLING CONTR.

167311

CHK'D BY

DATE

18.1 (3) (REV. 11-80)

80

DRILLING CONTR.

167313

CHK'D BY:

DATE:

28.1 (3) (REV. 11-80)


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Sheet No.

Calc. No.

Rev. No.

By

Date

Chk'd.

Date

Job No. 06702-077

Job RAA

Client USATHAMA

Subject

Abandonment Diagram 28MW1 9/24/91

28MW1 - Grouted to Surface

6 5/8" I.D. Augers

 5 7/8" O.D. Ream
bit

 16.0 - Depth of Augers - deepest
point

 20.0 - Depth of Ream
Bit - deepest point

 Could not penetrate ~~ream~~

Augers through the gravel

zone/cobble zone; were able

to penetrate w/ Ream bit



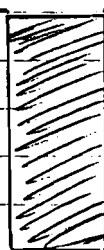
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Sheet No.	
Calc. No.	
Rev. No.	
By	Date
Chk'd.	Date

Job No. 06702-077 Job RAAP
 Client WEATHRAMA Subject

Abandonment Diagram 32MW2



← Cave-in to 0.5' when pulled Augers.

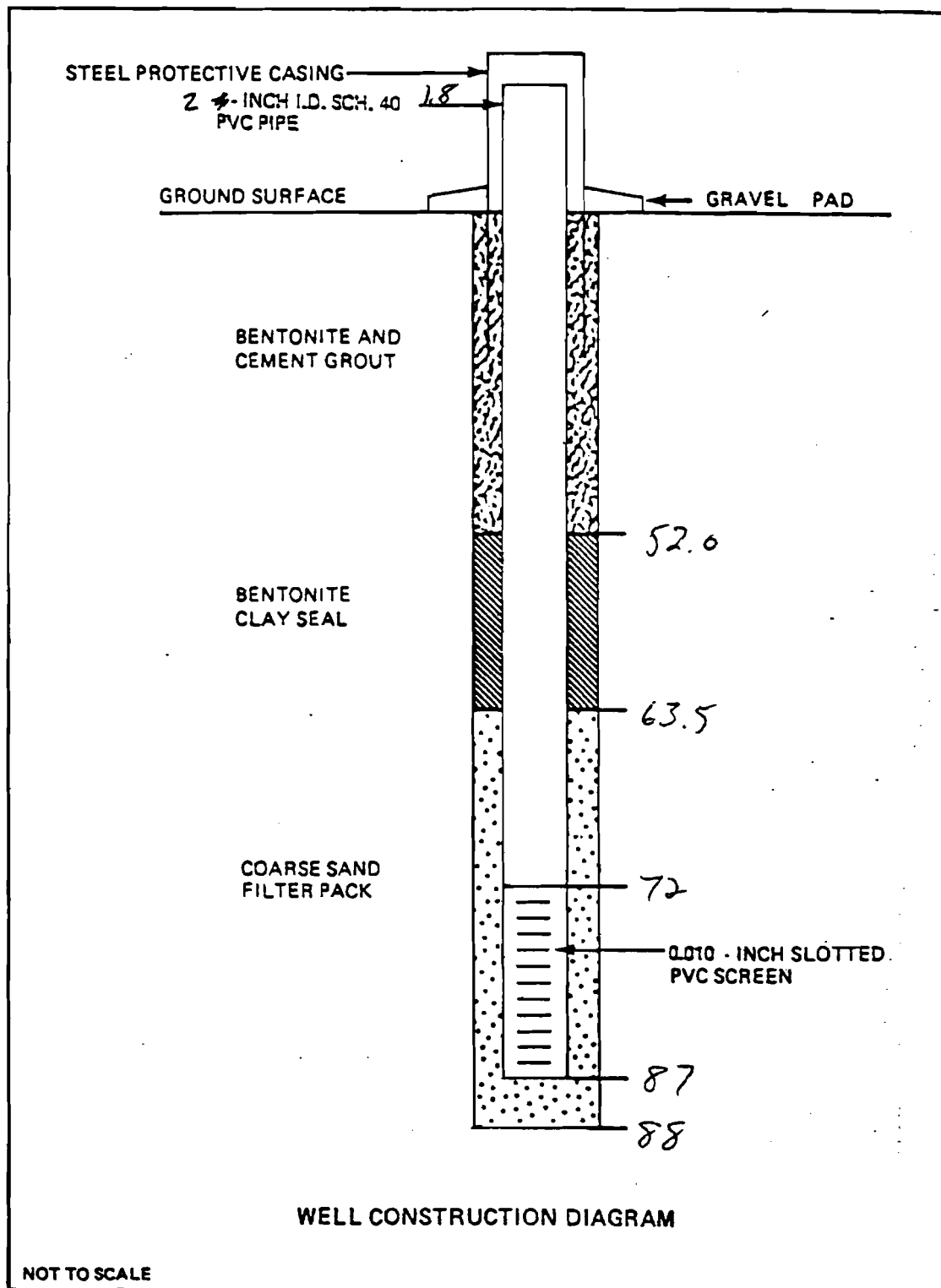
Topped off w/ grout from 0.5' to Surface.

Total Depth 3.0 feet

6 5/8" Augers (I.D.)

1st abandonment

Location: 3274
Installation Date: 9/27/91
Surface Elevation:
Top of Casing Elevation:



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84

DRILLING CONTR. *EDJ*
Tom Byrum - Driller
Byrum

167293

James O. Spencer

DATE 7-30-91 CHK'D BY

16.1 (3) (REV. 11-80)

LOCATION OF BORING

upstream
well named
32 MW1 to
~~32 MW2~~
match
SWMU 74
NAMING
scheme.

large tree
A3' ft
32 MW2
98.5 ft E road

SWMU 31
upgraded
N

JOB NO.

06702-77

CLIENT

USATHAMA

LOCATION

32
SWMU

DRILLING METHOD:

air rotary 6" bit + tri-cone
with SS sampling then
reamout with 10" bit air rotary

SAMPLING METHOD:

SS 24" 5' intervals

BORING NO.

32 MW2

SHEET

1 OF 4

DRILLING

START FINISH

TIME 3:17 TIME 3:58

DATE DATE

9-30-91

DATUM

ELEVATION

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	TIME NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
SS	24 20	0	S-1 1-1.5	19 (35)	3:17 20 0.0	0	ML	Flat soil area excavated into slope, weather sunny 70° night winds pid amb = .1
						1		Hard light yellowish brown sandy silt (ML) 10 yr friable, dry some conc of black minerals (magm)
						2	CL	0-1.0 Hard light yellowish red 5 yr 5/8 silty clay (CL) massive, some concentrations of black minerals pid 0.0
						3		
						4		
SS	24 19	-	S-2 6.5-7	16 (42)	3:30 20 0.0	5	Mz-CL	Hard yellowish red 5 yr 5/8 silty clay (CL) - clayey silt some concentrations of black minerals, 0 (ML) occasional rounded dolomite pebbles w/ calcite replacement occasional incl. of red silty clay slightly moist
						6		
						7		
						8		
						9		
SS	24 23	-	S-3 7.5-9	7 (17)	3:44 11 0.0	10	CL	very stiff yellowish brown 10 yr 5/8 sandy clay (CL) black mineral stains, moist, massive. increasing moisture w/ depth
						11		
						12		
						13		
						14		
SS	24 22	-	S-4 16.5-17.5	5 (13)	3:56 9 0.0	15	ML	stiff yellowish brown 10 yr 5/8 clayey silt (ML) conc. of black minerals, moist, massive
						16		
						17		
						18		
						19		
						20		see next page

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LOCATION OF BORING		JOB NO. 06702-77	CLIENT USATHAMA	LOCATION RAAP SWMU 42
		DRILLING METHOD: air rotary 6" tri cone bit sample ss, then ream with 10" tri cone bit air rotary		BORING NO. 32442
		SAMPLING METHOD: ss 24" 5' sample interval		SHEET 2 of 4
				DRILLING
		WATER LEVEL		START TIME 4:05
		TIME		FINISH TIME 5:26
		DATE		DATE
		CASING DEPTH		9-30-91

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
		SS	24 22		5-6 20-24	346 (10)	4:05 00	20	ML	stiff, yellowish brown 10 yr 5 yr 5/6 clayey silt (ML) moist to very moist, black mineral stains trace fine sand
							4:07	22	CL	reddish yellow 5 yr 6/6 silty clay (CL) low to med plasticity very moist, thinly laminated reddish br 2.5 yr 4/4, brownish yellow 10 yr 6/8 and black mineral laminations.
		SS	24 2		5-6 24	50/2	4:10 4:12	24		
								25	Lime Stone	at 24.0 ft Reddish brown 2.5 yr 4/4 silty clay (CL) low to med plasticity, Very moist, small fragments of gray dolomitic limestone
								6	Dolomite	refused to ss
								7		cuttings weathered limestone - dolomite
								8		remove ss samples - install 10" tri bit ream out with air rotary from 4:25 to 5:26. Prepare for setting 8" pvc casing 10-1-91.
								9		
								0		
								1		
								2		
								3		
								4		
								5		
								6		
								7		
								8		
								9		
								0		

DRILLING CONTR. Ed

100889

James O. Spencer

DATE 9-30-91 CHK'D BY

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36

LOCATION OF BORING		JOB NO. 06702-77	CLIENT USATHAMA	LOCATION RAAP, VA SW MU 32
		DRILLING METHOD: 8" 3" caliche core		BORING NO. 32 MND
		SAMPLING METHOD: NX rock core 5 ft runs		SHEET 3 of 4
				DRILLING
		WATER LEVEL		START TIME 11 "
		TIME		FINISH TIME 1237
		DATE		DATE
		CASING DEPTH		10-141

DATUM ELEVATION

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
						20		
						21		
						22		
						23		
						24		
						25		
NX	5.0 3.4	68%	1 30	40	11:11	26		
						27		
						28		
						29		
NX	5.0 3.4	68%	1 30	40	11:11	30		start coring at 36.0 ft
						31		dark gray 2.54' N14 micrite limestone, highly weathered and fractured calcite cement with hematite staining, weakly cemented
						32		gray N45 micrite limestone, highly weathered, calcite cement and filling in voids and fractures, some hematite staining, pitted
						33		
						34		light gray N17 micrite limestone, less weathered, calcite filling in veins, hematite staining in fractures and fresh surfaces, fractured
NX	5.0 4.9	98	2 35.0	80	11:48 11:53	35		continue from 36.0 to 40.0 nearly intact core
						36		at 37.0-40.0 infilling of calcite in veins and crystallization in voids & pits more pronounced. Hematite stains in voids and pits
						37		hematite staining more pronounced on weathered surface from 38 to 40 ft
						38		
						39		Soft seam encountered at 39.0 to 40.0 ft easy core
						40		

DRILLING CONTR. EDI

0.109898

James O. Spencer

DATE 10-1-91 CHK'D BY

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87

LOCATION OF BORING note abandoned at 57.0 see detail of abandonment Ream with 4" tricone bit to 38' ft - abandon boring (ream from 25 → 38 ft)		JOB NO. 06702-77	CLIENT USATMAMA	LOCATION LAAP, VA SWMU 32
		DRILLING METHOD: Rock core with 3" casing + NX core		BORING NO. M32MWJ2
		SAMPLING METHOD: NX core 5 ft run		SHEET 4 of 4
		WATER LEVEL		START TIME
		TIME		FINISH TIME 1:15
		DATE		DATE
		CASING DEPTH		10-1-91 10-1-91

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN	PERCENT RECOVERED	NO. OF CORES	NO. OF SAMPLES	TIME OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
		NK	50	1.0	20%	3	12:00	40		light gray w/ - micrite limestone, vertical infilling of calcite veins hematite staining on fresh surface
								41		relatively intact 40 - 42.0 highly fractured pitted little recovery from 42 to 45 ft, highly pitted surface, mostly
								42		recovery of pebble size gravel to 45.6 ft
								43		very soft at 43.0 to 45.0 ft fast coring 1 tub of water loss 75 gallons
								44		
		NK	10	0	0%	4	12:35 1:04	45		starting fourth run at 45 ft. core + casing drop 10 ft to 55 ft through void (cave?)
								46		1 tub of water lost 75 gallons. casing at 55.0 ft
								47		
								48	VOID	
								49		
								50		
								51		
								52		
								53		
								54		
		NK	20	1.0	50	5	104 106	55		Returned coring to 56 ft then core recovery dropped to 57 ft. Stopped coring at 57.0 ft
								56	VOID	
								57		total water loss to formation 150 gallons
								58		55.0 to 56.0 ft
								59		greenish gray 564 611 to gray 54 611
								60		thinly bedded highly weathered limestone (horiz bedding) with hematite staining at 55.5 clayey highly weathered limestone with inclusions

DRILLING CONTR. EPI

109763

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DATE 10-1-91 CHK'D BY

Boring Abandonment 32 MW2 RAAP, VA SWMU 32

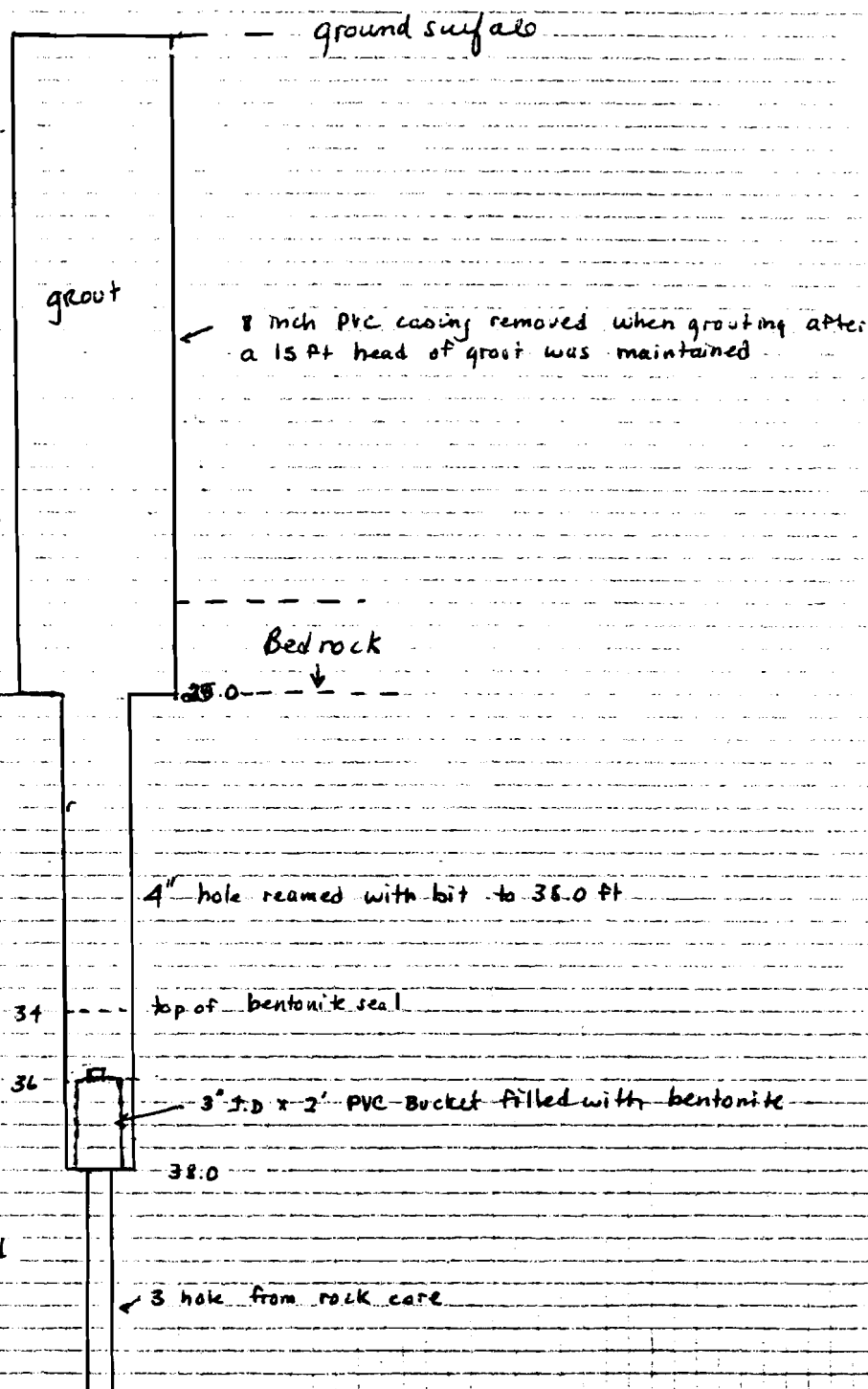
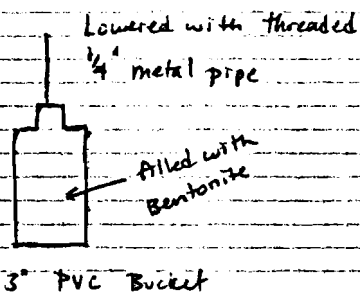
2nd Abandonment

Boring Abandonment

1. Reamed w 4" bit to 38.0 ft
2. Inserted a 3" ID PVC bucket w bent. to 38.0 - resting on interface ledge between 3" & 4" hole
3. Unscrewed metal rod from bucket, pulled out of hole
4. Placed bentonite ^{seal} to 2 ft above bucket.
5. Placed grout via tremie pipe to ground surface. When 15 ft head maintained above 38 ft bottom. Temp 8" PVC casing removed
6. Grout composed of Portland Cement type II, Bentonite powder + H₂O

Note: Boring / well Abandonment due to 10 ft void encountered at 45.0 to 55.0 ft bgl.

PVC Bucket Detail



SWMU 40

90

128.1 (3) (REV. 11-80)

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91

DRILLING CONTR. EDI

NO.167408

BY J. Spangler

DATE _____ CHK'D BY _____

LOCATION OF BORING										JOB NO. <u>6702-077</u>		CLIENT <u>THAMA</u>		LOCATION <u>RAAP</u>	
										DRILLING METHOD:				BORING NO. <u>407W1A</u>	
										SAMPLING METHOD:				SHEET <u>2</u> OF <u>9</u>	
										DRILLING					
										START TIME		FINISH TIME			
										DATE		DATE			
										CASING DEPTH					
DATUM										ELEVATION					
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:							
<u>10X</u>	<u>3.0</u> <u>0.8</u>	<u>27%</u>	<u>4</u> <u>20-</u> <u>20.0</u>	<u>0</u>	<u>222</u>	<u>20</u>		<u>10/21/91</u>							
						<u>1</u>									
						<u>2</u>	<u>void</u>								
					<u>2:29</u>	<u>3</u>		<u>void 21.5 - 23.0 Heavy water loss</u>							
					<u>2:52</u>	<u>4</u>									
						<u>5</u>		<u>Begin Air Hammering due to water loss</u>							
						<u>6</u>									
						<u>7</u>									
						<u>8</u>		<u>No Voids encountered</u>							
						<u>9</u>									
						<u>10</u>									
						<u>1</u>		<u>Rock is full of clay, per drillers but no voids, which we feel are a strong possibility</u>							
						<u>2</u>									
						<u>3</u>									
						<u>4</u>									
						<u>5</u>									
						<u>6</u>									
						<u>7</u>									
						<u>8</u>									
						<u>9</u>									
						<u>10</u>									
						<u>11</u>									
						<u>12</u>									

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LOCATION OF BORING					JOB NO. 6702-077		CLIENT THAMA		LOCATION RAAP		
					DRILLING METHOD:						BORING NO. 404W1
SAMPLING METHOD:						SHEET 3 OF 9					
						DRILLING					
WATER LEVEL						START TIME		FINISH TIME			
						TIME		TIME			
DATE						DATE		DATE			
						DATE		DATE			
CASING DEPTH						10/21/91					

DATUM				ELEVATION				SOIL GRAPH	SURFACE CONDITIONS:
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET			
						40			
						1			
						2			
						3			
						4			
						5		4:03 Air Hammering continues. Dusty, clayey; Driller notes clay seams abundant	
						6			
						7			
						8			
						9			
						50			
						1			
						2		Continued Dusty drilling (no moisture)	
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						60			

FOI

DRILLING CONTR.

No. 167409

BY V. Spangler

CHK'D BY

DATE

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93

LOCATION OF BORING		JOB NO. 6702-077	CLIENT THARMA	LOCATION RAAP
DRILLING METHOD:			BORING NO. 404W1	
SAMPLING METHOD:			SHEET 4 OF 9	
WATER LEVEL			DRILLING	
TIME			START TIME	FINISH TIME
DATE			DATE	DATE
CASING DEPTH			10/1/91	

DATUM ELEVATION

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
						0		
						1		
						2		
						3		
						4		4:36 Continued Rusty dolomite chips;
						5		
						6		
						7		
						8		
						9		
						70		4:50 Less dusty; cuttings slightly cohesive, very slight moisture content;
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						80		5:05 Back to very dusty Again. Was less dusty, possibly indicating moist comp. but no water yet

DRILLING CONTR. FOI

No. 167410

By J. Spangler

CHK'D BY

DATE

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94

DRILLING CONTR. EOI

No. 167411

BY J. Spangler

DATE _____ CHK'D BY _____

128.1 (3) (REV. 11-80)

LOCATION OF BORING							JOB NO. <u>06702-077</u>		CLIENT <u>THAMA</u>		LOCATION <u>RAAP</u>		
							DRILLING METHOD:				BORING NO. <u>40MW1</u>		
											SHEET <u>5 OF 9</u>		
											SAMPLING METHOD:		
											DRILLING		
							WATER LEVEL		START TIME		FINISH TIME		
							TIME		DATE		DATE		
							DATE		DATE		DATE		
							CASING DEPTH						
DATUM							ELEVATION						
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:					
						0		5:15 Still dry, dusty, no indication of water					
						1							
						2							
						3							
						4		5:18 Same; Hard to determine exact location cuttings coming from because they are being broken up so much. No indication of water. Dolomite and siltstone chips					
						5							
						6		5:21 Same					
						7							
						8							
						9							
						90							
						1		5:29 Same					
						2							
						3							
						4							
						5							
						6		5:58 Cuttings pile PID = 2.8 still dry, dusty, dolomite/siltstone chips					
						7							
						8							
						9							
						1000		6:07 Same					

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95

DRILLING CONTR. FOI

No. 167412

BY J. Springer

LOCATION OF BORING										JOB NO. <u>6702-077</u>		CLIENT <u>THAMA</u>		LOCATION <u>RAAP</u>					
										DRILLING METHOD:				BORING NO. <u>40MW1</u>					
														SHEET <u>6 OF 9</u>					
														DRILLING					
										SAMPLING METHOD:				START TIME <u>607</u>		FINISH TIME			
				DATE		DATE													
WATER LEVEL				CASING DEPTH		DATE <u>10/21/91</u>													
TIME																			
DATE																			
DATUM										ELEVATION									
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:											
						0													
						1													
						2													
						3													
						4		6:16 At 104' still dry dusty dolomite and siltstone cuttings. no sign of water. Will let sit overnight											
						5		Drilling stopped 6:16 PM 10/21/91											
						6													
						7		Drilling resumed 7:40 AM 10/22/91											
						8													
						9		7:40 10/22/91 Dry, hard, dusty, same; No H ₂ O influx.											
						10													
						11													
						12													
						13		7:57 Same; dry hard dusty; probably less siltstone mixed in											
						14													
						15		8:05 Same, coll etc. for guidance. Drill further? yes											
						16													
						17		8:29 Same											
						18													
						19													
						20													

LOCATION OF BORING					JOB NO. 6702-077		CLIENT THAMA		LOCATION RAAP		
					DRILLING METHOD:				BORING NO. 40MW1		
									SHEET 7 OF 9		
									DRILLING		
					SAMPLING METHOD:				START TIME		FINISH TIME
				WATER LEVEL							
				TIME				850			
				DATE				DATE			
				CASING DEPTH				10/22/0			
DATUM					ELEVATION					SURFACE CONDITIONS:	
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH				
						0					
						1					
						2					
						3					
						4		Same, Dry, Hard (9:02)			
						5					
						6					
						7		Less Dusty, very slight possibility of some moisture from look of cuttings; less dusty, softer.			
						8					
						9					
						10					
						11					
						12		9:22 Continued soft faster drilling, still dusty but not "smoky"			
						13					
						14		9:34 Getting Hard Again, cuttings not all returning to surface due to our depth			
						15					
						16					
						17					
						18		9:46 Same			
						19					
						20		557 PID cuttings 1.2			
						21					
						22					
						23					
						24					
						25					
						26					
						27					
						28					
						29					
						30					

NO. 167413

DRILLING CONTR. F.O.I.

BY J. Spangler

CHK'D BY

DATE

18.1 (3) (REV. 11-80)

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97

FOI

DRILLING CONTR.

No. 167414

BY T. Spayber

DATE _____ CHK'D BY _____

625.1 (3) (REV. 11-80)

LOCATION OF BORING					JOB NO.	CLIENT	LOCATION
					6702-077	THAMA	R4AP
					DRILLING METHOD:		BORING NO.
							40MW1
					SAMPLING METHOD:		SHEET
							8 OF 9
							DRILLING
							START
							FINISH
					WATER LEVEL		TIME
					TIME		TIME
					DATE		DATE
					CASING DEPTH		10/22/91

DATUM				ELEVATION				SOIL GRAPH	SURFACE CONDITIONS:
SAMPLER TYPE	INCHES DRYEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET			
						0			
						1			
						2			
						3			
						4			
						5			
						6		10:06 Still dry No water yet	
						7			
						8			
						9			
						10			
						1			
						2			
						3			
						4		Same	
						5			
						6		10:40 Almost lost cuttings Return Even when stop to blow cuttings out.	
						7			
						8			
						9			
						10			

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION					
Bore hole abandoned 10/23/91										6702-077		THAMA		RAMP					
										DRILLING METHOD:				BORING NO.					
														40MW1					
														SHEET					
														9 OF 9					
										SAMPLING METHOD:				DRILLING					
										WATER LEVEL		START		FINISH					
										TIME		TIME		TIME					
										DATE		DATE		DATE					
										CASING DEPTH		DATE		DATE					
DATUM										ELEVATION									
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:											
						0		At 162' (10:53) Can not proceed further. Will call H. F. W. Will grout holes. Blew out some mud upon return to site at 2:00. If this is water, it is not enough. Will grout anyway per discussion w/ Temp.											
						1													
						2													
						3													
						4													
						5													
						6													
						7													
						8													
						9													
						10		10/23/91 Grouted Hole to Surface; Got grout mixture from A-1 concrete company, who delivered via cement truck. Used 600 pounds cement 4 bags bent 480 gal H₂O and added bent as poured in, per USA THAMA A											
						1													
						2													
						3													
						4													
						5													
						6													
						7													
						8													
						9													
						10													

DRILLING CONTR. E.D.T.

No. 167415

BY T Spangler

CHK'D BY

DATE

Dames & Moore

99

16738
 DRILLING CONTR. E.D.I.
 T. Lynch, B. Phillips, D. Adcox
 Taha Spengler
 DATE 10/30/91
 CHK'D BY
 B.1 (3) (REV. 11-90)

LOCATION OF BORING										JOB NO. 06702-077		CLIENT USATHIAMA		LOCATION RAAP					
										DRILLING METHOD:				BORING NO. 407142					
														SHEET 3 of 3					
														DRILLING					
										SAMPLING METHOD:				START TIME 4:30		FINISH TIME 11:00			
										DATE 10/29/91		DATE 10/30/91							
WATER LEVEL										TIME		DATE							
CASING DEPTH										DATE		DATE							
DATUM										ELEVATION									
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:										
							40												
							1												
							2												
							3												
cut				8/44		485	4		44' Hard clay with some sand, some gravel, some silt.										
							5												
							6		Gul soft 41'										
cut				9/49		485	7		Very soft 47-49'										
							8												
							9		49'-50' soft mud clay, silt, lost all circulation at 76'.										
							50		Resume Drilling Oct. 10/30/91										
							1		Very soft to 60'; No cuttings coming to surface.										
							2												
							3		Clays and silts are squeezing rods when we go past 47', blocking below.										
							4												
							5		Soft, fast drilling; no cuttings.										
							6		No logs encountered; set well to 56 feet on 10/30/91 per Thomas.										
							7												
							8		Soft fast drilling. No cuttings.										
							9												
							10		50' Hard drilling - Rock. Obtained small amount of sample. Silty clay w/ some sand.										

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DRILLING CONTR. E 113
T. C. Phillips, B. Phillips, D. A. L. L. L.
DATE 10/20/91 CHK'D BY J. A. Spangler

LOCATION OF BORING							JOB NO.		CLIENT		LOCATION				
							06702-077		USA THANA		RAAP				
							DRILLING METHOD:							BORING NO.	
														40712	
							SAMPLING METHOD:							SHEET	
														2 OF 3	
							DRILLING		START		FINISH				
							WATER LEVEL				TIME				
							TIME				4:12				
							DATE				DATE				
							CASING DEPTH				10/20/91				
DATUM							ELEVATION								
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:						
							0								
							1								
							2								
							3								
cut				5		4.16	4		Soft, light yellowish brown silty clay, silty clay						
							5								
							6		26' 4.18 still soft, but becoming sandy						
							7								
							8								
cut				6		4.23	9		29' Same Much silt in cuttings						
							10		pebbles silty clay						
							11								
							12								
							13								
							14		4.28 at 24', no change						
							15								
							16								
							17								
							18								
cut				7		4.37	19		4.37 39' Getting harder						
							20								

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION					
										06702-077		USA/HAMA		RAAP					
										DRILLING METHOD:		6" Tricone (Air) to 17'; 12" Tricone (Air)				BORING NO.		40702	
										SAMPLING METHOD:		Split Spind Jammed Cuttings for Rock				SHEET		1 of 3	
										WATER LEVEL						START TIME		FINISH TIME	
TIME								1:42											
DATE								DATE		DATE									
CASING DEPTH								10/20/94											
DATUM										Junction		ELEVATION							
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:									
SS	2.0	1.8	0	1	0.2	N/D	10, 20, 22, 11	0	MC	down gradient well at									
								1	MC	Location of SWMU 40									
								2	CL	And Air 0.3									
								3											
								4											
								5	CL	No deflection in PID. 10' 1/4" & pale brown									
								6	MC	Silt clay, no clay roots to 0.8'. At 1.0 becomes									
								7	MC	very stiff 10' 1/4" yellow to sandy (5' 1/2") silt									
								8		At 2.0 becomes 7.5' 1/8" reddish yellow									
								9		Silty clay w/ trace (5' 1/2") sand									
								10											
								11		becoming moist, lighter, cuttings are clay									
								12											
								13	CL	No deflection PID, 5' 1/8" yellowish red silt,									
								14	MC	clay, slightly plastic & plastic, 2' moist									
								15	MC	becomes mottled w/ light to brownish yellow									
								16		at 6.0 it becomes silt w/ vfg sand									
								17		very moist.									
								18											
								19		Cuttings very moist - some gravel									
								20		water no free water but very moist									
								21	MC	very soft silt 7.5' 1/8" to 10' 1/4" at 10.0-11.5									
								22	MC	slightly plastic silty clay, light reddish									
								23	MC	yellow. 11.5-12.0 is very moist vfg sand,									
								24		silt w/ small amount of sandstone, sand									
								25		this is very moist zone, 1' plastic water									
								26		but no free water									
								27											
								28											
								29	MC	No PID deflection of spoon									
								30	MC	some very soft vfg sandy silt, becomes									
								31		stiff clayey silt w/ thin sand at 16.3									
								32		2.5' 1/4" light yellowish brown sandstone									
								33	Rock	dry, brittle, until rock at 17.0									
								34											
								35											
								36											
								37											
								38											
								39											
								40											

DRILLING CONTR. 167399
T. Lynch, P. Phillips, & D. R. R. R.
John Spangler
DATE 10/20/94 CHK'D BY
28.1 (3) (REV. 11-80)

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LOCATION OF BORING										JOB NO.		CLIENT		LOCATION			
NT 40MW2 40MW3 SW 1/4 40 40MW1 40MW4 PID (Spaced)										06702-077		USA THRM A		RAAP			
										DRILLING METHOD: 5 7/8" tricone				BORING NO. 40MW3A			
										12" tricone				SHEET 1 OF 3			
										8" Air Hammer				DRILLING			
										SAMPLING METHOD: SPLIT SPOON				START TIME 10:31		FINISH TIME 10:15	
										NX CORE SAMPLER				DATE 10/18/91		DATE 10/20/91	
										WATER LEVEL				TIME		DATE	
										CASING DEPTH							
DATUM										ELEVATION							
SURFACE CONDITIONS:										Ambient Air 0.4 Next to trees at edge of landfill							
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	SAMPLE DEPTH	BLOWS/FT	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	PID SPOON 0.5 - Dry, rock 4/4 dark brownish w/ silt, root material and coal/leanders at top 0.3'. Becomes vfy sandy silt w/ fine gravel, w/ 10% 7.5YR 5/8 strong brown mottling. At 1.6' grades to 2.5YR 5/3 olive brown w/ black mottling, less fgy sand. At 1.8' becomes coarser 5/4 yellowish brown silt, little mottling, trace vfy sand. Possible bedrock 4 1/2'. Will try spoon at 5.0 feet. No Penetration. Will try 5 7/8" tricone another 2' to ensure are in bedrock. Tried spoon at 6 feet - no recovery. Rock chips are very thin, bedded siltstone, 7.5Y 6/4 Lt yell. brn. Bedrock 4.5' 5 7/8" bit to 6.0 feet, overcame w/ 12" bit to 6' set 8" PVC casing to 6' spinning 4" steel casing to 9 feet. No water loss re setting casing. Core 10-13.5' Lost 70 gals at 13.5' due to probable gravel zone. Will pull casing and try to air ream through this zone with 5 7/8" tricone bit - Re-set casing to 14', Ream to 15' core 15-17' (Lost 80 gals) set casing at 17' + Core from 17'							
SS	2.0	1.3	0	1	0.2		11, 10, 12, 21	0	REL								
SS	0	0	5	2	0		5510	1									
SS	0	0	6	3	0		50/0	2									
								3									
								4									
								5									
								6									
								7									
								8									
								9									
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								49									
								50									

DRILLING CONTR. ENT

No. 167337

BY John Spring

DATE 10/18/91

CHK'D BY

Dames & Moore

103

EDI

DRILLING CONTR

NO.167406

BY J. Spangler

DATE CHK'D BY

12B.1 (3) (REV. 11-80)

LOCATION OF BORING						JOB NO. 6702-079		CLIENT THAMA		LOCATION RAAP	
						DRILLING METHOD:				BORING NO. 40ML 3A	
										SHEET 2 of 3	
										DRILLING	
						SAMPLING METHOD:				START TIME 4:10	
						WATER LEVEL				DATE 10/23/41	
						TIME				DATE	
						DATE				DATE	
						CASING DEPTH					
DATUM						ELEVATION					
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:			
						20					
						1					
						2					
NX	3.7	100	4 22.5 26.2	15/51 69%	434	3		hard, w/4 gray dolomite fractures as shown. Some brownish yellow staining of cracks, as shown			
						4					
						5					
						6					
						7		Stop casing at 26.2 feet due to water loss. will Air Hammer down to depth with 8" Air Hammer			
						8		Begin Air Hammer on 10-19-91			
						9					
						30					
						1		Very dusty, dry			
						2		Softer 31.5-33.0'			
						3					
						4					
						5					
						6		Less dusty at 36'			
						7					
						8		Some cuttings moist at 38'			
						9		Hit large cavity at 38'; silty; cannot keep hole open.			
						40					

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DRILLING CONTR. EOT
No. 167407

BY J Spangler

DATE _____ CHK'D BY _____

12B.1 (3) (REV. 11-90)

LOCATION OF BORING							JOB NO. 6702-077		CLIENT THAMA		LOCATION RAAP	
							DRILLING METHOD:				BORING NO. 40703A	
											SHEET 3 of 3	
							SAMPLING METHOD:				DRILLING	
											START TIME 9:00 DATE 10/17/91	FINISH TIME 10:15 DATE 10/21/91
DATUM							ELEVATION		WATER LEVEL		CASING DEPTH	
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:				
						40	6-05	Mud in void Grab sample put in driller's sample jar				
						1						
						2						
						3						
						4						
						5						
						6						
						7						
						8						
						9						
						50	DOT	Cavity extends to 49 feet. Cannot keep hole open. Call for instructions. USATHAMA Advises to abandon (James Rouch) on 10/21/91 Abandoned boring per USATHAMA specifications on 10/21/91 to a depth of 38 feet (cave-in to 38 feet)				
						1						
						2						
						3						
						4						
						5						
						6						
						7						
						8						
						9						
						60						

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LOCATION OF BORING		JOB NO.	CLIENT	LOCATION
		06702-077	USATIANA	RAMP
DRILLING METHOD: 6" tri cone (A) to 14'				BORING NO.
overrun with 10" tri cone (A), 8" A				4070214
SAMPLING METHOD: Split Spoon				SHEET
N.A. (see Report)				1 OF 5
				DRILLING
WATER LEVEL		START	FINISH	
TIME		TIME	TIME	
DATE		DATE	DATE	
CASING DEPTH				

DATUM	SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
										And A.C. 0.4 up to 14' muller
										well of SHMU 40
	SS	2.0	0.8	0	0.2	N/D	6.8	0		Macrofracture P.D. clay, 100% yellowish brown, w/ 70-100% of greyish brown mottling, trace silt, clay, mottling; becomes fg sand, silt at 1.8, 100% yellowish brown, homogeneous, trace marlstone (light) no odor
								1		
								2		
								3		
								4		
								5		
	SS	2.0	2.0	5	2	N/D	3.2	6		100% 1/8 brownish yellow soft silt, moist, no odor, no macrofracture, 5-10% of mg sand, v. slight plasticity, on staining, homogeneous.
								7		
								8		
								9		
								10		
	SS	2.0	2.0	10	3	N/D	6.4	11		moist 100% 1/8 brownish yellow med stiff silt, grading to soft and more moist at 11.0' At 11.0' becomes 100% 3/8 strong brown, slightly clayey (5%) soft silt, trace only sand
								12		
								13		
								14		
	SS	0	0	14	4	N/D	100/0	15		Rock at 14.0' Reaming 10" Tri cone bit over 6" tri cone hole to set 8" PVC casing at 14'
								16		Tip of spoon at 14' - 100% white clay, moist at interface of rock & overburden is very moist, muddy, no macrofracture
								17		
								18		
								19		
								20		
								21		
								22		
								23		
								24		
								25		
								26		
								27		
								28		
								29		
								30		

DRILLING CONTR. E.D.I.
 16741
 John Spangler
 DATE 10/16/01
 CHK'D BY

Dames & Moore

106

LOCATION OF BORING		JOB NO. 06702-077	CLIENT US. AIR FORCE	LOCATION RAAP
DRILLING METHOD:			BORING NO. 48754	
SAMPLING METHOD:			SHEET 2 OF 5	
WATER LEVEL			DRILLING	
TIME			START TIME 10:15	FINISH TIME
DATE			DATE 10/15	DATE
CASING DEPTH			DATE 10/15	

DATUM (0.00) Rec RQD Time ELEVATION

SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
--------------	---------------	------------------	-----------------	------------	--------------	-------------------	-----------------	---------------	------------

SURFACE CONDITIONS:

								20	
								1	
								2	
								3	
								4	
cut				5	25		10:15	5	
								6	
								7	
								8	
								9	
cut				6	30		12:21	30	
								1	
								2	
cut				7	33		12:30	3	
								4	
Type	Core	Recl	olo	Run	DPH	RQD	Time	5	
NX	50	4.7	94	1	35	26/50	215	6	
								7	
								8	
								9	
								10	

Air hammering through soft rock continuous

10:15 AT 25 feet. Will attempt core run. 4" steel casing set to 26'.

Will begin casing at 27 feet, after 4" steel casing set to 26'.

Sample taken at 25' of casing set to 26 feet.

cutting is representative of rock from 14-25'.

No fluid below.

Did not core at 27.0'. Rock will not contain trim or prevent drilling - water loss.

12:21 30 feet. Rock now is harder. Since 28' will hammer further. Rock is bituminous with continuous cutting present - 150

Re set casing to 34 feet.

Last 100 gals. had to flush hole - hammer was stuck.

12:30 Rock continues to be hard. Will try to core from 25'.

Drill to 57' 6" pale olive with thin limestone seams every 1"-2" apart. Well cemented. No weathering is not apparent on surface.

1st 10' of hole is mostly shale. 1st 20' from surface to well cementation and weathered. Fractures, as shown, are less than 1/8" wide. At 76' (100' to 110' grey) at 76' hole to 110' grey. At 78' becomes

DRILLING CONTR. F.D.3
T. Lynch, J. Phillips, D. Naleed

167417

DATE 10/25/91 CHK'D BY
Type Core Recl olo Run DPH RQD Time
NX 50 4.7 94 1 35 26/50 215

107

1 (3) (REV. 11-80)

DATE 10/28/01 CHK'D BY John Spangler

167395

DRILLING CONTR. FDI

T. Lynch, C. H. Hays, D. Nelson

25.1 (3) (REV. 11-80)

Dames & Moore

108

DRILLING CONTR. EDZ
FLANK 4, 2 Phillips, D. Wilson
 167388
J. J. Samplel
 DATE 10/28/11 CHK'D BY
 25.1 (3) (REV. 11-80)

LOCATION OF BORING		JOB NO. <u>06702-077</u>	CLIENT <u>USATAMA</u>	LOCATION <u>RAAP</u>
		DRILLING METHOD:		BORING NO. <u>401719</u>
		SAMPLING METHOD:		SHEET <u>4</u> OF <u>5</u>
		WATER LEVEL		DRILLING
		TIME		START TIME <u>5:07</u>
		DATE		FINISH TIME
		CASING DEPTH		DATE <u>10/28/11</u>

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
							5.07	60		60 to 63 feet is soft per hammer;
								1		
								2		
								3		
		cut			11/64		5.11	4		At 64 feet cuttings are abundant, sandstone & siltstone,
								5		
		cut			12/66		5.17	6		Still soft; less dusty; cuttings are moist
								7		
								8		From 66-74 feet hammer to goes through easily. There is a void.
								9		No Deflection on PID in this area next to the borehole.
								70		No cuttings come to surface for collection
								1		
								2		
								3		
								4		
								5		After 74' still very fast drilling but hammer action indicates there is more rock
							5.25	6		Still no cuttings at surface.
								7		
								8		
								9		
		cut			13/80		5.74	80		At 80 feet No cuttings about when hammer

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LOCATION OF BORING		JOB NO. 06702-077	CLIENT USATHAMA	LOCATION RAAP
		DRILLING METHOD:		BORING NO. 407W4
				SHEET 5 of 5
		SAMPLING METHOD:		DRILLING
				START TIME 7:31
				FINISH TIME 8:59
		WATER LEVEL		DATE 11/29/91
		TIME		DATE 11/29/91
		DATE		
		CASING DEPTH		

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
								0		Hard Again at 80.5 per. filler
								1		
							743	2		Down to 82 feet. No cuttings returned per Driller down to cavity
								3		
		cut			14/84		756	4		84; more cuttings came to surface moist, 2.5 milly d. grey, dolomite
								5		
								6		No PID Deflection in area of observation
							807	7		At 86'; cuttings same
							811	8		88-89' very soft
								9		
							813	90		At 90 feet. Zero blowback at air. Have to pull rods.
								1		
								2		Trud to try bottom w/ blowpot - could not get past 63 feet
								3		
								4		Will set a well at this location to a depth of 63 feet
								5		Bottom of hole is 90 feet
								6		
								7		Cave in at hole permitted us to set well to 62.8 feet at 11/29/91
								8		Total H ₂ O Loss 340 Gallons
								9		
								10		

DRILLING CONTR. E.O. 2
167390
T. Lyach, R. Phillips, D. Aulke
John Spangler
DATE 11/29/91 CHK'D BY
28.1 (3) (REV. 11-80)

SWMU 41

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION			
										06102-077		USA THAMA		RAMP			
										DRILLING METHOD: 5 7/8" Air Rotary				BORING NO. 411W1			
										SAMPLING METHOD: Split Spoon				SHEET 1 OF 5			
														DRILLING			
DATUM										WATER LEVEL		START TIME		FINISH TIME			
PIB ELEVATION												8:15		10:45			
										TIME		DATE		DATE			
												10/8/91		10/10			
										CASING DEPTH							
SURFACE CONDITIONS: Amb Air 0.6 Upgradient well																	
surrounding disposal layer, in upgradient logging hole																	
Cdr (754) Feas,																	
No signs in detection stiff 5/8" redish brownish																	
clay w/ 10% 5/8" yellow mottling and shales																	
5' clay mottling. Root material resembles clay																	
fill; dry;																	
8:30 wait for Air compressor Arrived																	
9:57 Begin Air Reaming overburden																	
with 5 7/8" reamer bit & tri cone																	
Vapor recovery. Get some deflection of PIB																	
will check pierced sample later. 7.5 x 2 1/3 plastic																	
clay, trace mg. sand, shunt (d. brn A)																	
w/ trace 5/8" yellowish red mottling																	
PIB Spun 5.0; March 3.2; 7.5 x 2 1/3 d. brown clay,																	
getting slightly moist slightly softer, highly																	
Plastic increased sand to 10-15%. App. Chalky																	
Rock zone of 11.5' weathered bedrock																	
at Rock/clay interface is a block, soft																	
residue (ash?) End of Spun is a soft																	
7.5 x 2 1/3 to brn rock flou w/ 7.5 x 2 1/3 CF																	
reddish yellow mottling Bedrock - Compact -																	
at 13.0'																	
Outer Casing Set to 13'																	
Inner Casing Set to 17'																	
Started Casing at 18'																	
Limestone, 2.5 x 4 dark gray (looks bluish																	
black). Many small calcite filled cracks.																	
Rust colored staining of fractures																	
(fractures as shown on graph); no																	
apparent bedding																	
No H ₂ O Loss																	
Run 1																	

DRILLING CONTR. E-01

NO. 167375

BY John Spang

DATE 10-8-91 C&D BY

Dames & Moore

112

DRILLING CONTR. FDI

No. 167376

BY T. Spangler

CHK'D BY

DATE

625.1 (3) (REV. 11-80)

LOCATION OF BORING							JOB NO.		CLIENT		LOCATION			
							6702-077		THAWA		RAAP			
							DRILLING METHOD:					BORING NO.		
												41MW1		
												SHEET		
												2 of 5		
							SAMPLING METHOD:					DRILLING		
							WATER LEVEL				START TIME		FINISH TIME	
											270			
							DATE				DATE		DATE	
											10/8/91			
DATUM							ELEVATION							
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:					
							20							
							1							
							2							
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							
							13							
							14							
							15							
							16							
							17							
							18							
							19							
							20							
							20		Grades lighter colored to 2.5 ft at 19.0'. Becomes waxy at fracturing, continued no effort bedding; becomes more fractural to gravelly (highly fractured) at 19.7-20.2 (Gravel) back to gray, LS at 20.2 at zones of minor cracking. From 22.0-23.0 grades back to N/7 d. gray w/ thicker calcite filled cracks. Fractures at 21, 21.6, and 23 are in highly weathered zones of highly cracked and re-cemented limestone with sand and clay infilling; is grayish yellowish brown at those cracks, include much sand in above fractures 23-28.0'. Dark gray/bluish black limestone w/ abundant calcite filled cracks. Some fractures are open, some feel waxy due to bit. Limonite or rust colored staining becomes less abundant below 27.5'. Small pyrite specks visible beginning at 24.0'. Remains same thru 29.0', with fractured following no apparent pattern.					
							1		28-33.0: Same dark gray - bluish black limestone, less fractured. At 30.3 thick calcite veins become pitted and waxy. This zone, from 30.2-30.5 is also rust stained and sandy due to weathering, but below and above is solid - no color change or weathering. 31.0-31.4 is zone of rubbleization; 31.4-32.0 is highly cracked, vertically, over 1/2 of the vertical specimen. Other vertical 1/2 from 31.4-32.0 is intact. 32.0-33.0 is highly rubbleized, with fracture sides stained 7.5YR 5/6 strong brown.					
							2		33.0-38.0: Limestone, N/7 d. gray, highly fractured and rubbleized. Breaks are highly angular, with 7.5YR 5/6 strong brown staining on fracture faces. Strong brown staining ends at 36' with specimen being much less fractured after 32.0 feet. At 33 feet limestone becomes 2.5Y 5/2 grayish brown, w/ thin calcite veins and occasional pits through 38'. At 34.5 grades to N/5 gray w/ 36 grades to N/7 gray. Polomite, N/7 gray with 10YR 6/6 brownish yellow mottling or staining fracture & s. shales. Continued to be well cemented, had little porosity, no apparent bedding; somewhat;					
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							
							13							
							14							
							15							
							16							
							17							
							18							
							19							
							20							

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FD-302 (REV. 11-80)

Dames & Moore

114

LOCATION OF BORING		JOB NO. 6702-077	CLIENT THAMA	LOCATION RAAP
DRILLING METHOD:			BORING NO. 41721	
SAMPLING METHOD:			SHEET # 4 of 5	
WATER LEVEL			START TIME	FINISH TIME
TIME			10:50	
DATE			DATE	DATE
CASING DEPTH			10/9/91	

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	DEPT. OF SAMPLE	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
										60		calcite veins but are thin and.
										1		Dolomite remains hard, fq, no apparent bedding, "sugary",
		NX	5.0	5.0		10	61.5	61.5	50/60	11:12		At 61.6 becomes pitted with small pits. More calcite, and apparent thin ls beds. At 62', highly rubberized zone to 62.3, with abundant yellowish orange staining. This zone is softer, and possibly a water conduit. Pitting ends at 62.9 (to trace pits only), where Dolomite becomes n/4 gray, hard, fq, w/ thicker calcite seams.
										6		66.5: Same dolomite Hematite content appear to increase because darker shading is increasing. Calcite veins showing signs of weathering
		NX	5.0	5.0		11	66.5	53/60	76.5	11:40		At 69.0' - 70.5' specimen is more pitted, but is essentially the same than 71.5 as above
										7		71.5: Same dolomite. but grading darker to 50.4/1' dk. bluish gray, with fractures as shown. Calcite seams are more abundant. At 74.5 there is a change to dolomite chips that appear weathered back together with calcite. Resembles breccia. Look like mini faults also, like a tiny thrust system as calcite veins have been cut short, and "thrust plates" are visible in core. Mini fault ends at 75.4' where dolomite becomes the same n/4 gray, hard, well cemented and many thin calcite veins which show signs of weathering.
										8		76.5: Same dolomite, with increasing d. gray shades.
										9		
										10		
										11		
										12		
										13		
										14		
										15		
										16		
										17		
										18		
										19		
										20		
										21		
										22		
										23		
										24		
										25		
										26		
										27		
										28		
										29		
										30		

DRILLING CONTR. EOT

NO. 167305

BY D. Spangler

CHK'D BY

DATE

28.1 (3) (REV. 11-80)

Dames & Moore

115

DRILLING CONTR. EOT

No. 167334

BY T. Spangler

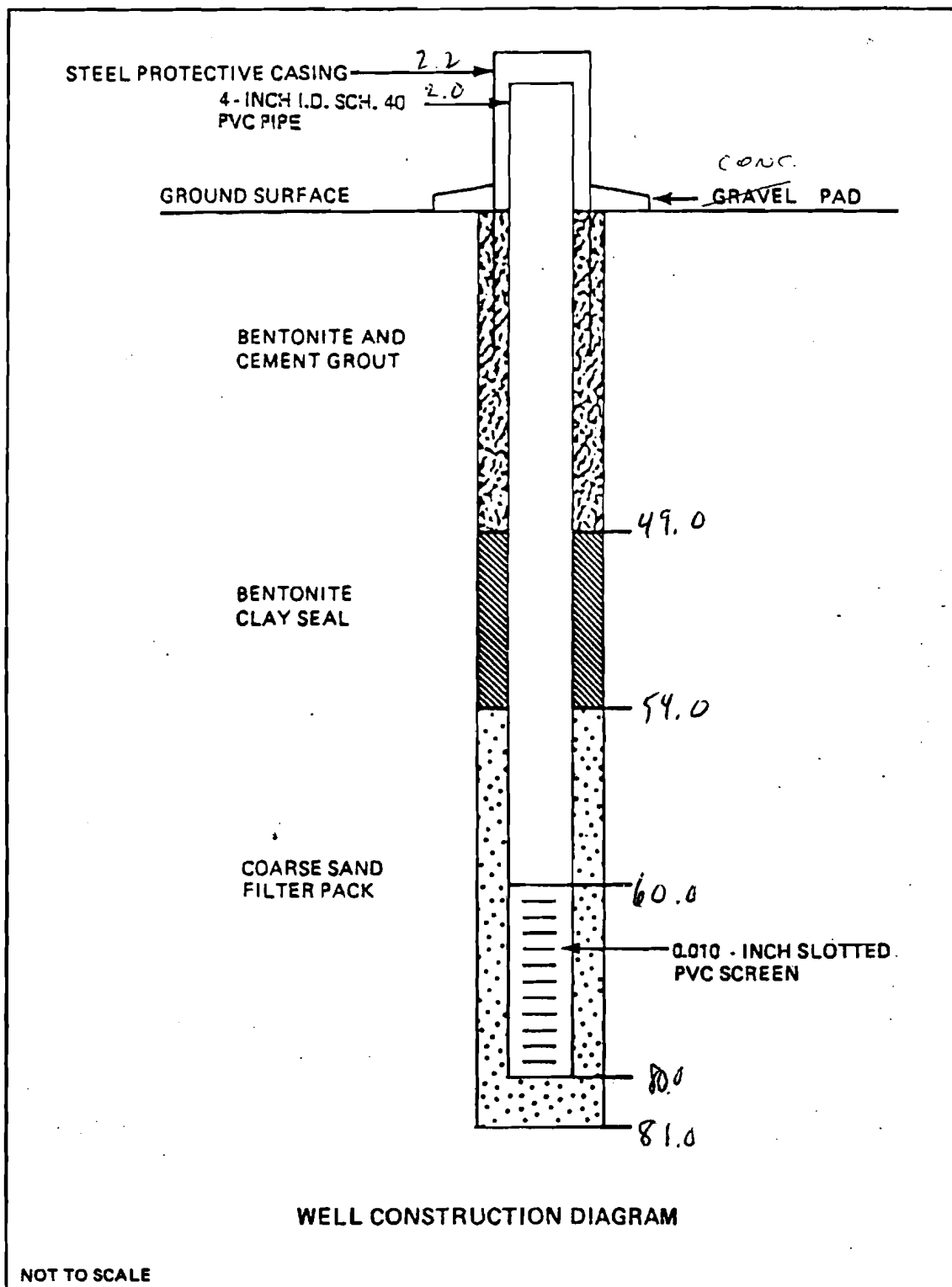
CHK'D BY _____

DATE _____

628.1 (3) (REV. 11-80)

LOCATION OF BORING							JOB NO. 6702-077		CLIENT THAMA		LOCATION R.A.P.	
							DRILLING METHOD:				BORING NO. 417W1	
											SHEET 5 OF 5	
											DRILLING	
							SAMPLING METHOD:				START TIME 8:00	
				DATE 14/10/91		DATE 14/10/91						
WATER LEVEL				TIME		DATE						
CASING DEPTH				TIME		DATE						
DATUM	SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:			
							80		with fracture as shown Specimen is highly intact, with occasional yellowish brown - orange staining.			
							1					
							2		Reamed hole to 81 feet. Set 4" well with 20 feet screen to a depth of 800 feet on 10/10/91			
							3					
							4					
							5		Net H ₂ O Loss of 5 gals while drilling, because we blew out 65 gals while Reaming.			
							6					
							7					
							8					
							9					
							0					
							1					
							2					
							3					
							4					
							5					
							6					
							7					
							8					
							9					
							0					

Location: 417W1
Installation Date: 10/10/91
Surface Elevation:
Top of Casing Elevation:



LOCATION OF BORING							JOB NO.		CLIENT		LOCATION		
N↑ 41MW3 41MW3B Aband. 41MW3A Aband. 41MW2 41MW1 Trailer							06702-077		VSATHAMA		RAAP		
This is 3rd hole drilled to install well 41MW3							DRILLING METHOD: 5 7/8 Tri core Air Rotary					BORING NO. 41MW3	
							SAMPLING METHOD: Cuttings sampled as they returned to surface					SHEET 1 of 4	
							WATER LEVEL					DRILLING	
							TIME					START TIME 7:30	
							DATE					FINISH TIME 14:00	
							CASING DEPTH					DATE 10/17/91	
DATUM							ELEVATION						
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS: Ambient Air 0.3.				
							0		Logged this from cuttings -- more detailed Log from samples at split span and NX core available from Log of 41MW3B				
							1	nc	2.0': Dry to slightly moist. 7.5 yr 1/4 clayey silt, no odor, no lid deflection				
							2		Jarred lid - 7.2				
							3						
							4						
							5						
							6						
							7	cl	7.0': Becoming moist, silty clay, 10 yr 5/4 yellowish brown, no odor				
							8						
							9		Jarred lid 4.2 (7')				
							10		10.0': 7.5 yr 1/4 d. brown fs sandy silt, no odor, slightly moist, cohesive, v. slight plasticity				
							11	nc	Jarred lid 4.2				
							12						
							13						
							14						
							15	cc	15.0': 5 yr 5/4 yellowish red, slightly moist, gravelly sandy silty clay				
							16		Jarred lid 6.2				
							17						
							18		18' - same				
							19		Jarred lid 5.8				
							20		19' Becoming cohesion - less ductile				

DRILLING CONTR. E.D.I.

NO. 167317

BY John Spangler

DATE 10-17-91 CHK'D BY

15.1 (3) (REV. 11-80)

118

825.1 (3) (REV. 11-80)

BY V Spangler

119

2B.1 (3) (REV. 11-80)

120

520.1 (3) (REV. 11-80)

121

LOCATION OF BORING

NT

43MU3A

Aband.

43MU2

43MU1

Thrs was the 1st of 3 holes drilled to install well 43MW3

Jam 1

9'0

ELEVATION

JOB NO.

06702-077

CLIENT

USA THAMA

LOCATION

RAAP

DRILLING METHOD:

575 Tri-Cone (Air)

BORING NO.

41MW3A

SAMPLING METHOD:

SS

SHEET

1 of 2

WATER LEVEL

TIME

DATE

CASING DEPTH

START TIME

FINISH TIME

DATE

DATE

DATUM

9'0

ELEVATION

SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
SS	2.0 0.9	0	1 0-2	7, 15 28, 20		0 0.19	Li
						2	
						3	
						4	
						5	
SS	2.0 1.8	5	2 5-7	8, 10 7, 13		5 8.06	CL
						7	CL
						8	
						9	
						10	
SS	2.0 0.5	10	3 10-12	4, 6 7, 9		10 8.24	CL
						12	
						13	
						14	
						15	
SS	2.0 1.3	15	4 15-17	5, 4 6, 7		15	
						16	
						17	
						18	
						19	
						20	

SURFACE CONDITIONS:

Amb Air 0.4 Cloudy, overcast, may rain, 58°

silty clay, 7.5YR 4/6 strong brown, slight plasticity at 1.0' zone of 10YR 6/3 rock floor and rocks, probably due to crushed rocks. Below 1.3 becomes 7.5YR 4/4 clay w/ less silt, slightly moist, w/ 20% 10YR 7/6 yellow mottling.

High Plasticity

Moist, softer (medium stiff) 7.5YR 8/6 strong brown clay, w/ occasional 2.5Y 5/6 light olive brown mottling beginning at 6.5'

At 6.5', becomes gradually sandy clay (fg gravel and c.g. sand, 25%, 75% slightly silty clay)

2.5Y 4/3 olive brown soft, sandy clay with some gravel (20% fg sand, 5% gravel, 5% gravel (S), moist; plastic

No deflection of spoon; 2.5Y 4/3 olive brown clay, 5% sand, 5% gravel, soft, moist; high plasticity;

Dames & Moore

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EOI

DRILLING CONTR.

No. 167336

BY J. Spangler

CHK'D BY

DATE

625.1 (3) (REV. 11-80)

LOCATION OF BORING										JOB NO. 6702-077		CLIENT THAMA		LOCATION RAAP	
										DRILLING METHOD:				BORING NO. 41MW3A	
														SHEET 2 of 2	
														DRILLING	
										SAMPLING METHOD:				START TIME 8:40	
				DATE 10/15/91		DATE 10/15/91									
WATER LEVEL				TIME		DATE									
CASING DEPTH															
Jared PLO										DATUM		ELEVATION			
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:							
SS	2.0 0.6	20	5 2022	5, 100/4	843	20		CLAY, 2.5x 4/3 olive brown 5% sand, 5% gravel, soft, moist, high plasticity; strong refusal after 6" due to wood. Strong odor from borehole - smells like cut wood & moist cut wood has a bad smell, but no PID							
						2									
						3		8:57 - No PID deflection of cuttings, 8:00, or borehole.							
						4									
						5									
SS		25	6 25	8, 100/5	908	5		Same, w/ slight block mottling, also, possibly hit ash, will call office							
						7									
						8									
						9									
						10		Found small red ash-like pieces thought to resemble red water ash. Harbey still felt this was ash. We therefore grouted this boring, with USATHAMA approval, per Dennis Bauer, on 10-15-91, per USATHAMA specifications, to depth of 27.0 feet							
						11									
						12									
						13		Boring was then re-designated 41MW3A							
						14									
						15									
						16									
						17									
						18									
						19									
						20									
						21									
						22									
						23									
						24									
						25									
						26									
						27									
						28									
						29									
						30									
						31									
						32									
						33									
						34									
						35									
						36									
						37									
						38									
						39									
						40									

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION	
										06702-077		USATHAMA		RAMP	
DRILLING METHOD: 578 Tri-Cone (Air)										BORING NO.		SHEET			
SAMPLING METHOD: SS										41MW30		1 of 3			
WATER LEVEL										START		FINISH			
TIME										TIME		TIME			
DATE										DATE		DATE			
CASING DEPTH										1/5/16		10/1/16			
DATUM										PLO		ELEVATION			
SAMPLER TYPE	SPANNERS DRIVEN	RECOVERED	DEPTH OF CASING	SAMPLE NO.	DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS: Ambient Air 1.0					
SS	2.0	1.3	0	1	0.2	4.0	18.16	12:07	SM	PLO inside spoon 7.8 gravelly					
							19.19		MC	7.5YR 7/4 d. brown silty f. sand at 0.5 becomes 7.5YR 4/6 strong brown v. stiff clayey silt, w/ gravel. AT 1.8 becomes more clayey silt (70-40%) 5YR 4/4, reddish brown 10YR 7/2 v. pale brown mottling (rock flour).					
								2	MC						
								3							
								4							
								5							
SS	2.0	1.3	5	2	5.7	3.8	4.9	12:23	CL	PLO tip of spoon 4.8. clay 10YR 4/4 d. yellowish brown, moist high plasticity, 10% f. mg sand, 5% gravel. gravel seam blocked recovery end of spoon					
							13.13								
								7		12:25 Inside Spoon 4.6 PLO 3.3 (5) Ambient Air 0.4					
								8							
								9							
								10							
SS	2.0	1.9	10	7	10.2	2.6	7.8	12:34		PLO tip of spoon 4.3 7.5YR 5/6 strong brown f. sandy silt, moist 5% clay, non-plastic but cohesive, 1% - track pea-gravel.					
							10.17			Note in core in section of spoon was grayish brown clayey (15%) silt, w/ black staining or mottling					
								2							
								3							
								4		boulder					
SS	2.0	0.9	15	4	15.7	4.2	38.49			12:43 Apparent bedrock at 15.0'. Attempting Spoon					
							54.24			Drove Spoon 2 feet					
								6	GC	Tip of spoon PLO 2.2					
								7		7.5YR 5/6 strong brown gravelly sandy clay, occasional small block and thin mottling, slightly moist					
								8		Boulder at 15'; Spoon refusal not experienced.					
								9							
								20							

DRILLING CONTR. EDE

No. 167315

BY John Spangler

DATE 10/15/16 CHK'D BY

229.1 (3) (REV. 11-00)

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION			
										06702-077		TH407A		RAXP			
										DRILLING METHOD:				BORING NO.			
														41MW3B			
										SAMPLING METHOD:				SHEET			
														2 of 3			
														DRILLING			
										WATER LEVEL				START TIME		FINISH TIME	
										TIME				1:12			
										DATE				DATE		DATE	
										CASING DEPTH				19/5/91			
DATUM										Jarras PID		ELEVATION					
SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:									
SS	2.0 1.6	20	5 20-22	2.2	19.30 52.53	1.17	ML	5YR 4/3 pale olive very hard silt w/ 2.5Y 6/6 olive yellow mixed throughout. Black staining (5%) along non-uniform surfaces. Silt is dry, crumbles under hand hand pressure, 5% gravel;									
						2											
						3											
						4											
						5											
SS	2.0 1.6	25	6 25-27	3.2	16.30 15.6	12.06	ML	PID inside spoon 11.0. gravelly very stiff silt becoming slightly moist, overall color is 2.5Y 6/4 light yellowish brown with various mottling of 2.5Y 6/7 light grey, 2.5Y 5/2 greyish brown 7.5YR 5/8 strong brown and 5Y 5/2 olive grey; w/ 10% gravel and siltstone. At 27', tip of spoon is very soft clay, 7.5Y 5/6 strong brown, moist, high clay plastic, sticky,									
PID	inside borehole			3.2		7	CL										
						8											
						9											
SS	0.1 0.1	30	7 30-30	50/6	11.40	3		Attempted to drive spoon at 30'; no penetration. Backed at 30'. will Ream 5 7/8" Ream hole w/ 1 1/2" Ream bit. Oil Recovery - at 20.0 - 5G 5/1 greenish grey siltstone w/ some color clay/sand/rock flour mix tone, dry to moist.									
						1											
						2											
						3		Set PVC casing to 31.0'									
						4		Set inner 4" casing to 34' (lost 50 gals) will begin coring at 25'									
						5											
NX	5.0 4.8	96	1 35-40	38/58	9.10	6		5BG 4/1 dark greenish grey clay w/ abundant calcite veins. no apparent bedding. clay is clay of 'Fractures' as shown yellow staining appears on fracture at 35.6 and is only slight until 37.0, where clay is stained yellow until 40'. This may be due to increased clay. There are zones of siltstone and sandstone (clayey) and limestone inter mixed also to 40' with calcite and limestone areas pitted starting at 38.5									
						7		Lost 5 gals coring Run 1									
						8		Driller notes clayey rock while coring									
						9											
End Run 1										9:35							

DRILLING CONTR. EOI

No. 167316

BY J. Spangler

CHK'D BY

DATE

DMS-1 (3) (REV. 11-80)

125

225.1 (3) (REV. 11-80) DATE _____ CHK'D BY _____

SWMU 43

Dames & Moore

127

LOCATION OF BORING		JOB NO.	CLIENT	LOCATION	
New River		06702-058	USATHAMA	RAA	
		DRILLING METHOD:			BORING NO.
		6.25 ID Hollow Stem Auger Cont Flight			43 MWI
		SAMPLING METHOD:			SHEET
		SS			1 of 2
DATUM		ELEVATION		DRILLING	
				START	
				TIME	
				DATE	
				FINISH	
				TIME	
				DATE	
				DATE	
				DATE	

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
								Flat, grass field, wet, cloudy 60°
								Amb PIO = 2.1
								Organic surface layer, grass, many small roots OL
SS	24/26	0	2		7:35	1		Brown 7.5 yr 3/2 silt (mL) some roots, some incl orange silt, some organics
						2		dark yellow brown 7.5 yr 4/4 silty sand (sm) fine to med sand (silt & 45%) moist, np trimagne stains
						3		
						4		
SS	24/24	5	5	8 1/2	7:50	5		yellow brown 10 yr 5/4 sandy silt (mL) np moist, very stiff (silt & 40%)
						6		
						7		
						8		Brown 7.5 yr 5/3 sandy silt (mL) np mic, fine sand & 30%-35%
						9		
SS	24/24	10	3	36	8:00	10		yellow brown 10 yr 5/4 sandy silt (mL) np mic, moist, stiff (fine sand & 30%-35%)
						1		
						2		
						3		
						4		
SS	24/14.5	15	4	23	8:05	5		yellow brown silty sand (sm) very moist loose, 10 yr 5/6, mic np
						6		faint mottling gray
						7		
						8		Encountered water at 18
						9		
SS	24/12	20	5	46	8:30	20		(hard) clay

DRILLING CONTR

No. 169765

BY: [Signature] DATE: 8/13/91

CHK'D BY:

DATE: 8/13/91

Dames & Moore

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LOCATION OF BORING					JOB NO.		CLIENT		LOCATION SWMU 43	
					DRILLING METHOD: 6.25 ID Hollow stem Auger Cat #1				BORING NO. 43MW1	
					SAMPLING METHOD: SS				SHEET 2 of 2	
									DRILLING	
					WATER LEVEL		START TIME 8:30		FINISH TIME 8:50	
					TIME		DATE 8/17/91		DATE 8/13/91	
					DATE		CASING DEPTH		CASING DEPTH	
					CASING DEPTH		CASING DEPTH		CASING DEPTH	

PID

DATUM				ELEVATION			
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
SS	24 18		5 20-2	46 50	8.35 2.5	20	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						0	

SURFACE CONDITIONS:
**Flat grass field, wet, cloudy 65°
amb PID = 2.1**

**Wet light gray clay (CL) finely laminated
highly fractured limestone rock, wet, hard
0.25 inch gravel**

Very hard fractured limestone rock

auger refusal

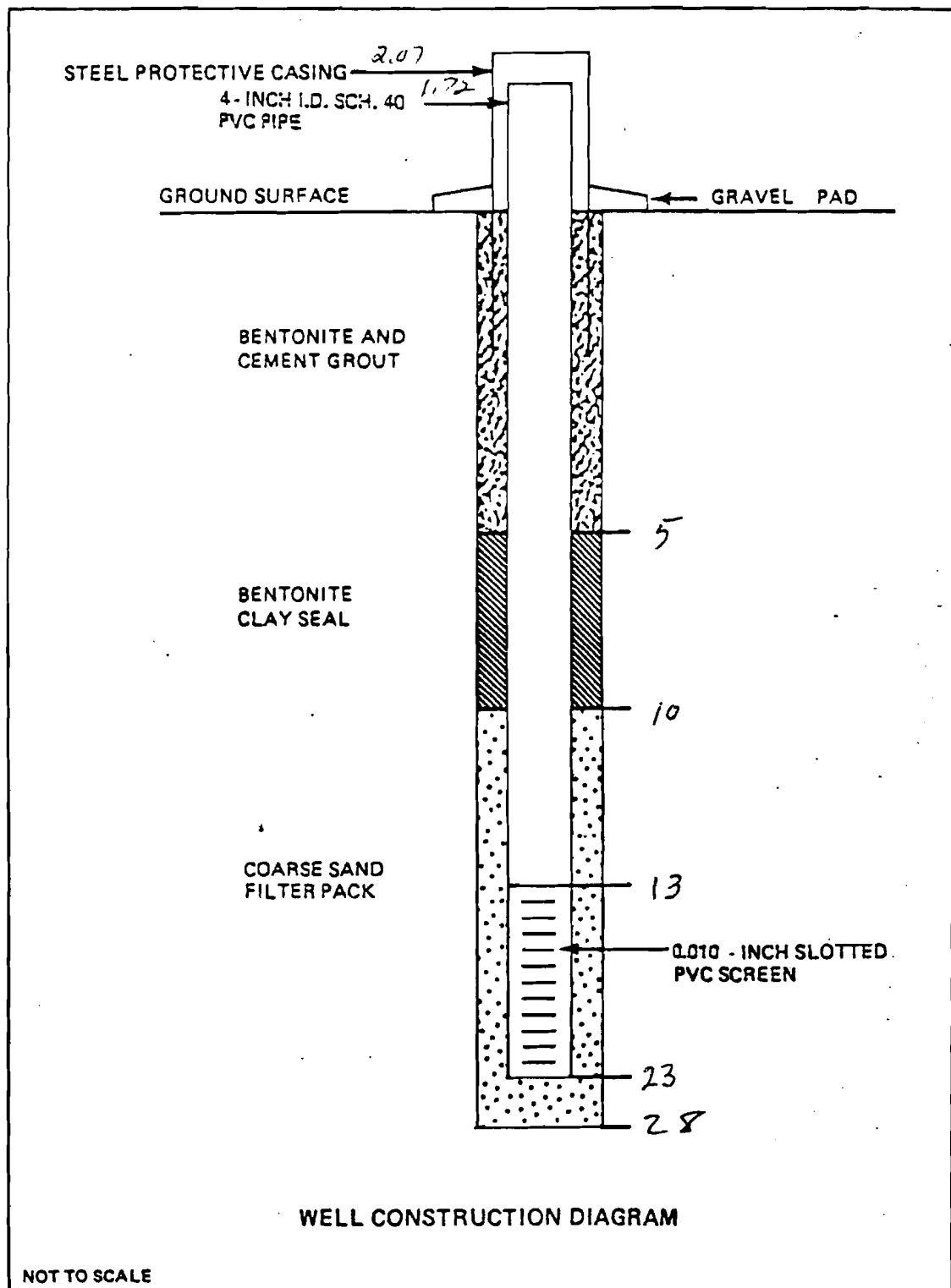
**Reamed Hole to 28' & installed
well with a 15 foot screen on
8/13/91. Did not obtain core
sample**

DRILLING CONTR. No. 169840

BY _____ DATE _____ CHK'D BY _____

18.1 (3) (REV. 11-90)

Location: 43 MW1
Installation Date: 8/13/91
Surface Elevation:
Top of Casing Elevation:



Dames & Moore

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LOCATION OF BORING										JOB NO.		CLIENT		LOCATION	
										06702-058		USATHAMA		RAAP	
										DRILLING METHOD: 6 1/2" ED HSA				BORING NO.	
														437W2	
														SHEET	
										SAMPLING METHOD: SS				1 of 2	
														DRILLING	
										WATER LEVEL				START	
														TIME	
										TIME				7:28	
										DATE				DATE	
										CASING DEPTH				8/17/91	

DATUM							ELEVATION		SURFACE CONDITIONS:	
SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH			
SS	24 1.6'	0	1	5.6, 8.5	0.4	0		Raining, flat grassy field No PID due to rain, background 0.1		
						1		TOPSOIL:		
						2		10YR 3/2 v dark grayish brown silt, 5% mica, root mat 6		
						3		16. becomes 5YR 4/3 reddish brown silt, no roots, soft		
						4		no odor, slightly moist, becoming stiff, 5% fg sand,		
						5				
						6		7.5YR 4/4 micaceous silt, 15% clay, 15% mica,		
						7		6' gravel zone encountered, to fg sand		
						8		moist (time 8:15), sticky		
						9		Note: no pid readings on cuttings.		
						10				
						11		(8:23) no pid same, less clay, less sticky		
						12		moist no odor, trace to sand; 21% g.g. sand		
						13		or vfg gravel		
						14				
						15				
						16		(8:29) note: no reflection anywhere around soil		
						17		same; AT 16.0 grades to 19 same, 15% silty, 5% clay, specks of multicolumn mica color (7.5YR 4/4) & brown;		
						18				
						19		drill chatter indicates firm gravel		
						20				

SDI

DRILLING CONTR.

No. 169834

BY John Spangler

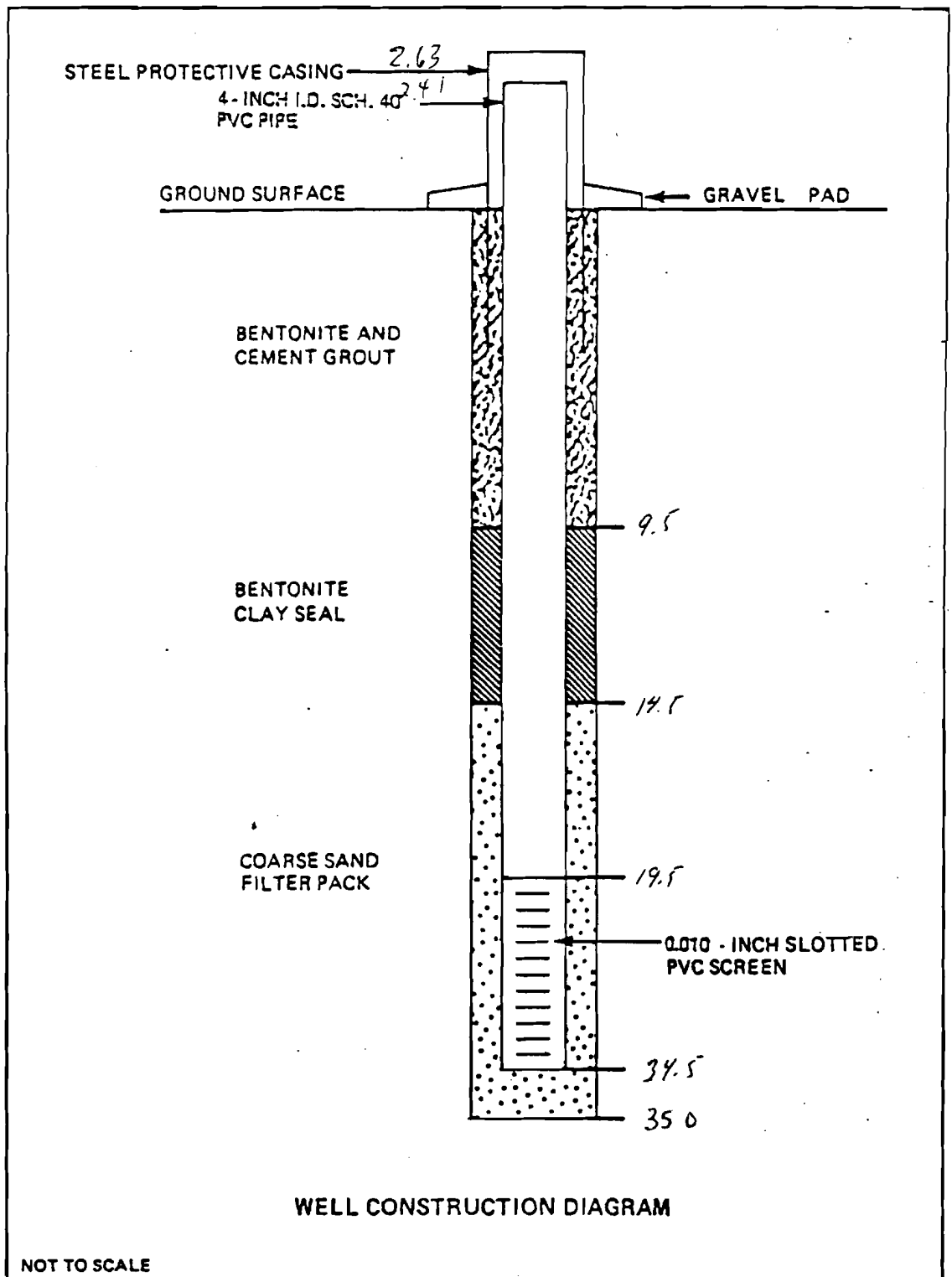
DATE 8/16/91

CHKD BY

31

BY-

Location: 4577 W 2
Installation Date:
Surface Elevation:
Top of Casing Elevation:



Dames & Moore

133

LOCATION OF BORING		JOB NO.	CLIENT	LOCATION
		06702-	USATHAMTA	RAAP, Va
DRILLING METHOD:				BORING NO.
6" HSA, rock coring, roller bit ream				43MW3
SAMPLING METHOD: SPT, rock coring				SHEET
				1 of 2
				DRILLING
WATER LEVEL				START TIME
				0800
TIME				FINISH TIME
DATE				DATE
				8/19/91
CASING DEPTH				

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	DEPT. SAMPLE	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
												flat grassy field, clear & cool morning
	0800	SPT 24	22	0	1	6	13	19		0		10YR 6/8 br. yel silt w/ clay & sand, mottled, stiff to very - 1" black ash layer
										1		7.5 YR 3/4 dk brown sandy silt
										2	ML	10YR 3/3 dk brown, silty fine sand, micaceous, dry (natural looking soil)
										3		grading
										4		
	0813	SPT 24	19	5	2	5	6	10		5	ML	Dark dk brown 10YR 4/4 fine sandy silt w/ trace micaceous w/ trace drab red mottling dry
										6		
										7		
										8		
										9		- turn clay, diff color
										10		- clayey maybe
	0824	SPT 24	22	10	3	6	10	12	7	1	SP	olive gray 5Y 4/2 fine sand, trace silt micaceous, dry, loose but cohesive due to mica
										2		
										3		
										4		
	0835	SPT 24	13	15	4	4	15	17	18	5	SP	SAME clayey b/w 15.5 - 16.5
										6	SP	
										7	SP	Gray m-c sand, mtr 5Y 5/1 - may have been wet when pulled but not too wet
										8	LG	19.0 Auger refusal, will try SAT
	0855	SPT 5	19	5	5	100	5			9		LG fine grained gray 2.5Y 5/1, dry but upper 55 pale yel 2.5Y 8/3 silt in bit, dry and wet
										20		

DRILLING CONTR. E.D.I.
Penny Lynch - Driller

No. 167297

BY A. DuDa

CHK'D BY

DATE

8.1 (3) (REV. 11-80)

LOCATION OF BORING

put 1/4 buc. at ben pel in
hole at bot. of augers to
try to seal augers during
coring and reaming
coring will start at 20.0 FT
at 0957

JOB NO.

06702-

CLIENT

USATTHAMA

LOCATION

RAAP, Va

DRILLING METHOD:

roller bit wash to 2000 ft 0940-
0957

BORING NO.

434W 7

SHEET

2 of 2

SAMPLING METHOD: CORE

good return on water but some is
going down the augers

DRILLING

START FINISH

TIME TIME
0905 1130

WATER LEVEL

TIME

DATE

CASING DEPTH

DATE DATE

8/19/98 8/19

FT
CORER/FT RUN RQD RQD
ELEVATION

SAMPLER TYPE	INCHES DRIVEN RECORDED	DEPTH OF CASING	SAMPLE NO. DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
NX	5.0 4.5	90%	1 20-25	2.1	42%	20		core boxes are 4 rows of 3, 8 FTea = 15 ft a box
						1		0957
						2		lg gray LS w/ br. yel. stained seams, thin layered, deformed, seams up to 45° angles even the bigger intact pieces are deformed seams are ~ less than 1", many fractures mostly horizontal
						3		zone a little more deformed
						4		
						5		
NX	5.0 3.5	70	2 25-30	1.8	36%	6		starts grading deformed thin beds to LS breccia
						7		still deformed with irreg. bedding (most lost core prob from middle of run)
						8		LS breccia starts, clasts up to 1"
						9		
						1030		
						1046		br. gray LS deformed
						1		
						2		~33.5 gsf zone starts, brown water
NX	5.0 3.7	74	3 30-35	2.4	48%	3		LS breccia, gray look like this zone is below the water table
						4		oxy. zone yel. br gsf, brown water
						5		gray deformed LS - oxy. staining not below this level
						6		gray LS with zone having green and/or purple tint, no oxy. yel. zones appears to have shale/clay in LS, no clay or shale seen cored through the unbroken pieces seem more solid than overlying LS but lot of fractures
						7		
						8		
						9		
						1127		

DRILLING CONTR.

No. 167298

CHK'D BY

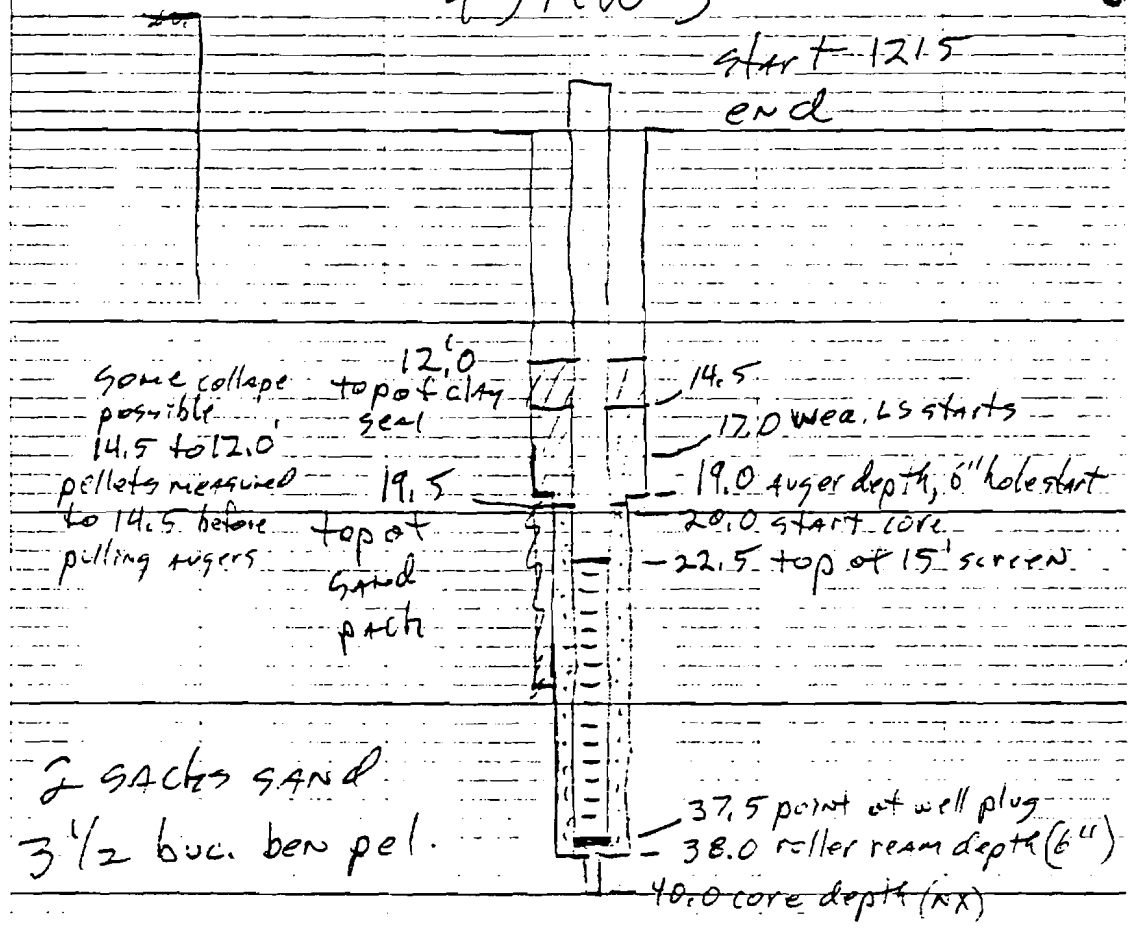
DATE

1 (3) (REV. 11-80)

8/19/91 Monday

43 MW 3

28



2:15 George started to decon pipes

2:40 George " " " Augers

Dames & Moore

136

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION			
New River Flow DATUM 10 ELEVATION				06702-058		USATHAMA		RAAP			
				DRILLING METHOD: 6 5/8" HSA						BORING NO. 4372W4	
				SAMPLING METHOD: Split Spoon						SHEET 1 OF 2	
				WATER LEVEL						START TIME	
TIME						FINISH TIME		DATE			
DATE						DATE		DATE			
CASING DEPTH						8/17/51					
SURFACE CONDITIONS: Background 1.4											
7.5YR 4/3 d. brown clayey silt w/ 10% fg sand, moist, plastic, med stiff, no odor, no pit, micaceous											
7.5YR 5/4 Brown silty sand (15% FH), fg, micaceous (20%) Some moist, no odor, no pit, no local fill material											
At 11.6 becomes clayey (50%) sand, stiff											
2.5Y 4/2 d. grayish brn, mg sand interbedded w/ mg clayey sand (clay zones) no odor, no pit, moist, micaceous (20%) Becomes cleaner sand at 17.0 [SI]											
Driller says hit H ₂ O at 18.5'											

No. 169872

DRILLING CONTR.

BY DATE CHK'D BY

(3) (REV. 11-80)

Dames & Moore

137

LOCATION OF BORING		JOB NO.	CLIENT	LOCATION
		DRILLING METHOD:		BORING NO. 437W4
		SAMPLING METHOD:		SHEET 2 OF 2
		WATER LEVEL		DRILLING START TIME 8/17
		TIME		FINISH TIME
		DATE		DATE 8/72
		CASING DEPTH		

DATUM

ELEVATION

SURFACE CONDITIONS:

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	
SS	2.0 0.4	20	4	24.21 NO. 20.15	10:21	20		Spore came out saturated; 2.5-2.4/5 olive brown w/ 7/8 4/4 reddish brown mottling of sandy micaceous silt (20% of sand)
MX	5.0 4.8	76	22.5	20.15	10:21	2		Weathered bedrock encountered at 20.0 feet
						3		Lim-stone, 2.5-2.5 gray, 10% pits & wugs. No apparent bedding, but thin clay (clay 6/6 reddish yellow) at seams & fractures
						4		LS is rounded at edges at fractures, markedly weathered. Fractures or shoud. 23.6' highly pitted zone, below mod weathered LS fragments
						5		At 25.0' becomes highly weathered & clayey, with calcite veins and calcite-filled fractures decomposing
						6		Below 25.6 becomes less weathered 2.5-2.4/4-2.3
						7		gray-very dark gray, many vertical calcite veins visible fractures (horizontal breaks) appear to occur at clay partings post 20
						8		prim. fault to weathering and cracks and fissures, decreases below 25.6
						9		
						0		
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		
						9		

DRILLING CONTR.

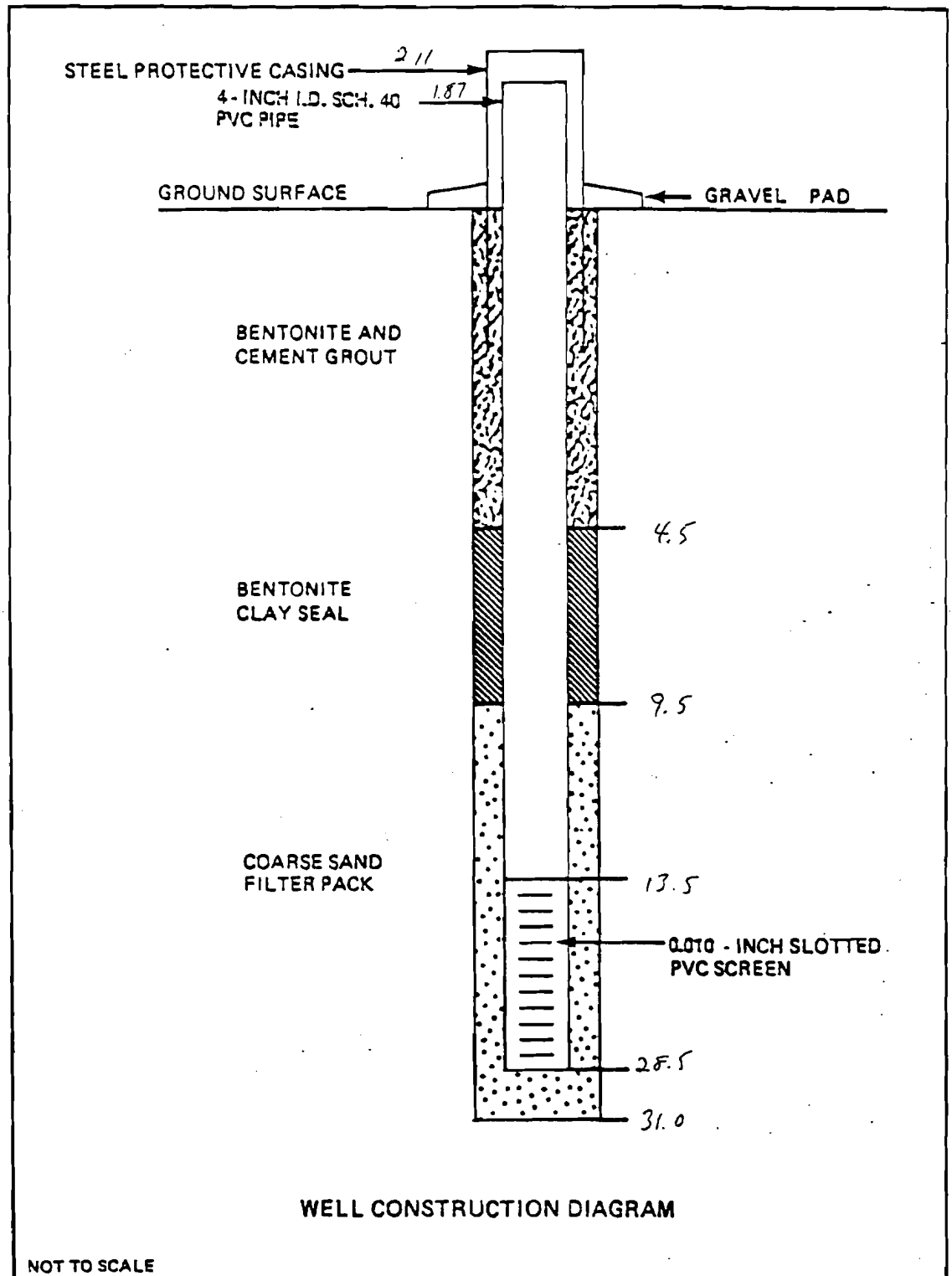
No. 69873

CHK'D BY

DATE

(3) (REV. 11-80)

Location: 43MW4
 installation Date: 8/17/91
 Surface Elevation:
 Top of Casing Elevation:



Dames & Moore

133

LOCATION OF BORING		JOB NO. 06702-058	CLIENT USATHAMA	LOCATION RAAP
		DRILLING METHOD: HSA 6 5/8 ID NX Core 6 1/4" Ream Bit		BORING NO. 43 MW5
		SAMPLING METHOD: split spoon NX core		SHEET 1 of 2
				DRILLING
		WATER LEVEL		START TIME 746
		TIME		FINISH TIME 9:25
		DATE		DATE 8/15/91
		CASING DEPTH		DATE 8/15/91

DATUM ELEVATION

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
						0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
SS	24	10	1			0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						10	
						11	
						12	
						13	
						14	
						15	
						16	
						17	
						18	
SS	6	18	2	57, 100/2		9	
						10	
						11	
						12	
						13	
						14	
						15	
						16	
						17	
						18	
						19	
						20	

SURFACE CONDITIONS: Covered Landfill, grassy, Humid, foggy, 64°, Ambient Air 6.0

Will Drill thru Landfill, not taking samples until through Landfill
0-2' yellowish brown clay + silt cap

2.0: Landfill material, gray, including paper cardboard, metal, band-aids, etc, rags

(749) Strong odor at 3.5'; HNU 2.0

5.0' Amb air 2.2

7.5 HNU 3.0 Ambient Air cuttings 3.4

9.0 - hit gray silty sand zone
10-12 p.c. to spoon. Spooned thru but still in garbage.

14' PID 2.8 (18.01)

From cuttings:
8.27 54R 1/2 dk olive gray, fg clayey (25%) sand, 10% mica chds;

8.28 on Rock at 18' will attempt sample
18.0 4: 2.54R N/4 gray, silt trace clay, 5% gravel, no odor.

DRILLING CONTR. CDI

No. 169866

BY John Springer

DATE 8/15/91

CHK'D BY

Dames & Moore

140

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION	
														RAAP.	
										DRILLING METHOD:				BORING NO.	
														43MW 5	
														SHEET	
										SAMPLING METHOD:				2 OF 2	
														DRILLING	
										WATER LEVEL				START	
										TIME				TIME	
										DATE				DATE	
										CASING DEPTH				8/15/91	
DATUM										Time		ELEVATION			
SAMPLER TYPE	THICKNESS GIVEN	DEPTH OF CASING	SAMPLER NO	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:							
Nx	50	0	1	20.0-25.0	9:22	20		Augered through soft rock to 20.0; Start casing 20.0 No Recovery, very soft							
						1									
						2		- No H ₂ O Loss							
						3									
						4									
					9:42	5									
Nx	70/20	40%	2/25X		9:43	6		2.5YNS gray conglomerate, poorly cemented, fractures as shown, 10% clay, mg ss, w/ ls frags throughout							
						7	Probably Clay	- No H ₂ O Loss							
						8	Seam (w/ no R.C.)								
						9		Black clayey mg ls conglomerate w/ ls chips, abundant (10%) clay (black)							
					9:53	30									
Nx	50/35	70%	3/30-35		10:02	1	clay	Hard clay seam to 31.0 feet; black, - Some fluid with gravels 31-31.5'; 2.5YR4/2 very d. loss during gray ls, highly fractured w/ black coring clay infilling of cracks. High 2° perm due to fractures. 31.5': Black ls, highly fractured, mostly vertical, w/ 30-35% horizontal & dipped fractures w/ white calcite infilling (healed fractures) At 32.5 becomes hard claystone w/ 55-60% clay, w/ 20% calcite minerals							
						2									
						3									
						4									
					10:10	5									
Nx	50/38	76%	4/35-40		10:15	6		Recemented ls conglomerate resembling first gauge, w/ abundant clay (40%). Many rugs (25%) infilled w/ clay, 25% calcite crystals							
						7		37-37.5 clay seam							
						8									
						9		Below clay seam is again ls, highly fractured + poorly cemented, much calcite infilling high 1° + 2° permeability							

DRILLING CONTR.

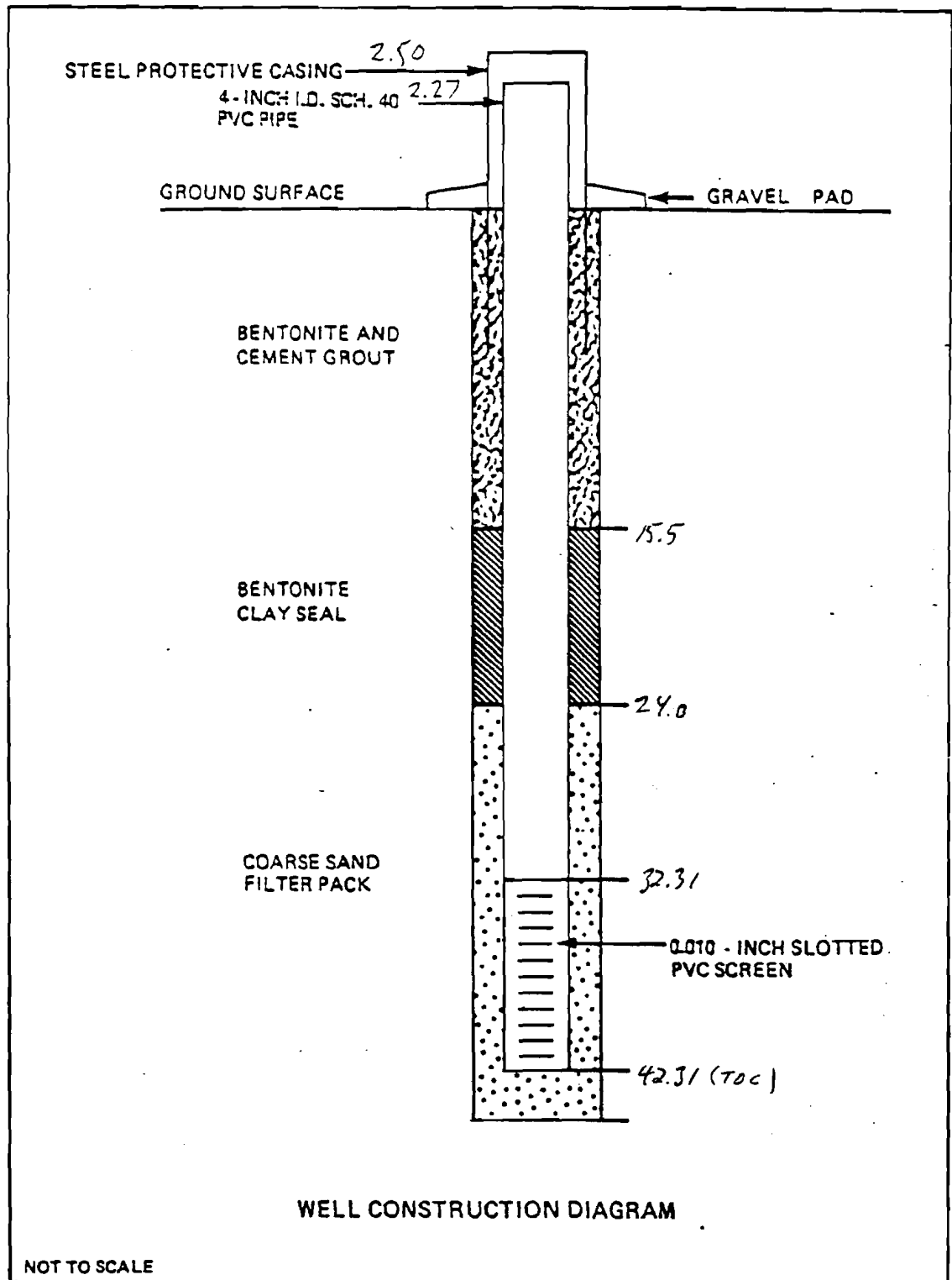
Nu. 169876

CHK'D BY

DATE

BY

Location: 43MW5
 installation Date: 8/15/91
 Surface Elevation:
 Top of Casing Elevation:



Dames & Moore

142

LOCATION OF BORING						JOB NO.		CLIENT		LOCATION	
Note Boring location moved 10 ft to the South from staked location										SWMU 43	
						DRILLING METHOD:				BORING NO.	
						Hollow Stem Auger 6.25 ID.				SWMU 43 MWK	
						SAMPLING METHOD:				SHEET	
						SS				1 of 3	
										DRILLING	
						WATER LEVEL				START	
						TIME				TIME	
						DATE				DATE	
						CASING DEPTH				8-1391	
DATUM						ELEVATION					
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO	BLOWS/FT SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:		
SS	24	20	0	①	346	11.58	0	ML	Level to existing grass, field, wet,		
				02	3	12.15	1		organic surface layer		
							2	Fill	Brown 7.5 GR 5/4 sandy silt (ML) black mineral stains		
							3		Encountered fill @ 1.5 ft - black soil consisting of trash incl plastic, rubber, odor, very moist		
							4		2.5 GR 2.5		
							5				
SS	24	13	5	②	124	12.25	5	Fill	Fill, Black, with pieces of rubber, plastic, paper		
				57	76	12.35	6		H. odor, very moist		
							7		2.5 GR 2.5		
							8				
SS	24	4.5	10	③	21	10.3	10	Fill	Fill Black with pieces of rubber, plastic, paper		
				1052	23	1.40	11		mod odor, very moist		
							12		2.5 GR 2.5		
							13				
SS	24	16	15	④	17	2.00	15	SM	Fill, Black with pieces of rubber, rope, plastic		
				157	24		16		paper mod odor, very moist		
							17		2.5 GR 2.5		
							18				
							19	SM	dark gray 10 GR 4/1 silty sand (SM) np,		
							20		very moist 24% silt - some small pebbles		
							21		fine to med sand		
							22		Encountered water at 18.5 ft		
							23	Alluvium			
							24				

DRILLING CONTR. EDI
John Muller

No. 169759

BY James O. Spencer
DATE 8-13-91 CHK'D BY

Dames & Moore

143

LOCATION OF BORING		JOB NO.	CLIENT	LOCATION
<i>Existing 43MW6</i> <i>Note Boring location moved 10 ft to the south from the Staked location</i> <i>Road</i>		DRILLING METHOD:		BORING NO.
		Hollow Stem auger 6.25 I.D.		43MW6
		Dry		SHEET
		SAMPLING METHOD:		2 of 3
		SS		DRILLING
WATER LEVEL		START	FINISH	
TIME		TIME	TIME	
DATE		DATE	DATE	
CASING DEPTH		8-13-91		

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
		SS	8"	5 1/2"	20	5	58	2-20	20	CL	grassy field, wet, cloudy 56°
									1	CL	organic, roots
									2	CL	brownish yellow 10 YR 6/6 silty clay (CL)
									3	CL	blocky structure, dry, residual limestone highly weathered brownish yellow 10 YR 6/6; mainly .25 inch pebbles
									4	CL	stop drilling at 22.5 ft
									5	CL	pour 50 lb 3/8" bent pellets to 16.5 ft
									6	CL	above auger to seal off water
									7		
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DRILLING CONTR.

No. 169764

BY James O. Spencer

DATE 8-13-91 CHK'D BY

Dames & Moore

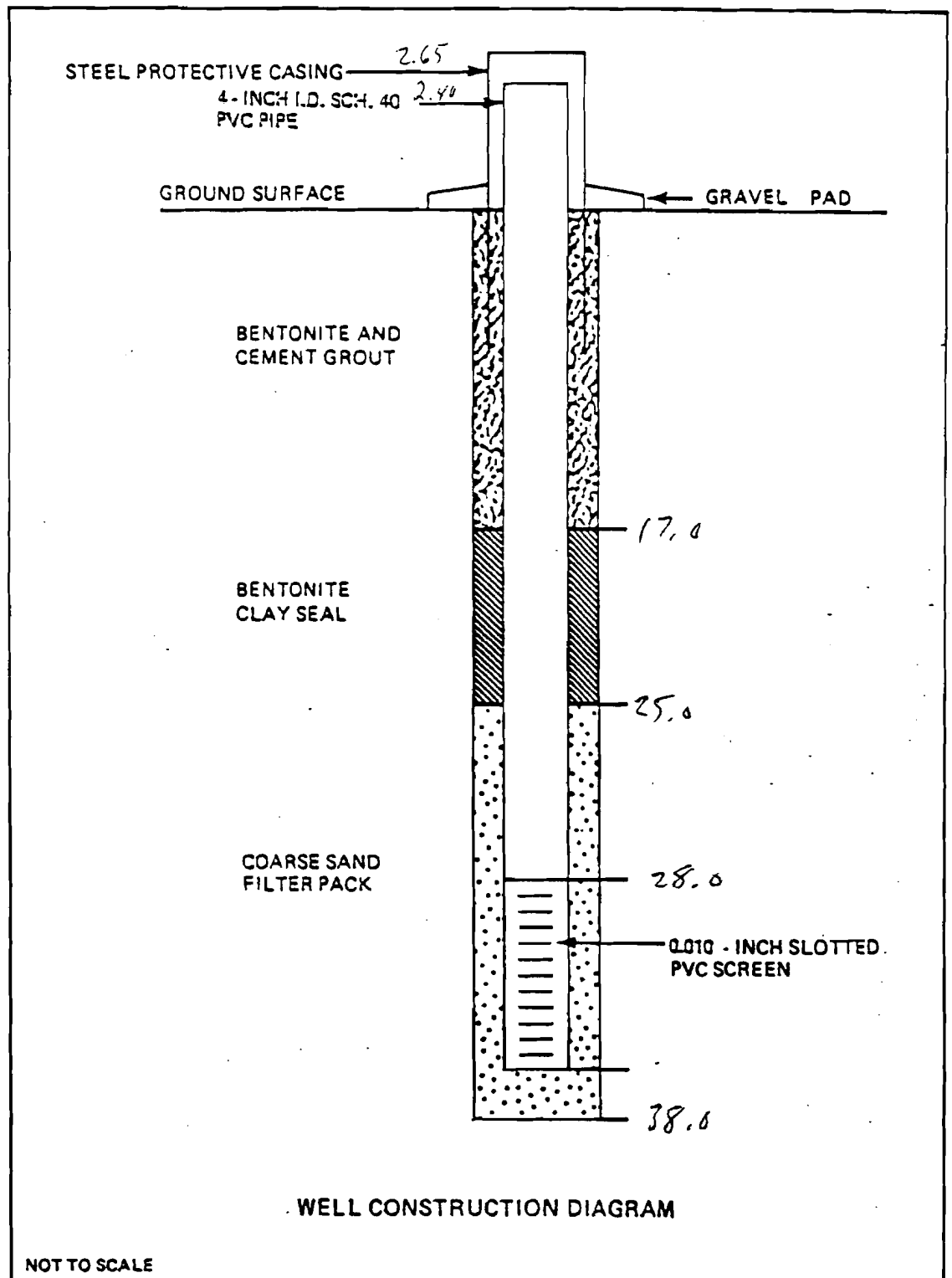
144

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION					
										06702-058		USATHAMA		RAMP					
										DRILLING METHOD:				BORING NO.					
														43MW6					
														SHEET					
														3 of 3					
										SAMPLING METHOD:				DRILLING					
														START					
														TIME					
														DATE					
														8/14/91					
										WATER LEVEL				DATE					
														DATE					
										TIME									
										DATE									
										CASING DEPTH									
DATUM										ELEVATION									
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:										
									covered land fill										
									amb air 1.8										
									cloudy, foggy, humid, 70's, poss. rain										
							20												
							1												
							2												
							23		23-25 - 7.5YR/3 very dark gray										
									25-27.8 10YR5/1 gray										
									27.8-28 7.5YR/4 gray										
NX	4.0	80					4		23.0-27.5 gravel zone grading to very fine										
NX	4.0	80					5		Fractures with some orange staining at fractures; smooth										
							6		some fine sand (cemented) infilling of fractures. At 15'										
							7		thin ss vein appear (healed fractures) AT 28' more										
							8		healed cracks occur with orange staining in No Flow										
							9		open fractures. This rock is totally loss										
							10		fractured, very little is in core from (25-25.5)										
							11		Should produce excellent quan. of water										
							12		6" Void, H2O loss occurs										
							13		10:14 Begin										
							14		Drainage Losses										
							15		At 28' is Recemented gravel zone 7.5YR/5 circulation										
							16		clay zone at 28.0 to end of core										
							17		28.0: cavernous pitted ss, 40% pits & vugs										
							18		at fractures pyrite infilling. AT 29.0' become										
							19		thinly laminated ss with clay partings or										
							20		sieve occurring intensely clay, at 35% clay, pore										
							21		29-31 - 10YR/4, dark gray										
							22		25-29 - 2.5Y/5 gray										
							23		At 31.0' becomes a poorly cemented gouge, ss										
							24		50% gravels, 50% sand & clay, color to gray N/5										
							25		Poor recovery.										
							26		Chert nodules followed by black										
							27		stained ss and ss sand at end										
							28		of barrel (lost in) below black ss,										
							29		with calcite crystals infilling the pits and										
							30		vugs. calcite veins first throughout										
							31		one corner of rock (3 inches x 3 inches),										
							32		and along fracture side.										
							33												
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DRILLING CONTR. ED1
Tam Lucas
 No. 50045
 BY John Spangle
 DATE 8/16/91 CHK'D BY
 (3) (REV. 11-90)

used 800 gals in over-ream and core

Location: 4317W 6
Installation Date: 8/14/91
Surface Elevation:
Top of Casing Elevation:



SWMU 45

DRILLING CONTR. FAD I
Tom Lynch R. Phillips D. Dales

167314

Toha Spring

DATE 9/25/91 CHK'D BY

B.1 (3) (REV. 11-80)

SAMPLER TYPE	INCHES DRIVEN RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
						0		clearly in woods, grassy, weedy, Amb air 84°, cold, 40° (will warm to 60)
SS	2.0 1.6	0	1 0.2	6, 12 10, 14	N/D	21	SC	10YR 3/5 d.bwn vfg silty sand; micaceous Root material; grades to 10YR 4/6 dark yellowish brn clayey fy sand at 0.8' micaceous (2.0%) moist, no PID deflection of spoon, med dense,
						2		
						3		
						4		
						5		
SS	2.0 1.9	5	2 5-7	4, 8 8, 8	N/D	7:38	SM	No PID deflection at spoon. 10YR 4/6 d.y. yellowish brn fy silty sand, 20% micaceous homogeneous, med. dense, sl. moist, 1% pea gravels; yielding to fg-mg c.t spoon tip
						7		
						8		
						9		
						10		
SS	2.0 1.9	10	3 10-12	8, 7 9, 13	N/D	7:44	SP	10YR 4/4 d.y. yellowish brn with poorly graded mg sand. thin vfg silty sand lens at 11.0'; slightly moist; no deflection PID; homogeneous gravel blocked for thr recovery tip of spoon, was siltstone 5YR 3/2 d reddish brown
						2		
						3		
SS	3" 0	14	4 14-	100/3		8:00	Boulder Cobbles	Gravels increasing. Note: no gravels evident in spoons but driller encountered some gravels throughout auguring.
						5		Refusal at 14.0'; No spoon penetration or Recovery No water encountered yet
TYPE II K _a -REC R _{max} D _{max}	R _{AD} T _{max}							Boulder At 14.0' thought was rock Attempted core, switched back to augers
SS	2.0 0.9	16.5	5 16.5-18.5	45, 73, 30, 23	0.5	9:26		Began to set up to core at 14.5'. Reamer Auger out and hit gravelly cobbles. Lost 25 qals. will try to Auger through. Augered to 16.5' Spaced to 18.5'
						7		16.5': Gravel angular 20% sand and silt. is wet (saturated) but don't know if from casing or not - probably is. But expect water around this depth no PID deflection of spoon
						8		
						9		
SP	19-21							

Dames & Moore

148

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION	
				06702-077		USA MAMA		RAAP	
				DRILLING METHOD: 65/8 ED 15A				BORING NO. 45441	
								SHEET 2 OF 2	
				SAMPLING METHOD: split spoon				DRILLING	
								START TIME	
								9:44	
								FINISH TIME	
								12:20	
								DATE	
								9/28/91	
								DATE	
								9/28/91	

Jarral
PID

DATUM		ELEVATION							
SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:	
	RECOVERED		DEPTH		THROWS				
SS	2.0 0.6	19.0	6 19.21	24.11 10.6	0.5	9.420	GM	Sampled split spoon 19-21': med and c.g. sand and gravels, 104R 3/6 d. yellowish brown, no PID, very moist to saturated. Last 1/2 of spoon went very quickly (last 2 blows), very soft material there.	
						2	ML		
						3		WATER AT 22.0'	
						4			
SS	2.0 0.1	24	7 24.26	Wt. of Rods	N/D	9.55	ML	Saturated 104R 4/2 d. grayish brown sandy very soft silt (20% sand)	
						6			
						7			
SS	2.0 1.0	27	8 27.24	7.7, 5.9	N/D	10.14		Same; increased clay content to 20%; no PID deflection at spoon sample	
						9			
						30			
						1		Set well to 27.3' ON 9/28/91. 4" well, 10' screen	
						2			
						3		Total depth of borehole 27.5'	
						4			
						5			
						6			
						7			
						8			
						9			
						0			

DRILLING CONTR.

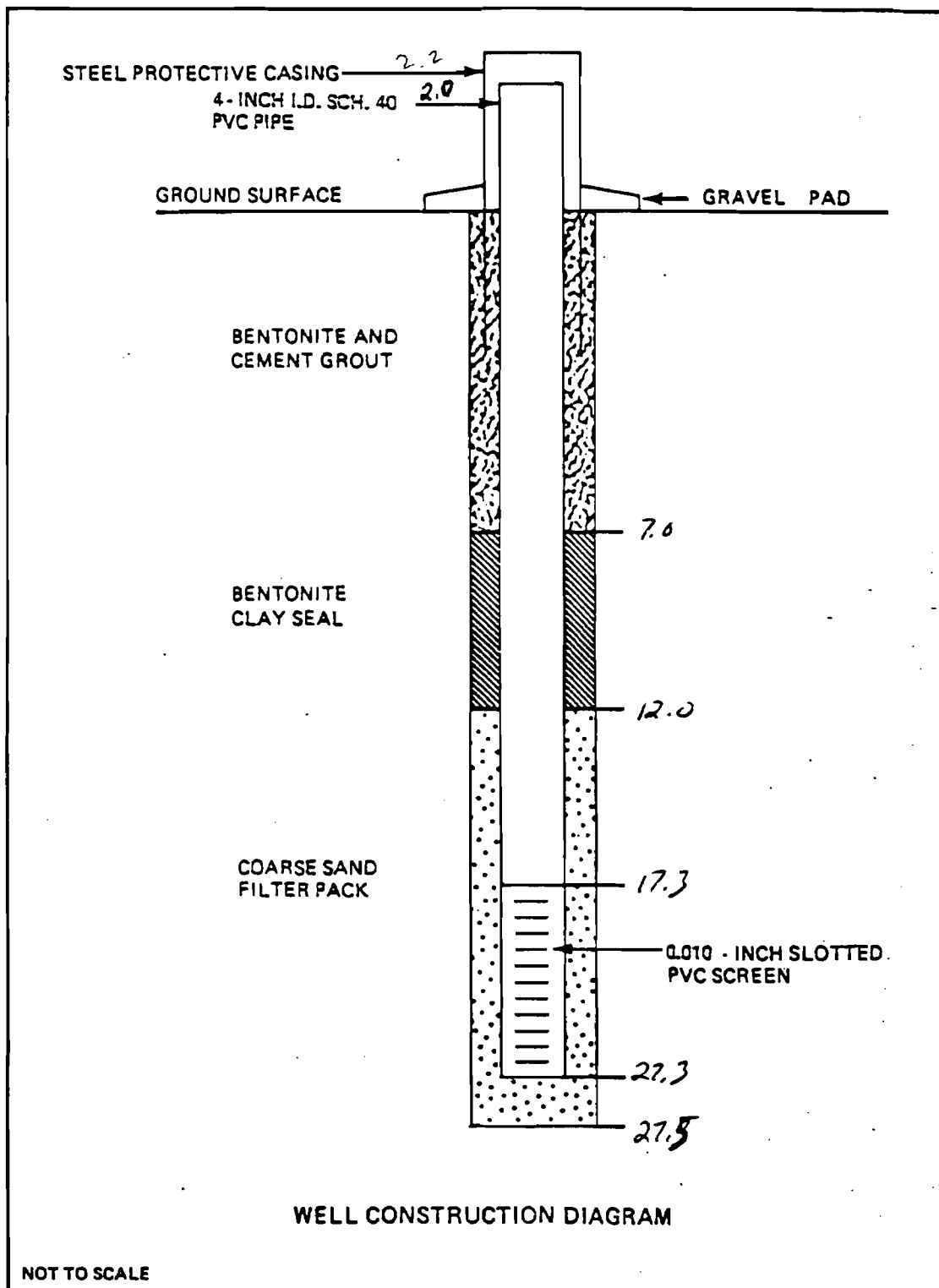
107373

CHK'D BY

DATE

125.1 (3) (REV. 11-80)

Location: YSMW1
 Installation Date: 9/28/91
 Surface Elevation:
 Top of Casing Elevation:



50

15.1 (3) (REV. 11-80)

James O. Spencer

LOCATION OF BORING: New River

JOB NO. 06702-77 CLIENT USATAMA LOCATION KAAP, VA
SWMU 45

DRILLING METHOD: 6 5/8" ID, hollow stem auger, contin flight dry BORING NO. 45MW2
B-80 mobile drill rig SHEET 1 of 2

SAMPLING METHOD: SS 2'4" DRILLING
5' sampling interval

WATER LEVEL: START TIME 7:22 FINISH TIME
TIME DATE DATE

CASING DEPTH: 9-29-91 9-29-91

51.2
45 MW2
Prop. X 45 MW3
ELEVATION

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
SS	24 22	0	S-1 5-2 7.10 (21)	11	7.22 0.6	0	ML	Flat grassy field, Sunny low 50's → 60's pid amb = .1
					7.26 0.0	1		very stiff light brown 7.5 gr 6.14 sandy silt (ML) 55% silt NP, micaceous slightly moist, trace fine roots pid 0.00
						2		
						3		
						4		
SS	24 14	5	S-2 5.6 (14)	8	7.35 0.0	5	SM	medium dense pale brown 10 gr 6.13 silty sand (SM) fine sand (53%) NP slightly moist, micaceous PID = 0.0
					7.40	6		
						7		
						8		
						9		
SS	24 22	10	S-3 10.5 (11)	7	7.43 0.0	10		medium dense brown 10 gr 5.13 silty sand (SM) moist fine sand (54%), micaceous pid = 0.0
					7.48	11		at 11.0 med. brown 10 gr 5.13 silty sand (SM) moist, magn stains sand (5%), micaceous
						12		increasing moisture with depth
						13		
						14		
SS	24 23	15	S-4 11.5 (15)	7	7.50 0.0	15		medium dense sand brown 10 gr 5.13 silty sand, (SM) fine sand to med sand (58%), micaceous, magn mineral stains, PID = 0.0 moist to very moist
						16		
						17		
						18		encountered water at 18.5 ft
						19		
						20		

Dames & Moore

151

DRILLING CONTR. EDT
Tom Byrnes, Brian Phillips, Paul Dellen

067286

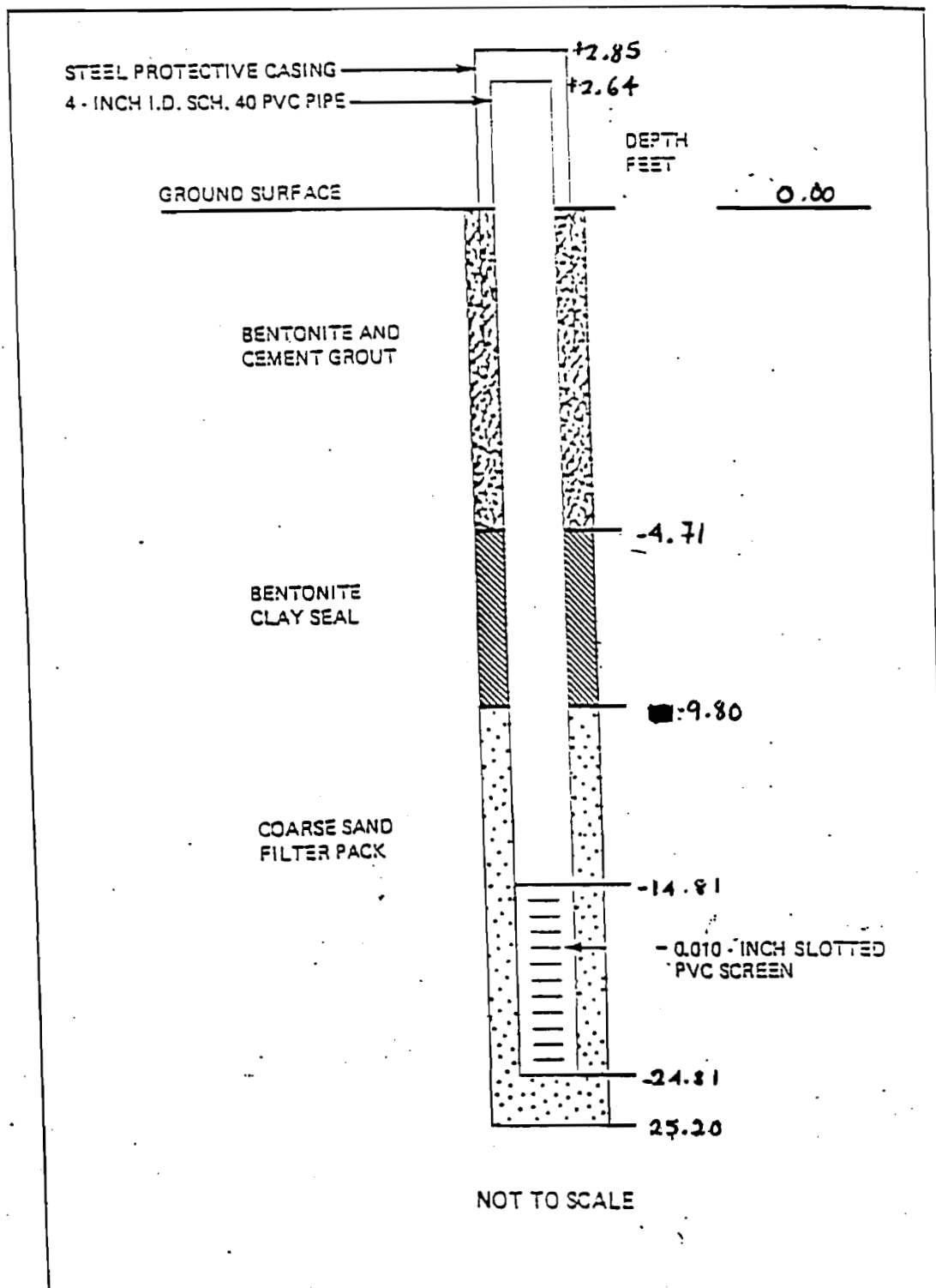
Jamies O. Spencer
DATE 9-29-91 CHK'D BY

LOCATION OF BORING						JOB NO.		CLIENT		LOCATION			
See page 1						06702-77		USATMAMA		KAT, VA			
						DRILLING METHOD: 6 3/8" ID hollow stem continuous flight auger						BORING NO.	
						B-80 mobile drill rig						45 MW 2	
						SAMPLING METHOD: SS 24"						SHEET	
						5' sampling interval						2 OF 2	
DATUM						ELEVATION							
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:				
SS	24	8"	20	5-5	53	8:00	20	sm	flat grassy field sunny				
						0.0	21	6m	low 50's → 60's				
						8:05	22		pid amb = .1				
							23		very loose, brown 10 gr 5/3 silty sand (sm)				
							24		(52% fine sand), wet, after first 6" inc				
							25		spoon was driven to bottom of sampling, inc by next blow				
							26		encountered dense gravels at 20.5 ft				
							27		difficult drilling recovery of first 6 inches				
							28		then gravels impacted at spoon tip				
							29		wet brown 10 gr 5/3 silty sand gravel (6m)				
							30		with 1" or less size rounded dolostone, gravel				
SS	24	6"	25	5-6	75	8:30	31		pid 0.0				
							32		attempt to drive spoon at 25.0 ft				
							33		unable to penetrate w/ ss grind out with				
							34		bit to 26.0 ft				
							35		small fragments of weathered gray				
							36		dolomitic dolostone rock pid 0.0				
							37		boring terminated at 26.0				
							38						
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							100						

Materials used 8.5 bags of sand
for well 4 pails of bent pellets
construction 2 bags of portland cement I
1/2 bag bent powder

WELL INSTALLATION DIAGRAM
FOR
REMEDIAL INVESTIGATION

152
Location: SW MW 45
Installation Date: 15MN2
Surface Elevation: 9-30-91
Top of PVC Elevation: 0.00
Top of PVC Elevation: 2.61



Dames & Moore

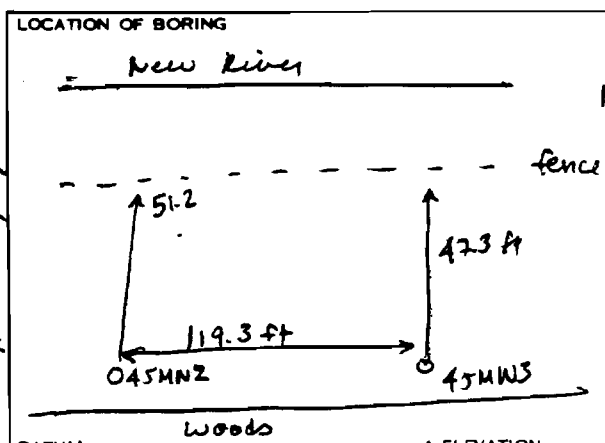
153

DRILLING CONTR. EDI
Tom Bryan Driller Bep Phillips, Dave Dolan

167289

James O. Spencer
DATE 9-30-91

CHK'D BY



JOB NO. 06702077		CLIENT USATHAMA	LOCATION KAAP, VA
DRILLING METHOD: 6 5/8" hollow stem contin flight auger, dex B-80 mobile drilling rig		BORING NO. 45 MW 3	
SAMPLING METHOD: SS 24" 5 sampling interval		SHEET 1 OF 2	
WATER LEVEL		START TIME	FINISH TIME
TIME		10:11	
DATE		DATE	DATE
CASING DEPTH		9-29-91	9-29-91

DATUM	SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO SAMPLE DEPTH	BLOWS/FT. SAMPLER	TIME NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
	SS	24 21	0	5-1 1.5-2	11 18	10:41 0.0	0	ML
						10:43	1	Fill
							2	
							3	
							4	ML
	SS	24 23	5	5-2 6.5-7	55 11	10:52 0.0	5	sm
						10:53	6	
							7	
							8	
							9	
	SS	24 22	10	5-3 11.5-12	57 13	11:03 0.0	10	
						11:05	11	
						0.0	12	
							13	
							14	
	SS	24 15	15	5-4 15.5-16	57 15	11:13 0.0	15	
							16	
							17	
							18	
							19	
	SS						20	

SURFACE CONDITIONS: flat grassy field adjacent to wooded area sunny 60's

pid amb = .1

organic surface layer 0-2" dry some fine roots

fine brown 10yr 5/3 sandy silt, tr organics dry, fill small pieces of black rubber (occasional) and paper pid = 0.0 (ML) NP

very fine sand 20% (Fill) Very stiff on edge of landfill near low swale

moist fine brown 10yr 5/3 sandy silt, occasional paper to 3.0 ft (fill)

very pale brown 10yr 7/4 fine to medium sand (68%-70%) moist natural undisturbed soils, pid 0.00 medium dense (sm) micaceous

very pale brown 10yr 7/4 fine to medium sand some thinly laminated layers of fine brown silt, moist, medium dense (sm) micaceous

increasing moisture with depth

fine brown 10yr 5/3 silty sand (54-56%) moist some magn. stains, micaceous pid 0.0

see next page

Dames & Moore

154

DRILLING CONTR. EdI

167290

James O. Spencer

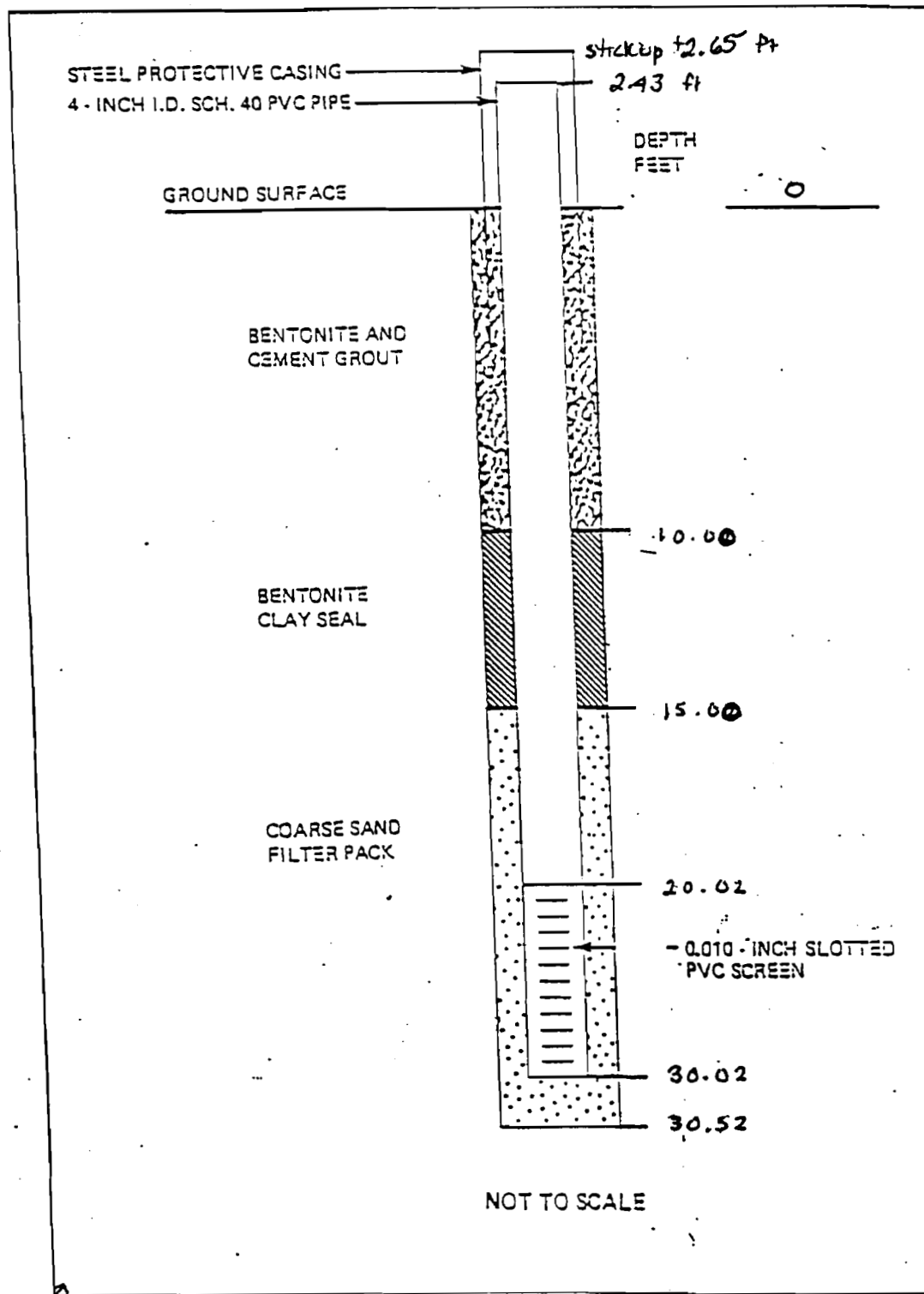
DATE 9-29-91 CHK'D BY

88.1 (3) (REV. 11-80)

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION	
New River				06702-77		USATHAMA		Swmu 45	
				DRILLING METHOD: 6 5/8" hollow stem continuous flight auger				BORING NO. 45MW3	
				B-80 mobile drill rig				SHEET 2 of 2	
				SAMPLING METHOD: S; 24" 5 ft sampling interval				DRILLING	
DATUM				WATER LEVEL		START TIME		FINISH TIME	
ELEVATION				TIME		DATE		DATE	
				CASING DEPTH		9-29-91		4-29-91	
SURFACE CONDITIONS: Flat grassy field see page 1									
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	
SS	24	22	20	5-5	22	11:22	20	Sm	very moist brown fgyr silty sand (Sm) to 20.8, Dense, fine to medium sand (58%) P10=0.0
							21	Gm	
							22		very moist to wet silty gravel (Gm) encountered water at 22.0 ft. Dense
							23		
							24		
SS	24	16	25	5-6	23	11:30	25		
							26	CH	very soft
							27		Reddish brown silty clay (CH) highly plastic, wet, trace fine sand some magn stains, some mottles of gray sticky
							28		
							29		
SS	24	8	30	5-7	weight of hammer 9.0	11:48	30		very soft brown clay, some gravel, wet highly plastic, sticky weight of hammer drive sampler 24"
							31		
							32		boring terminated at 30.52 ft
							3		
							4		
							5		materials used for well construction
							6		- 8.5 bags of sand
							7		- 3 pails (buckets) 50 lbs 3/4 bentonite pellets
							8		2 bag of portland II cement
							9		1/2 Granular Bentonite powder
							0		

WELL INSTALLATION DIAGRAM
FOR
REMEDIAL INVESTIGATION

Location: *Sumu 45 MW3*
Installation Date: *9-30-91*
Surface Elevation: *0.00*
Top of PVC Elevation: *+2.43*



SWMU 48

Dames & Moore

157

LOCATION OF BORING		JOB NO.	CLIENT	LOCATION	
		CG702-	USA THAMA	SWMU 49	
		DRILLING METHOD: mobile B-57			BORING NO.
		B-57 - 6.25 hollow stem auger			48SB1
		continuous flight auger			SHEET
		SAMPLING METHOD: M sampler			1 of 1
DATUM		ELEVATION			
		SURFACE CONDITIONS:			
		grassy field sloping to the south, sunny 60's			
		PIP amb - 2			

SAMPLER TYPE	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	
M		0			8:06	0		Organic surface layer, grass, many fine roots
			①		0.5-2	1	ML	light brown 7.5 4R 6/3 sandy silt (ML) non plastic, slightly moist, fine sand 35% fill, trace organics
						2		30 to 50 ft not recovered
						3		
						4		
M	5.0	5			8:11	5		
	2.0				8:39	6	Land fill?	5 to 7.0 ft not recovered cobbles, gravel encountered at 5.0 probable star contact with land fill
						7		
			③		90-95	8	Land fill	black 2.5 4R N2.5 / stained soil, some gravel wet, oil land fill
						9		
M	5.0	10			8:45	10	CL	brown 7.5 4R 5/4 silty clay (CL) trace of fine sand, wet, ^{low to} medium plasticity
	2.5				9:49	11	Gm?	no recovery 10 to 12.5 ft cobbles, gravel encountered from 10 to 15 ft
						12		
			④		10:08	13	Sm	strong brown 7.5 4R 5/8 silty sand (Sm) wet, with some gravel (sub angular), massive structure fine to med sand
M	5.0	15			10:08	14		
	2.5		⑤		13.5-14.0	15	Gm	dark brown 7.5 4R 4/4 silty gravel (Gm) wet fine to med sand
						16		boring terminated at 150 ft
						17		no water encountered
						18		
						19		

DRILLING CONTR. EDT

No. 167251

BY James O. Spence

DATE 8-19-91 CHK'D BY

(3) (REV. 11-80)

Dames & Moore

158

LOCATION OF BORING							JOB NO.		CLIENT		LOCATION			
							067 02		USATHAMA		Swmu 48			
							DRILLING METHOD: 6.25"					BORING NO.		
							Hollow Stem Auger cont. flight, dry Mobile B-57					48SB 2		
							SAMPLING METHOD:					SHEET		
							SS					1 OF 2		
												DRILLING		
												START		FINISH
												TIME		
												2:15		3:30
												DATE		
												8-16-91		8-16-91
DATUM							ELEVATION					CASING DEPTH		
SURFACE CONDITIONS:							sloping grassy field, sunny & 80°							
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH						
SS	24	4	0	1	25	2:15	0	ML	organic surface layer					
				0-2	5	.2	1		yellowish red 5 yr 5/6 silt (ml)					
							2							
							3							
SS	24	4	5	2	32	2:32	4		soft, brown 7.5 yr 5/2 silt w tr fine sand (ml) slight moist (fill)					
				4-6	8	.2	5							
							6							
							7							
							8							
							9							
							10							
							11							
SS	24	16	10	3	11	2:43	10	Land Fill	soft black 10 yr 2/1 stained soil (landfill) no odor					
				10-12	13	.2	11							
SS	24	2	12	4	12	2:50	12	CL	environmental sample light brown silty clay (cl) 7.5 yr 6/3 little recovery wet, soft					
				12-14	4	.2	13							
SS	24	2	15	5	22	3:00	14	CH	Hard Brown 10 yr 5/3 silty clay (cl) with gravel, very moist (Alluvium)					
				14-16	19	.2	15							
SS	24	0		6	100	3:18	16		no recovery					
				16-18	5	.2	17							
SS	24	0		7	100	3:30	18		no recovery					
				18-20	5	.2	19							
							20							

DRILLING CONTR. EPT

No. 169760

BY James O. Spencer

DATE 8-16-91 CHK'D BY

Dames & Moore

159

EP1

DRILLING CONTR.

No. 69761

BY James O. Spencer

DATE 8-16-91 CHK'D BY

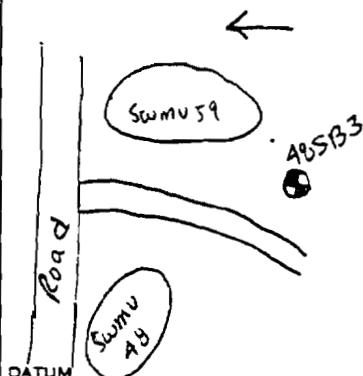
(13) (REV. 11-80)

LOCATION OF BORING							JOB NO.		CLIENT		LOCATION	
							06702		USATHAMA		SUMU-48	
							DRILLING METHOD: 6.25"				BORING NO.	
							Hollow stem auger cont				48SB2	
							Flight, dry, Mobile B-57				SHEET	
							SAMPLING METHOD: SS				2 of 2	
							START		FINISH			
							TIME		TIME			
							3:39		3:50			
							DATE		DATE			
							8-16-91		8-16-91			
DATUM							ELEVATION					
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:			
SS	24	22	20	8	3	3:39	20		Sloping grassy field, sunny 80°			
				10	10	10.2	1	CL	stiff yellow brown silty clay (CL) very moist, residual 10 yk sil			
			22			3:50	22	CL	dry yellow brown silty clay (CL) residual 10 yk sil			
							3		boring terminated at 22.0 ft			
							4		no water encountered			
							5					
							6					
							7					
							8					
							9					
							0					
							1					
							2					
							3					
							4					
							5					
							6					
							7					
							8					
							9					

Dames & Moore

160

LOCATION OF BORING



JOB NO.

06 702

CLIENT

USATHAMA

LOCATION

SWMU 48

DRILLING METHOD: B-57 mobile

Hollow Stem auger 6.25 ID,

continuous flight, dry

SAMPLING METHOD: M-sampler 5' core

BORING NO.

48SB3

SHEET

1 of 1

DRILLING

START

TIME

11:25

FINISH

TIME

2:20

DATE

8-19-91

DATE

8-19-91

WATER LEVEL

TIME

DATE

CASING DEPTH

ELEVATION

SAMPLER TYPE	INCHES DRIVEN RECOVERED	DEPTH OF CASING	SAMPLE NO. DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
-----------------	-------------------------------	--------------------	------------------------	----------------------	--------------------	------------------	---------------

SURFACE CONDITIONS:

grass area just west of gravel road, sloping $\approx 2\%$ to the west

PID amb. 2

M		0			11:25	0	
						1	
			① 1-20			2	
						3	
						4	
M	5.0 2.5	5			11:31 12:01	5	
			② 6-7			6	
						7	
						8	
						9	
M	6.0 2	16			12:19 12:30	10	
						11	
						12	
						13	
			③ 13-15			14	
M	5 20	15			1:21 1:10	15	
						16	
						17	
						18	
						19	
						20	

organic surface layer, grass many fine roots

CL Strong brown, silty clay (CL) 7.5 yr 5/6, slightly moist, trace fine sand

ML strong brown 7.5 yr 5/6 Sandy silt (ML), slight moist 35% fine sand, some rounded to subangular pebbles and gravel weathered elongated inclusions of pale yellow 2.5 yr 8/4 fine sand w/ silt and weathered elongated inclusions of pink 3 yr 7/3 fine sand, some silt, some discontinuous layers of light brownish gray 2.5 yr 6/2 silt with trace fine roots and organics. Recovery of 0-2.5 ft, observed cuttings of 2.5 to 5.0 (no recovery)

SM-SC Strong brown 7.5 yr 5/6 silty-clayey sand (SM-SC) (45% silt-clay) slightly moist, some fragments of very pale brown 10 yr 8/4 and pale olive 5 yr 6/4 Med. laminated fine argillaceous sandstone (sample 2 from cuttings)

some pebbles and gravel (sub rounded to sub angular) of chert, dolomite

no recovery 10-13

GC Strong brown 7.5 yr 5/6 silty gravel (GC) with fine to medium sand. mod strong odor, kerosene? light oil (hydraulic) (13.0 ft) fuel

PID 4.8 on cuttings

ML yellowish brown 10 yr 5/4 sandy silt (ML) moist, strong odor, light oil? PID on cuttings 5 to 10

DRILLING CONTR. FDI

No. 69758

BY James O. Spencer

DATE 8-19-91 CHK'D BY

33 (REV. 11-90)

Dames & Moore

161

No. 169887

DRILLING CONTR. EPI

BY James O. Spencer

DATE 8-17-91 CHK'D BY

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION			
				06702 -		USATHAMA		SUMMU 50			
				DRILLING METHOD: 6.25"						BORING NO. 50SB1	
				Hollow stem Auger (d. 4)						SHEET 1 OF 1	
				Continuous Flight, Mobile B-57							
				SAMPLING METHOD: M sample core (5 ft)							
				WATER LEVEL				DRILLING			
				TIME				START TIME			
				DATE				FINISH TIME			
				CASING DEPTH				8-17-91 8-17-91			

DATUM				Time ELEVATION				SURFACE CONDITIONS:	
SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	flat grassy field, nearly level, warm sunny 81°, calm winds HNU PID amb = .2	
MS	0				10:40	0	CL	organic surface layer	
					.2	1		yellow brown 10 yr 5/4 silty clay (CL) trace of fine sand moist (fill)	
						2	SL	light gray 7.5 yr 1/2 sludge, some dark gray gravel 2.5 yr 1/3, wet, landfill	
						3		Composite environmental sample taken from .8 to 5.0 ft	
						4		no water encountered	
MS	5	5	① RUTS 9		10:50	5		boring - core terminated at 5.0 ft	
					.2	6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

SWMU 50

Dames & Moore

163

No. 169884

BY James O. Spencer

DRILLING CONTR EDI

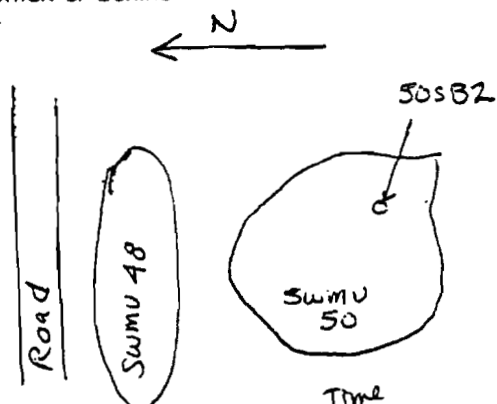
DATE 8-17-91

(3) (REV. 11-80)

DATUM

SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
MS	0	0	1	11:33	0.2	0	CL
						1	
						2	
						3	SL
						4	
MS	5	5	10	11:42	0.2	5	
						6	
						7	
						8	
						9	
						0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	

LOCATION OF BORING



JOB NO.

06702-

CLIENT

USATHAMA

LOCATION

SWMU 50

DRILLING METHOD: 6.25"

Hollow stem auger (dry)

Continuous flight, Mobile B-57

SAMPLING METHOD:

M sample core (5ft)

BORING NO.

50S82

SHEET

1 OF 1

DRILLING

START

FINISH

TIME

TIME

10:40

11:42

DATE

DATE

8-17-91

8-17-91

WATER LEVEL

TIME

DATE

CASING DEPTH

SURFACE CONDITIONS:

Grassy field, nearly level warm, sunny 83°
calm winds

HNU PID Amb = .2

organic surface layer

yellow brown 10YR 5/4 silty clay (CL) slightly moist fill

light gray 7.5YR N/7 to white 2.5YR N/8
with some dark gray 2.5Y N/3 gravel. wet
sludge landfill

composite environmental sample taken
from .9 to 5.0 ft

no water encountered
boring terminated at 5.0 ft

SWMU 51

Dames & Moore

165

DRILLING CONTR. EDT
John Spangler

0.167351

DATE 9/24/91 CHK'D BY John Spangler

28.1 (3) (REV. 11.90)

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION	
										06702-077		USATHAMA		RAAP	
										DRILLING METHOD: 6 5/8 ID Dry HSA				BORING NO. 51MW1	
														SHEET 1 OF 2	
										SAMPLING METHOD: Split Spoon				DRILLING	
										WATER LEVEL		START TIME		FINISH TIME	
												7:30			
										TIME		DATE		DATE	
														4/24/91	
DATUM										ELEVATION					
										Jared P19					
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	DEPT. OF CASING	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS: Grassy field, slight depression, East of Asbestos Landfill at SWMU 28/51/52; cloudy overcast. Likely to rain.					
SS	2.0	0.3	0	1	0-2	7.8, 11.15		7.301	ML	10YR 5/4 yellowish brn vfy sandy silt; hard, dry; (v. poor recovery), roots.					
								2	CH	Tip of spoon: 2.5Y 4/3 olive brn clay, hard, dry, slippery and highly plastic when moist.					
								3							
								4							
								5							
SS	2.0	2.0	5	2	5-7	15.45, 28.42		7.556	GC	CLAYEY GRAVELS w/ sand, some silt (trace) clay c. (w/ 2.5Y 1/5 gray, 10YR 6/8 brownish yellow, 10YR 7/5 yellowish brown; sand is 10YR 8/1 white; plus varying shades of above. Gravels represent river rock and cobbles and are highly weathered, forming various soil types & colors; highly leached structure; slightly moist.					
								7		7.56 PID Ambient Air 2.2					
								8							
								9							
								10							
SS	1.3	0.8	10	3	10-13	48.53, 50.14		8.109	GM	Continued gravelly, but becomes sandy silty gravel with less clay than above, clay is 10YR 4/6 d. yellowish brown; slightly moist, spoon refusal on cobbles.					
								2							
								3		At 12 feet got through cobbles, but still gravelly (as observed by cuttings)					
								4							
								5							
SS	2.0	2.0	15	4	15	7.8, 7.13		8.36	ML	Silt, w/ trace c.g. sand (50%), 5-10% clayey. 10YR 6/8 brownish yellow w/ 30% 2.5YR 3/6 dark red mottling; silt is moist, with occasional brittle zones. At 16.4 is a thin vfy silty sand lens 10YR 8/1 white below which is a very moist, very soft silt seam w/ clay to 16.8. Below 16.8 is silt w/ a more stiff clay, not as soft, grading to 5Y 6/2 Lt. olive gray silt, not as moist w/ 50% clay.					
								7	CL						
								8	CL						
								9							
								10							

DATUM

Jared P19

ELEVATION

SURFACE CONDITIONS:

Grassy field, slight depression, East of Asbestos Landfill at SWMU 28/51/52; cloudy overcast. Likely to rain.

10YR 5/4 yellowish brn vfy sandy silt; hard, dry; (v. poor recovery), roots.

Tip of spoon: 2.5Y 4/3 olive brn clay, hard, dry, slippery and highly plastic when moist.

CLAYEY GRAVELS w/ sand, some silt (trace) clay c. (w/ 2.5Y 1/5 gray, 10YR 6/8 brownish yellow, 10YR 7/5 yellowish brown; sand is 10YR 8/1 white; plus varying shades of above. Gravels represent river rock and cobbles and are highly weathered, forming various soil types & colors; highly leached structure; slightly moist.

Continued gravelly, but becomes sandy silty gravel with less clay than above, clay is 10YR 4/6 d. yellowish brown; slightly moist, spoon refusal on cobbles.

At 12 feet got through cobbles, but still gravelly (as observed by cuttings)

Silt, w/ trace c.g. sand (50%), 5-10% clayey. 10YR 6/8 brownish yellow w/ 30% 2.5YR 3/6 dark red mottling; silt is moist, with occasional brittle zones. At 16.4 is a thin vfy silty sand lens 10YR 8/1 white below which is a very moist, very soft silt seam w/ clay to 16.8. Below 16.8 is silt w/ a more stiff clay, not as soft, grading to 5Y 6/2 Lt. olive gray silt, not as moist w/ 50% clay.

Dames & Moore

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LOCATION OF BORING		JOB NO. 6702-077	CLIENT THAWA	LOCATION RAAP
DRILLING METHOD:			BORING NO. 51761	
SAMPLING METHOD:			SHEET 2 OF 2	
WATER LEVEL			START TIME	FINISH TIME
TIME			8:49	12:54
DATE			DATE	DATE
CASING DEPTH			9/24/91	9/24/91

June 0
P10

DATUM ELEVATION

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
SS	2.0 1.0	20	5 20.22	6.7 14.18		20	ML	soft clayey silt 5x13 pale olive, moist, trace sand, mottled w/ 10x2 5/6 yellowish brown, 40% various shades of the pale olive and the yellowish brn. throughout; moist
SS	2.0 2.0	25	6 25.27	4.4 5.6		25	cy	Spoon came out v. moist; no deflection spoon, very soft very moist clay, highly plastic, occasional silt zones which contain trace sand. Colors: 10x2 5/6 yellowish brown mottled w/ 5x13 pale olive (40%) Tip of spoon very moist, sandy; close to water table, possibly in water table
SS	2.0 2.0	30	7 30.22	wt. of Rds		30		very soft interbedded silt and highly plastic clay seams, very moist, possible water table at 30.5' clay is 10x2 6/6 gray, silt is 10x2 5/6 yellowish brown. Trace sand, becoming sandier tip of spoon (c.g. to pea size gravelly)
SS	0.2 0	33	8 30.22	50/3		33	LS	9:22 Probable Bedrock at 33.0'. Will ream (AIR) into rock a few feet to ensure have enough water
						40		Bottom Ream Hole 37.0' Set well to 35.0' on 9/24/91

DRILLING CONTR.

J.167306

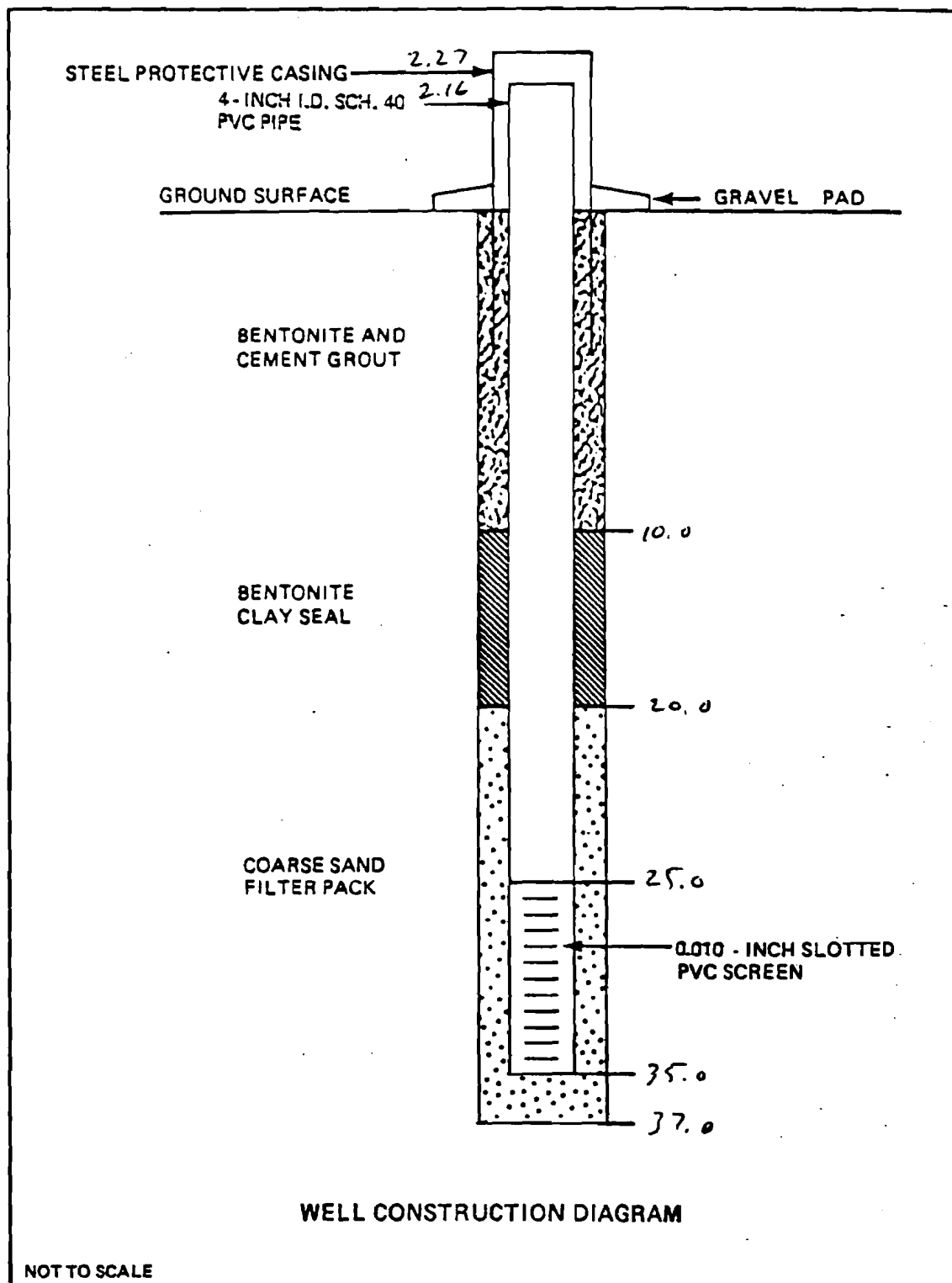
J. Spangler

CHK'D BY

DATE

228.1 (3) (REV. 11-90)

Location: 51MW1
Installation Date: 9/24/91
Surface Elevation:
Top of Casing Elevation:



SWMU 54

169

[illegible]

170

DRILLING CONTR. EDI
T. Gach, D. Muller, A. Nelson

169929

John Spangler

DRILLING CONTR. E.D.I.
169927
Z. Lynch, P. Phillips, P. Bolton

John Stangler
DATE 11/6/91
CHK'D BY

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION		
				06702-077		USA THAMA		RAAP		
				DRILLING METHOD:				BORING NO.		
								547121		
				SAMPLING METHOD:				SHEET		
								3 OF 3		
								DRILLING		
				WATER LEVEL				START	FINISH	
				TIME				TIME	TIME	
				DATE				DATE	DATE	
				CASING DEPTH				11/6/91	11/6/91	
DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
								40		
								1		
								2		
								3		
								4		
							1012	5		45' Same; still clay, no water yet. Full churning
								6		
								7		
								8		
								9		49' Same clay, no water. Cuttings are a mixture of hard clay, silts and some soft silts. There are some moist clayey cuttings at surface of 49'
								10		
								1		
								2		
								3		
								4		1025 AT 54'; no water, then 7
							1025	5		water yet
								6		
								7		12:50 Begin Dr. Hammering to 60.0 foot
								8		cuttings moist clay after getting through accumulated water zone
								9		
								10		
								11		Very deep silts at 58'; must
								12		hammered to 60.0 foot. Banded up
								13		to 54.8; Set bell to 54.8 w/ 15'
								14		bell

DRILLING CONTR. EPF
Taniguchi, R. & M. Phillips, Inc.

...167370

Taniguchi, R. & M. Phillips, Inc.
 DATE 9/17/91 CHK'D BY

128.1 (3) (REV. 11-80)

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION		
				06702-077		USATHANA		LAAP		
				DRILLING METHOD: 5 7/8 HSA				BORING NO.		
				5 7/8 Ream Bit				54703		
				Mobile B-80 Drill Rig				SHEET		
				SAMPLING METHOD: Split Spoon, 30"				OF 2		
				NX Core				DRILLING		
				WATER LEVEL				START		
				TIME				TIME		
				DATE				DATE		
				CASING DEPTH				DATE		
								9-18-91		
DATUM				ELEVATION		SURFACE CONDITIONS:				
SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	Amb Air 1.8 Old petroleum dump next to trees (as close as can get) humid, foggy		
SS	2.0	0	1	2.3	N/D	0	SC	cutting surface reflects 7.5 yr 3/3 d brown vfg sand		
	6.6		0-2	7.5		2		to 10% silt, sand mat. At 0.6' becomes 104 R/s		
						3		dark yellowish brown, vfg sand, as sand mat,		
						4		sl. moist, micaceous; loose		
SS	2.0	5	2	4.4	N/D	5	SC	No deflection 104 R 1/4 d yellowish brown f3		
	4.5		5-7	5.5		6		sand (has good sized slightly larger grains), trace		
						7		silt & clay, micaceous. Moist		
						8				
						9				
						10				
SS	2.0	10	3	3.4	N/D	1	SC	Grading near moist. 104 R 1/4 d yellowish		
	2.0		10-12	4.4		2	SC	brown very moist silty f3 sand, with		
						3		consist of increased silt and clay. At		
						4		10.5 becomes org sand, little fines		
						5				
						6	SC	very moist, soft, clayey sand 2.5 yr 4/4 d		
SS	2.0	15	4	4.4	N/D	6		brown micaceous at 16.5' clay grades		
	2.0		15-17	7.9		7	SC	out and becomes slightly silty f3		
						8		sand. All samples thus far have been		
						9		homogeneous, varying between a		
						10		clayey sand and silty sand, to a sand.		

LOCATION OF BORING		JOB NO. 6702-077	CLIENT THAMA	LOCATION RAAR
DRILLING METHOD:			BORING NO. 547W3	
SAMPLING METHOD:			SHEET 2 OF 2	
WATER LEVEL			START TIME	FINISH TIME
TIME			8:00	11:42
DATE			DATE	DATE
CASING DEPTH			9-18-91	9/18/91

DATUM	SAMPLER TYPE	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
	1					20	4N	
	4N	2.0	5	33	N/D	1	SW	7.5YR 5/6 strong brown silty sand equivalent to 10YR 5/2 grayish brown clean sand from 21.0-21.3
		1.4	2022	817		2	GN	At 21.3 becomes silty sandy gravel matrix Gravel in the form of small cobbles, silty sand matrix being 10YR 5/2 grayish brown
	4N	0.5	6	100/5	N/D	3		At gravel zone is saturated, or very close
		0.5	23524			4	SM	
	MP	0.1	0/0	Rec	Q00	5		10YR 5/1 gray silt, trace sand, sand increasing at end of spec; no rock chips in end of spec. Silt resembles till; appeared saturated but only after
	NX	5.6	3440	1	0"	6	Siltstone w/ ls pieces	close inspection had to tell. In the middle of the stiff gray till, it appeared moist only, but water was puddled up in spec. Till may contain H ₂ O to sandy zone above?
		1.7	2530			7		
						8		
						9	Siltstone	29.0-30.0: Very soft siltstone 10YR 4/1 dark gray; has soft limestone chunks resembling similar limestone breccia of this area, this specimen appears weathered more. Hard to determine where recovery lost, but specimen fractured every 0.1-0.2'.
	NX	5.0	60%	Rec	20%	30		Lost 10 gals during Run 1; lost no more fluid during well installation.
		2.0				1	gravel	
						2	LS	
						3		
						4		30-35': Has become softer, darker very thinly bedded. clayey, coaly siltstone. Becomes gravelly at 31.4; at 31.6 becomes a hard, cemented brecciated LS, with cemented LS breccia up to 32.7. Below 32.3 is a hard, cracked to sharp angular pieces limestone, with very thin calcite veins. LS is 10YR 4/1 v. dk gray.
						5		
						6		
						7		
						8		
						9		Reamed Hole to 32.0', set well to 30.0'
						40		

DRILLING CONTR.

J. 167371

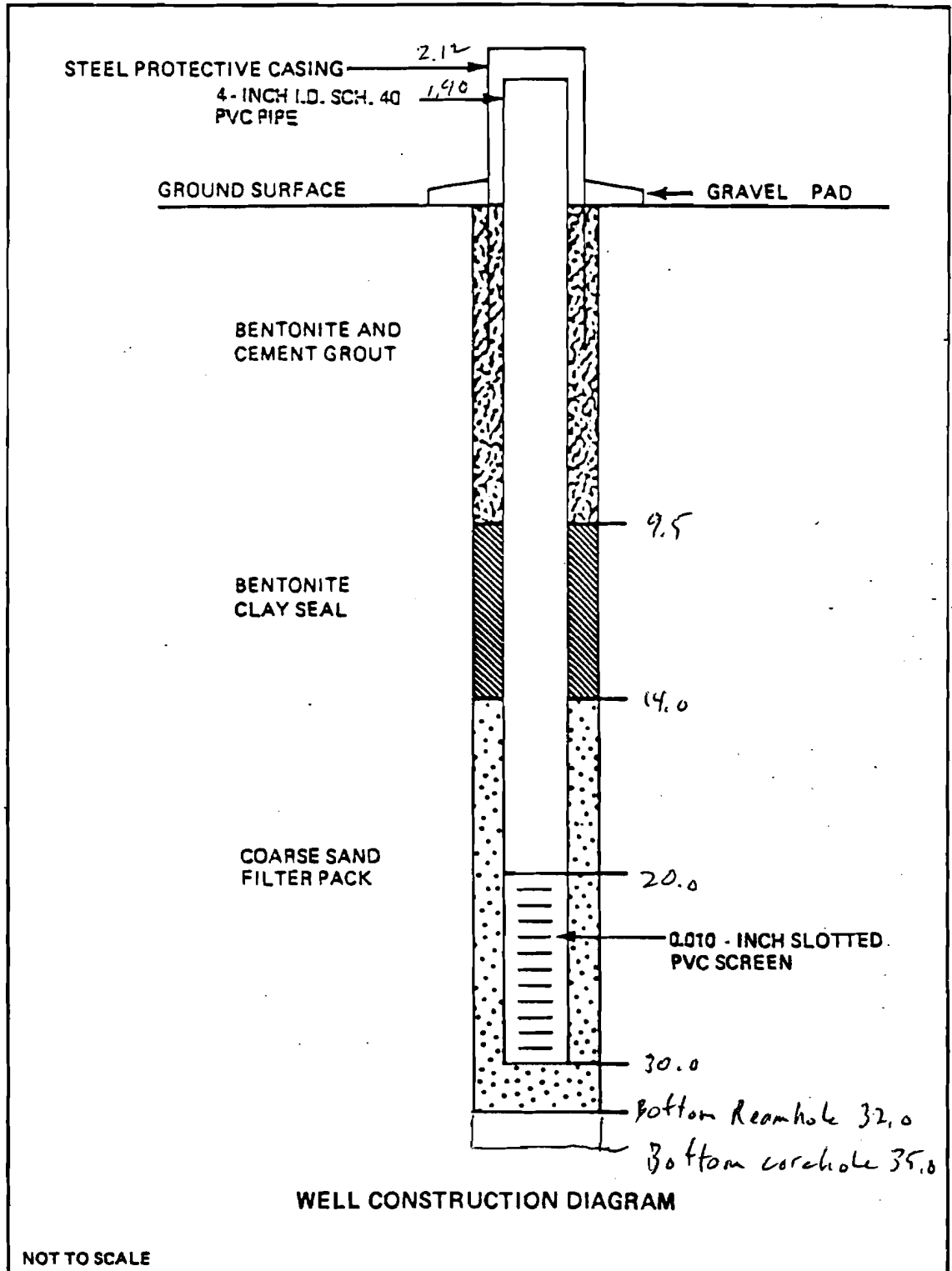
CHK'D BY

DATE

125.1 (31) (REV. 11-80)

J. T. Spangler

Location: 547w3
Installation Date: 9-18-91
Surface Elevation:
Top of Casing Elevation:



SWMU 74

Dames & Moore

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LOCATION OF BORING <i>Swmu 77</i>		JOB NO. <i>06702-77</i>	CLIENT <i>USA 74.1MA</i>	LOCATION <i>RAMP</i>
		DRILLING METHOD: <i>6" Tailcone</i>	BORING NO. <i>74MW1</i>	
		<i>air rotary</i>	SHEET <i>1 OF 4</i>	
		SAMPLING METHOD: <i>SS 24'</i> <i>5 ft interval</i>	DRILLING	
DATUM		WATER LEVEL	START TIME	FINISH TIME
ELEVATION		TIME	<i>7:46</i>	<i>8:22</i>
		DATE	DATE	DATE
		CASING DEPTH	<i>10-7-91</i>	<i>10-7-91</i>

DRILLING CONTR. *EDT*
Tom Lynch - diller Brian Phillips
Two Potomac

No. 1000001

BY *James O. Spencer*
DATE *10-7-91* CHK'D BY

925.1 (3) (REV. 11-80)

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
SS	24 17	0	1 15.2	7 21	7.46 6.0	0		pid amb. 1
						1	ML	organic surface layer 0-.3 (CL) 1/4 to 6/8 brownish yellow sandy silt (ML) Dry friable, some magnetite grains, Hard (70% silt)
					7.50 7.57	2		
						3		coarsening with depth
						4		
SS	24 18	5	2 6.5	7 11	7.54 7.56	5		
						6		yellowish brown 10-gr 5/16 sandy silt (ML) (52% silt) slightly moist, some magnetite grain and staining, very stiff
					7.58 8.00	7	ML	
						8		
					8.05	9		
SS	24 19	10	3 11.5	6 15	8.06 8.09	10		518
						11	SM	10-gr yellowish brown silty sand (SM) slightly moist magnetite grains medium dense Some magnetite staining at 11.8 ft fine to medium sand = 68%
					8.07	12		
						13		
					8.12	14		
SS	24 18	15	4 16.5	3 14	8.13 8.13	15		(SW)
						16		Very pale brown 10-gr 7/16 medium dense sand grading from silty sand at 15.0 ft to well graded sand at 16.0 ft magnetite staining
					8.14	17	SW	at 15 to 16.0 ft, magnetite grains 16 to 17 ft moist, 15 to 16.0 ft sand (70%) 16.0 to 17.0 95% + sand) med sand
						18		
					8.22	19		
						20		see next page

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION					
										06702-077		USA THAMA		RAAP, VA					
										DRILLING METHOD: 5 7/8" air rotary, then casing in 6 5/8" HSA, Rock core 3" diamond core, then 5 7/8" air rotary reaming,				BORING NO. 7414W1					
										SAMPLING METHOD: SS - 24				SHEET 3 OF 4					
										5 ft interval				DRILLING					
										WATER LEVEL				START TIME 8:24					
										TIME				FINISH TIME 9:29					
										DATE				DATE					
										CASING DEPTH				10-7-91 10-7-91					
DATUM										ELEVATION									
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:										
SS	24	19	20	5	17	8:24	20	sm	encounter gravel at $\pm$ 20.5 ft.										
							21	6m	Brownish yellow (G.R. 6/6) silty gravel (6m) moist. pebbly gravel of limestone, dolomite, chert, quartz. Very dense.										
						8:25	22		encounter loose sands - will attack 6 5/8" I.D. Hollow stem continuous flight and advance to case boring.										
						8:27	23		8:58 begin drilling (reaming) boring with 6 5/8" hollow stem auger to case boring.										
						8:35	24	ML	advance casing to 25.0 ft. pull up tricone mud wt $\pm$ 23.5 ft.										
SS	24	A	25	6	100	9:29	25		24.5 Brown sandy silt (ML)										
							26		Limestone										
							27		Dark yellowish brown (G.R. 4/6) sandy silt (ML) moist, massive silt = 70% at 24.6 fragments of calcite / dolomite rock										
							28		light gray NF dolomite / limestone										
							29		Split spoon refusal										
							30												
							31												
							32		Go to sheet 3 of 4 for core drilling info.										
							33												
							34												
							35												
							36												
							37												
							38												
							39												
							40												

DRILLING CONTR. ED
Sam

NO. 100000

BY James O. Spencer
DATE 10-7-91 CHK'D BY

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION					
										06702-07		USATHAMA		RAAP, VA					
										DRILLING METHOD: diamond bit - 3"				BORING NO.					
										core then air rotary 5 7/8" from 25 to 40 ft				74M1W1					
										SAMPLING METHOD: NX core				SHEET					
										5 ft Run				3 of 4					
										WATER LEVEL				DRILLING					
										TIME				START TIME					
										DATE				10:30					
										CASING DEPTH				10-29					
										DATE				DATE					
DATUM										ELEVATION									
SAMPLER TYPE	INCHES DRIVEN	RECOVERED	DEPTH OF CASING	NO. SAMPLES	DEPTH	NO. SAMPLES	DEPTH	NO. SAMPLES	DEPTH	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:						
											10								
											21								
											22								
											23								
											24								
NX	4.0	26	65%	1	25-27	33				10:30	25		dark gray N4 / micritic dolomite						
											26		calcrete infilling veins and fractures						
											27		small grains of magnetite on calcrete						
											28		highly fractured - weathered						
											29		stopped run at 4.0 ft core plugged						
NX	5.0	48	96%	2	29-31	90				11:00	29		dark gray N4 / micritic dolomite						
											30		finely laminated steeply dipping; at 29 to 31 ft						
											31		pitted massive at 33.0 ft, calcrete replacement						
											32		in voids, fractures and veins, some magnetite						
											33		grains within calcrete						
											34								
											35		Terminated coring at 34.0 remove casing, prepare						
											36		for air rotary due to water loss when coring						
											37		water loss 50 gallons						
											38		air rotary w/ 4" tricone bit						
											39		cuttings dark gray N4						
											40		encountered some moisture at 36.0 ft in						
													cuttings						
													encountered water at 38.0 ft water expelled						
													while drilling - net water loss 0 gallons						

DRILLING CONTR. EDIT

No. 1699004

BY James O. Spencer

DATE 10-7-91 CHK'D BY

Dames & Moore

179

DRILLING CONTR SEAR EDI

No. 169905

BY James O. Spencer

DATE 10-7-91 CHK'D BY

128.1 (3) (REV. 11-80)

LOCATION OF BORING						JOB NO.		CLIENT		LOCATION	
						06702-077		USATHAMA		SRAP, VA	
						DRILLING METHOD: <u>air rotary with 5 7/8" tricone bit</u>					
						BORING NO. <u>74HW1</u>					
						SHEET <u>4 OF 4</u>					
						SAMPLING METHOD: <u>N/A</u>					
						DRILLING					
						START TIME		FINISH TIME			
						12:35		12:55			
						DATE		DATE			
						10-7-91		10-7-91			
DATUM						ELEVATION					
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:			
						40					
						41	gray	air rotary with 5 7/8" tricone from 40 to 49 ft reaming hole. Water blown out with cuttings throughout. finished reaming / drilling, cuttings dark gray N4 / limestone / dolomite			
					42	limestone					
					43	dolomite					
					44						
						45					
						46					
						47					
						48		boring completed to 48.0 ft - cuttings blown out w/ air - hole cleared. net water loss during drilling 0 gal.			
					9						
						0					
						1		Materials used for well construction 5 lb bags of sand = 1.75 Pails of Bentonite pellets = .5 Portland Type II cement = 9 Bentonite granular powder bags = .5			
					2						
					3						
					4						
						5					
						6					
						7					
						8					
						9					
						0					

SWMU 0

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION	
										DL702-027		USATHA-72		RAMP	
										DRILLING METHOD: 6" E Auger (2)				BORING NO.	
										SAMPLING METHOD: Silt + Sand				SHEET	
														1 OF	
										START		FINISH			
										TIME		TIME			
										DATE		DATE			
										CASING DEPTH					
										8:30					
										11/1/72					
DATUM										ELEVATION		SURFACE CONDITIONS:			
SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH								
SS	2.0	0	0.2	5.7	19.15	0	SM	TYPICAL 2.5x0.25 silty sand, moist, no adhesion at 0.5 ft. No sand, clay, silt, 2.5x0.25 silty sand, gradation to fine sandy silt at 1 ft. Same color.							
						1	SC	No P.D., slightly moist, no adhesion.							
						2	ML	cuttings gravelly							
						3									
						4									
						5	SC	2.5x0.25 silty sand, grad. slightly moist, no adhesion, no P.D., some gravel, slightly (sandy) gravelly (gravel blocked further down at 7 ft. or so).							
SS	2.0	5	2	6.10	9.10	6									
						7									
						8									
						9	ML	continued Gravelly							
						10									
SS	2.0	10	3	17.7	7.9	10		moist, still to stiff clayey silt, trace sand.							
						11	ML	10R 618 brownish yellow. No P.D., grading slightly more moist at 11.5 inches, no P.D., 5.5x0.25 yellowish red soil, some staining, but still no adhesion.							
						12	ML								
						13									
						14									
						15									
SS	2.0	15	4	2.21	3.9	15		P.D. 10.0. Eval - for slightly moist, soft & slightly sandy, slightly clayey silt at slight transition. Heavy staining. Dominant color is 2.5x0.25 olive brown, w/ red, bluish gray, and yellowish brown mottling.							
						16	ML	adhesion getting stronger							
						17									
						18									
						19									
						20	CL	grading more uniform							

DRILLING CONTR. 622
 No. 16742
 DATE 11/1/72
 CHK'D BY
 28.1 (3) (REV 11-80)

Dames & Moore

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DRILLING CONTR. 601
John Spangler
DATE 4/10/01
CHK'D BY
No. 16742
Tim Lynch D. Phillips D. Miller

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION	
				16702-077		VIATHAMA		RAAP	
DRILLING METHOD:				BORING NO.		SHEET			
						07W1			
SAMPLING METHOD:				2 OF 2		DRILLING			
						START		FINISH	
WATER LEVEL						TIME		TIME	
TIME						9:32			
DATE						DATE		DATE	
CASING DEPTH									
DATUM				ELEVATION				SURFACE CONDITIONS:	
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	
15	2.0	2.0	20	5	20.22	4.4	20	CL/CH	Soil saturated at 20'; PID 2.8; No fine water but is very muddy, glossy.
15	2.0	2.0	20	5	20.22	4.4	1		split down 2.04, most 2.5x6x light yellowish brown clay, soft highly plastic at 20% 2.5x1/2 grey mottling; moderate fast color
15	2.0	2.0	20	5	20.22	4.4	2		
15	2.0	2.0	20	5	20.22	4.4	3		
15	2.0	2.0	20	5	20.22	4.4	4		
15	2.0	2.0	20	5	20.22	4.4	5		
15	2.0	2.0	20	5	20.22	4.4	6		
15	2.0	2.0	20	5	20.22	4.4	7		
15	2.0	2.0	20	5	20.22	4.4	8		
15	2.0	2.0	20	5	20.22	4.4	9		
15	2.0	2.0	20	5	20.22	4.4	10		
15	2.0	2.0	20	5	20.22	4.4	11		
15	2.0	2.0	20	5	20.22	4.4	12		
15	2.0	2.0	20	5	20.22	4.4	13		
15	2.0	2.0	20	5	20.22	4.4	14		
15	2.0	2.0	20	5	20.22	4.4	15		
15	2.0	2.0	20	5	20.22	4.4	16		
15	2.0	2.0	20	5	20.22	4.4	17		
15	2.0	2.0	20	5	20.22	4.4	18		
15	2.0	2.0	20	5	20.22	4.4	19		
15	2.0	2.0	20	5	20.22	4.4	20		
15	2.0	2.0	20	5	20.22	4.4	21		
15	2.0	2.0	20	5	20.22	4.4	22		
15	2.0	2.0	20	5	20.22	4.4	23		
15	2.0	2.0	20	5	20.22	4.4	24		
15	2.0	2.0	20	5	20.22	4.4	25		
15	2.0	2.0	20	5	20.22	4.4	26		
15	2.0	2.0	20	5	20.22	4.4	27		
15	2.0	2.0	20	5	20.22	4.4	28		
15	2.0	2.0	20	5	20.22	4.4	29		
15	2.0	2.0	20	5	20.22	4.4	30		
15	2.0	2.0	20	5	20.22	4.4	31		
15	2.0	2.0	20	5	20.22	4.4	32		
15	2.0	2.0	20	5	20.22	4.4	33		
15	2.0	2.0	20	5	20.22	4.4	34		
15	2.0	2.0	20	5	20.22	4.4	35		
15	2.0	2.0	20	5	20.22	4.4	36		
15	2.0	2.0	20	5	20.22	4.4	37		
15	2.0	2.0	20	5	20.22	4.4	38		
15	2.0	2.0	20	5	20.22	4.4	39		
15	2.0	2.0	20	5	20.22	4.4	40		

Soil saturated at 20'; PID 2.8; No fine water but is very muddy, glossy.
 split down 2.04, most 2.5x6x light yellowish brown clay, soft highly plastic at 20% 2.5x1/2 grey mottling; moderate fast color

Spore dropping out probably water at 25' only 2' of spore out (not clean reds)
 PID 2.8 same as before
 soft fill at 2.60, probably yellow sand

PID 8.0 same very soft saturated silt, clayey

Same just above bedrock as a stiff grey, slightly sandy fill

Advanced to 38' w/ 1" Roller bit (Adv)
 Soft Rock fast drilling

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION	
										06702-077		USATHANA		RAAP	
DRILLING METHOD: hollow stem auger										BORING NO.		SHEET			
4 1/4" ID										OSB1		1 of 2			
SAMPLING METHOD: SPT										DRILLING		START			
										TIME		FINISH			
WATER LEVEL										8:24		9:35			
TIME										DATE		DATE			
DATE										10/24/91		10/24			
CASING DEPTH															
DATUM										ELEVATION					
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	DEPT. OF SAMPLE	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS: Amb 2.0					
SS	2.0	1.7		1	0-2	14, 31	40, 32	0	GR	No PID deflection. Dry Fg sandy silt, with gravel (fill), 7.5YR 3/4 d. brown, w/ trace clay. Some pieces of brick also. grading sandier end of spoon to 7.5YR 5/6 yellow brown					
SS	2.0	1.6		2	2-4	11, 17	26, 15	1	SC	No PID deflection, milder slightly moist clayey sand, slight plasticity, 10% gravel end of spoon. Becoming slightly "furry" mottled or stained black at 3.7					
SS	2.0	1.8		3	4-6	18, 8	7, 6	2	ML	No deflection 10YR 5/8 yellowish brown clayey silt or silty clay, red plasticity occasional black staining, trace mg sand					
SS	2.0	1.8		4	6-8	11, 17	12, 15	3	CL	Same w/ interbedded lenses of clay and fine silt slightly moist, no PID deflection becomes much less silty end of spoon, mottled					
	2.0	2.0		5	8-10	10, 11	14, 12	4	CL	Same, becoming 2.5Y 6/6 olive yellow at 9.0, no PID, mottled moist tip of spoon					
	2.0	2.0		6	10-12	15, 15	17, 12	5	ML	No PID deflection, same clayey silt, softer, less plastic, w/ 5YR 4/6 yellow with red mottling throughout (20%)					
	2.0	2.0		7	12-14	7, 8	6, 5	6	CL	7.5YR 5/6 strong brown silty clay, soft, trace mottling of olive and red, no PID					
				8	14-16	3, 2	3, 3	7		chemical sample taken in PID					
				9	16-18	6, 4	4, 1	8		same, no PID					
				10	18-20	2, 3	1, 1	9		very moist. End of spoon becomes soft, olive silt, joined quickly					

DRILLING CONTR. EDE

T. Lynch, D. Phillips, D. Peltier

No. 167398

DATE 10/24/91

CHK'D BY

Taha Sanyal

BY

DATE 10/24/91

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184

82B.1 (3) (REV. 11-80)

Dames & Moore

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LOCATION OF BORING										JOB NO.		CLIENT		LOCATION					
										06702-077		USATHANA		RAAP					
										DRILLING METHOD:				BORING NO.					
														OSB2					
										SAMPLING METHOD:				SHEET					
														1 OF 2					
										DRILLING									
										START		FINISH							
										TIME		TIME							
										5:22									
										DATE		DATE							
										10/23/91									
CASING DEPTH																			
DATUM										ELEVATION									
SURFACE CONDITIONS:										Amb Air 88°F 0.5									
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	DESCRIPTION										
	2.0	1.3	0	1	0.2	16.24	0	nl	PID 4.2 10yr 48 brownish yellow fg sandy silt, hard 40% fg sand, red mott, no odor										
	2.0	1.5	0	2	2.1	48.32	1	se	PID 9.8 7.5yr 41/3 d. brn fg sandy clayey gravelly fill mott, no odor										
	2.0	0.6		3	4.1	16.13	2		PID 7.2 fg sandy clay, no odor, 10yr 41/4 d. yellowish brown; traces of pink inside silt, probably brick										
	2.0	2.0		4	6.8	8.11	3	cl	PID 5.6 clay and silt 5% fg and mg sand, 7.5yr 5/6 strong brown; 5% block "fairy" mottling throughout										
	2.0	2.0		5	8.10	10.3	4	ml	silt 7.5yr 5/6 strong brown, increased block staining, moist soft 20% clay, slight plasticity, base black mottling but is streaked instead of mottled										
	2.0	2.0	10	6	10.12	2.2	5	cl	3" Spoon - 5.6 pid - no sample taken - f-cg sandy clay (25%) med-hi plas, 7.5yr 5/6 yellowish brn										
	2.0	2.0		7	12.4	3.4	6	cl	4.8 pid same to 12.6. Below 12.6 becomes highly plastic clay from to no silt, slightly moist 10yr 5/6 yellowish brown mottled with light streaks of olive										
	2.0	2.0		8	14.6	2.3	7	cl	PID 3.4 4.4 same to 15.0, where becomes 7.5yr 4/6 strong brown clay, w/ some silty sandy "pockets"										
	2.0	1.8		9	16.8	2.8	8	nl	Becomes non plastic silt at 16.0, soft, 5yr 4/4 yellowish brown; becomes 5yr 5/6 olive gray at 17.5, silt, w/ green li and broken rocks										
	2.0	1.2		10	18.2	23.13	9		very moist, sandy (75%) silt 7.5yr 5/6 str. brn soft, no odor, close to Rm.										

DRILLING CONTR. EDI

No. 167396

BY Taha Spenser

DATE 10/23/91 CHK'D BY

186

28.1 (3) (REV. 11-80)

Dames & Moore

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LOCATION OF BORING										JOB NO.		CLIENT		LOCATION					
										06702-077		USATHAMA		RAMP					
										DRILLING METHOD: 3" tri cone air Rotary to 22'; then 4" HSA (ID) to 22'				BORING NO. 05B3					
										SAMPLING METHOD: Split spoons, 2 inch and 3 inch sizes				SHEET 1 of 2					
										WATER LEVEL		START TIME		FINISH TIME					
										TIME		DATE		DATE					
										CASING DEPTH		11:20		3:19					
										DATE		10/23/91		10/23					
DATUM										ELEVATION									
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS: Amb Air 0.8									
54	2.0	1.6	0	1	0.2	24.31	4	0	CL	PID 2.8 clay hard to sandy clayey silty, 10% to 15% d. yellowish brown, 20% gravel, trace heavy pebbles gravel,									
54	2.0	0.5		2	2.4	45.18	16, 14	2	GP/CL	PID 1.8 v. fine sandy due to gravel, very stiff, 10% to 15% yell. brown, dry									
54	2.0	0		3	4.6	7.3	4, 4	5	CL	NO Recovery; no soil inside spoon Chem. sample disregarded; back bore 14-18'									
	2.0	2.0		4	6.8	4.3	3, 4	7		11.53 Chem sample 7.54% str. brown v. (2%) sandy silty (20%) clay, moist, PID 4.0 slight mottling of brown, plastic (high)									
	2.0	2.0		5	8.10	4.4	4.7	9		PID 3.8 same soft silty clay, trace sand, moist, no staining or odor									
	2.0	2.0		6	10.12	4.5	4.6	10	CL	original sample PID of 4.8 same, increased sand to 5%, soft, moist, trace pebbles									
	2.0	0.9		7	12.14	4.1	7.10	3		PID 2.2 same									
	2.0	2.0		8	14.16	3.2	3.6	4	SL	PID 5.2 peak: same slight fine sand took sample here again due to fine sand; becoming sandy clay at 14'									
	2.0	2.0		9	16.18			5		Had to take another from here same									
	2.0	2.0		10	18.20	3.4	4.5	6		Same sandy clay, slight fine sand									
				11				7		Fine sand noted while reaming to 18'									
				12				8		PID open borehole at 18' = 4.6									
				13				9		Sandy clay same moist PID 3.6, grade (b) trace 54% silty clay mottling at 19.4'									

DRILLING CONTR. EDI

NO. 167327

DATE 10/23/91

BY John Spangler

Checked by Phillip A. Baker

Dames & Moore

185

LOCATION OF BORING		JOB NO. 6702-077	CLIENT THAMA	LOCATION RAAP
DRILLING METHOD:			BORING NO. 0523	
SAMPLING METHOD:			SHEET 2 of 2	
WATER LEVEL			START TIME	FINISH TIME
TIME			1246	315
DATE			DATE	DATE
CASING DEPTH			10/23/01	10/23/01

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
		SS	2.0	2.0		11	7.6		20	SC	Can still smell (white) caterying, kerosene to rock
						20-22	6.8		1		then diff. AT 21.5 recovered 25x5/4 light
									22	CL	olive brown clay, highly plastic, trace only
		SS	2.0	0.0		12	11.1		3		change to HSA due to cave-in at 22 feet
						22-24	2.2				No recovery - Rock at 24.0'
		SS	0	0		12	100/0		5	Rock	No Recovery - Rock
									6		
									7		
									8		
									9		
									30		
									1		Terminated boring at 24 feet due to bedrock
									2		
									3		
									4		
									5		
									6		
									7		
									8		
									9		
									0		

No. 167328 DRILLING CONTR. EOI

BY J. Spangler

DATE _____ CHK'D BY _____

Dames & Moore

1189

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION					
										06702-077		USA 7419-7A		PAAP					
										DRILLING METHOD: 4 1/4 ID HSA				BORING NO. 0584					
										SAMPLING METHOD: Mass Sampled - Soil (Core (Continuous))				SHEET 1 OF 1					
										WATER LEVEL				START TIME					
TIME				7:50				FINISH TIME											
DATE				DATE				DATE											
CASING DEPTH				DATE				DATE											
DATUM										ELEVATION									
SURFACE CONDITIONS: Ann Air 0.3																			
Topsoil: Live Y ₂ yellowish clay, sand and gravel																			
Poor Recovery 0.5' Soil with gravelly, 50% Y ₂ yellowish red clay; slightly moist; no odor;																			
5.0-7.5: Silty, clayey sand, 50% S.F. yellow red; slightly moist only, cohesion, no plasticity. At 3.5 becomes redder in wet clay to a silty sand from black stain. trace 10% Y ₂ yellow mottling.																			
7.5-10.0: p.d. 1.6; same; c.f. 8 becomes 7.5-8.5 strong brown silty clay, trace 1% sand. At 8.3 becomes mottled w/ black staining. Moderate plasticity no odor;																			
10.0-12.5: slightly moist sticky, silty clay, trace sand. 7.5-8.5 strong brown slight black mottling but no odor; p.d. 2.8																			
12.5-15.0: same as 14.0 becomes 12.5-14.0 strong brown clay, siltier, highly plastic, less sand and silt																			
p.d. 3.0																			
15.0-17.5: same trace green staining at 15.3' and again at 16.6', where staining is green and black and has some slight but odor at 16.8 becomes a silty clayey sand soft slight plasticity																			
17.5-20.0: highly stained silty clay, strong odor. Soil goes back to a sandy silty clay at 17.7																			
There are various shadings of green throughout																			
Soil reaction is strongly acid in bed																			

DRILLING CONTR. EOI
167380
10. 167380
John Spangher
DATE 11/2/91
CHK'D BY
125.1 (3) (REV. 11-80)

Dames & Moore

190

LOCATION OF BORING										JOB NO.		CLIENT		LOCATION	
										DRILLING METHOD:				BORING NO.	
														0584	
										SAMPLING METHOD:				SHEET	
														DRILLING	
										WATER LEVEL				START	
										TIME				TIME	
										8:55				9:40	
										DATE				DATE	
										11-29				11-29	
CASING DEPTH															
DATUM										ELEVATION					
SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:						
							855	20	CL	Sandy clay, strong odor, PID 10.0, mark green staining, 1/2 yellowish, brown, becoming olive 5 1/4 at 22.0 f.e.t.					
	5.0	5.0	20.6	20-25			1								
							2								
							3		CL	22.5-25.0 becomes 2.5 x 1/4 light olive brown at 22.0, increasing, sand to 15.0, green					
							4								
							5								
	5.0	5.0	25	7			6			PID 2.0 Sandy clay, 2.5 x 1/4 olive brown, very moist, soft, highly plastic, becoming sticky, still olive					
							7								
							8		CL	27.5 very soft, sandy, silty clay, or clayey silt, 50% fine gravel, very moist, same color 2.5 x 1/4 at 27.0, olive brown					
							9								
							10								
	5.0	5.0	30	8			1			Saturated very soft sandy gravelly silt					
							2		ML	slight deflection PID with sampler here also because does not appear to be very contaminated, if at all					
							3								
							4								
							5			Becomes slippery, fat clay, highly plastic at 34.27					
							6			Rock at 35.0 Bottom of Hole 35.0					
							7								
							8								
							9								
							10								

DRILLING CONTR. E.D.I.
7 Lynch, B. & H. & P. & L. & C.

No. 167380

DATE 11-29-91

CHK'D BY
J. J. Spang

128.1 (3) (REV. 11-80)

191

125.1 (3) (REV. 11-80)

Dames & Moore

192

LOCATION OF BORING N9 	JOB NO.	CLIENT	LOCATION
	06702-07	UTATHAMA	R AAP
	DRILLING METHOD: 4 1/4 I.D. HSA		BORING NO.
			OSB6
	SAMPLING METHOD: Moss sampler, casing out case		SHEET
			1 OF 2
WATER LEVEL			DRILLING
TIME			START
DATE			FINISH
CASING DEPTH			TIME
			DATE

DATUM	ELEVATION	SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:
		MOSS	5.0	0.8	0	1	0.50		(23)	0		Amber / Air 04
										1		
										2		
										3		
										4		
										5		
										6		
										7		
										8		
										9		
										10		
										11		
										12		
										13		
										14		
										15		
										16		
										17		
										18		
										19		
										20		

DRILLING CONTR. LDI
NO. 167382
BY Tube Spangler
DATE 11-2-91
CHK'D BY
25.1 (3) (REV. 11-90)

Very cobbly just under ground surface.
pid 7.4 at 4 ft. Very poor recovery due to
cobble & gravel.
10 ft 4/6 d yellowish brown w/ silt
silt, no clay, no staining, dry, (20% silt)
4 ft becomes 10 ft 2.5 ft brown w/ silt, silt
to silt, sand, dense, w/ 10-20% coarse sand
and 5% gravel (per size), dry, no clay,
pid 3.6 at 7.5 ft, from 5.0 to 7.5 only 4 ft
Recovery slightly moist, 7.5 ft 5/6 strong brown
clayey silt, fine, slight plasticity, no clay
no apparent staining
7.5 to 10.0 Full Recovery, pid 6.0 A very stiff
clay at 8.0 7.5 ft 5/6 strong brown, 20% gravelly
trace of silt, some sand (5%) ~~mod~~ plasticity
slightly moist, no staining, 15% silt
10.125 Full Recovery. Sand/clay mixture. Light
sand, slight plasticity, slightly moist
pid 5.0 still 7.5 ft 5/6 strong brown, w/ 2.5 ft 4/6
d brown mottling to 10.5 when mottling ends
Below 10.5 is same but w/ lenses of higher
clay, no sand. Occasional small black "spots"
of stains appear at 12.0 becomes sandy
silt/clay at 14.0 w/ 10% recovery, plasticity slight
plasticity, some type staining
pid 6.2 15.0 to 17.5 same, w/ 10 ft 4/6 light
yellowish brown sand lenses, silt, clay, At 15 ft
sand lenses end & becomes silt. Strongly
sandy silt moist, pid 5.2
At 17.5 less sandy, but 10% gravelly, silt & silt
10.5 ft 5/6 still same
17.5 to 20.0 Same gravelly silt silt moist
no indication (visually) of clay, clay
to rock with some sand
At 18.0 becomes more sandy,
gravelly

Dames & Moore

193

LOCATION OF BORING		JOB NO. 06702-077	CLIENT USA THATA	LOCATION RAAP
DRILLING METHOD:			BORING NO. OSB 6	
SAMPLING METHOD:			SHEET 2 OF 2	
WATER LEVEL			START TIME	FINISH TIME
TIME			1:44	2:00
DATE			DATE	DATE
CASING DEPTH			11/2/61	11/2/61

DATUM _____ ELEVATION _____

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
10/18	35 35	20	5 20-23.5	14	14	20	SW
						1	
						2	
						3	SW
						4	
						5	159
						6	
						7	
						8	
						9	
						10	
						11	
						12	
						13	
						14	
						15	
						16	
						17	
						18	
						19	
						20	

SURFACE CONDITIONS:

20-23.5 Saturated sample 2:00
from 20-23 feet 22-23 feet
20-22.5 Saturated, soft silt,
sand, mg-cg powder, no evidence of
strata. P.D. 2.0 gravelly
22.5-23.5: P.D. 5.2; mg-cg, sand, some
silt, 2.5x5/3 light olive brown, distinct
break to olive brown at 22.7'
23.5 Rock end of boring

This boring had no visual evidence of
contamination until 22.7', where sand
zone, just below soft sandy silt, was
an olive color. There were no
adverses, either. Even at the olive zone
at 22.7', no adverse present. Possibly
historic contamination.

DRILLING CONTR. 107007
7 Cyls. 0.141 0.141 0.141
No. 107007
John Springer
DATE 11-2-61
CHK'D BY

Dames & Moore

194

LOCATION OF BORING

JOB NO.

CLIENT

LOCATION

00702-077

USATHAMA

RAAP

DRILLING METHOD: 4 1/4" ID HSA

BORING NO.

0507

SHEET

1 OF 2

SAMPLING METHOD: Moss Sampler, continuous

DRILLING

core,

START

FINISH

WATER LEVEL

TIME

TIME

TIME

8:29

DATE

DATE

DATE

CASING DEPTH

11.4.91

DATUM

ELEVATION

SURFACE CONDITIONS:

Amb Air 0.2

SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO. DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
1.9	50	0	1	0-5	8.29	0	MC
	43					1	
						2	
						3	
						4	MC
						5	
11.9	50	5	2	5-10		6	
	50					7	CL
						8	
						9	SM
						10	CL
11.9	50	10	3	10-15	8.52	1	CL
	50					2	
						3	SC
						4	MC
						5	SE
11.9	50	15	4	15-20		6	MC
	50					7	
						8	
						9	
						10	MC

0-2.5' No No Deflection; 7.5' 1/4" 3/4" 1/2" 1/4" 1/8" 1/16" 1/32" 1/64" 1/128" 1/256" 1/512" 1/1024" 1/2048" 1/4096" 1/8192" 1/16384" 1/32768" 1/65536" 1/131072" 1/262144" 1/524288" 1/1048576" 1/2097152" 1/4194304" 1/8388608" 1/16777216" 1/33554432" 1/67108864" 1/134217728" 1/268435456" 1/536870912" 1/1073741824" 1/2147483648" 1/4294967296" 1/8589934592" 1/17179869184" 1/34359738368" 1/68719476736" 1/137438953472" 1/274877907344" 1/549755814688" 1/1099511629376" 1/2199023258752" 1/4398046517504" 1/8796093035008" 1/17592186070016" 1/35184372140032" 1/70368744280064" 1/140737488560128" 1/281474977120256" 1/562949954240512" 1/1125899908481024" 1/2251799816962048" 1/4503599633924096" 1/9007199267848192" 1/18014398535696384" 1/36028797071392768" 1/72057594142785536" 1/144115188285571072" 1/288230376571142144" 1/576460753142284288" 1/1152921506284568576" 1/2305843012569137152" 1/4611686025138274304" 1/9223372050276548608" 1/18446744100553097216" 1/36893488201106194432" 1/73786976402212388864" 1/14757395280442477728" 1/29514790560884955456" 1/59029581121769910912" 1/118059162243539821824" 1/236118324487079643648" 1/472236648974159287296" 1/944473297948318574592" 1/1888946595896637149184" 1/3777893191793274298368" 1/7555786383586548596736" 1/15111572767173097193472" 1/30223145534346194386944" 1/60446291068692388773888" 1/120892582137384777547776" 1/241785164274769555095552" 1/483570328549539110191104" 1/967140657099078220382208" 1/1934281314198156440764416" 1/3868562628396312881528832" 1/7737125256792625763057664" 1/15474250513585251526115328" 1/30948501027170503052230656" 1/61897002054341006104461312" 1/123794004108682012208922624" 1/247588008217364024417845248" 1/495176016434728048835690496" 1/990352032869456097671380992" 1/1980704065738912195342761984" 1/3961408131477824390685523968" 1/7922816262955648781371047936" 1/15845632525911297562742095872" 1/31691265051822595125484191744" 1/63382530103645190250968383488" 1/126765060207290380501936766976" 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Dames & Moore

195

No. 169935
 DRILLING CONTR. E.D.I.
 T. L. L. L. D. 26.11.91. B. D. L. L. L.

LOCATION OF BORING				JOB NO. 06702-077		CLIENT USA7HAMA		LOCATION RAAP	
				DRILLING METHOD:				BORING NO. 05B-7	
								SHEET 2 OF 2	
								SAMPLING METHOD:	
				WATER LEVEL		START TIME		FINISH TIME	
				TIME		DATE		DATE	
				CASING DEPTH		11-4-71		11-4-71	

DATUM				ELEVATION					
SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS:	
101	10	20	5			0	01		
						1			
						2		Rock at 21.0' permeable but at 21.0' due to Rock	
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

BY Tuba Spangler
 DATE 11-4-91 CHK'D BY

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196

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION	
				06702-077		USATHAMA		KAAP VA SWMU '0'	
				DRILLING METHOD: HSA				BORING NO. 05B8	
				Continuous Flight				SHEET 1 OF 2	
				Mobile B-80					
				SAMPLING METHOD: Moss-sampler				DRILLING	
				5 ft continuous				START TIME	
								FINISH TIME	
				WATER LEVEL				10:28 AM	
				TIME				DATE	
				DATE				DATE	
				CASING DEPTH				10-25-91	

DATUM		ELEVATION		TIME		DEPTH IN FEET		SOIL GRAPH		SURFACE CONDITIONS:	
SAMPLER TYPE	INCHES DRIVER RECOVERED	DEPTH OF CASING	SAMPLE NO. / DEPTH	BLOWS/FT. SAMPLER	NUMBER RINGS	DEPTH IN FEET	SOIL GRAPH	nearly level grassy area 15 ft South of manhole at grass road pid = .1			
M	5.0	0	1 / 4.5		10:28 / 0.0	0	CL	surface organic layer grass many small roots 0. - 0.1			
	5.0					1	ML	olive yellow 2.54 6/8 dry friable silt (ML) with many fine roots & organics .1 to 1.9 ft			
						2	CL	yellow 2.54 7/8 silt, friable dry massive 1.3 to 1.8 ft			
						3					
						4		brownish yellow 104K 6/8 silty clay (CL) slightly moist massive 1.8 to 2.5 ft			
M	5.0	5			10:33 / 0.0	5		brownish yellow and pale brown 104K 6/8 silty clay (CL) slightly moist, massive magn staining 2.5 to 3.5 ft			
	5.0					6		magn staining (large magn staining, discont) of magn staining at 4.0 ft. pid 0.0			
						7					
						8		more difficult drilling at 4.0 ft			
						9	CH	some weathered pieces of shale rock in soil			
						10	CL	occasional thin layers of greenish gray 5 64 6/1 shale			
M	5.0	10			10:41 / 0.0	10		brownish yellow 104K 6/8 silty clay (CL) magn staining in weathered rock fragments and soil pale brown 104K 6/8 layers (discont) increasing moisture at 7.0 ft pid 0.0			
	5.0					11	CH	thin 6" layer of plastic clay at 9.0 ft			
						12		very moist than silty clay (CL) with weathered shale fragments (greenish gray 5 64 6/1) moist pid 0.0			
						13		increasing moisture to very moist at 10.0 ft			
						14		brownish yellow 104K 6/8 silty clay (CH) highly plastic, very moist, sticky at 11.0 ft pid 0.0			
M	5.0	15	2 / 14-15		10:53 / 0.0	15		Some layers of greenish gray 5 64 6/1 highly weathered shale very moist same at 15 to 17.5 ft			
	5.0					16					
						17					
						18					
						19	CL	brownish yellow 104K 6/8 silty clay (CL) med plasticity, very moist 18.0 to 20.0 ft			
						20					

DRILLING CONTR. F.D. Tom Lind Dutton, Brian Phillips

Na 167400

BY James O. Spencer DATE 10-25-91 CHK'D BY

(97

628.1 (3) (REV. 11-80)

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LOCATION OF BORING		JOB NO.	CLIENT	LOCATION
		06702-077	ULATHAMA	RAP
		DRILLING METHOD: 4 1/4 HSA (I.D.)		BORING NO. OSB9
		SAMPLING METHOD: Moss Sampler, continuous		SHEET 1 OF 1
		CORE		DRILLING
WATER LEVEL		START TIME	FINISH TIME	
TIME		12:35	1:15	
DATE		DATE	DATE	
CASING DEPTH		11/4/91	11/4/91	

DATUM ELEVATION SURFACE CONDITIONS: Amb Air p 3

SAMPLER TYPE	INCHES DRIVEN	INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	SURFACE CONDITIONS
Moss	5.0	1.1	0	1		1235	0		veg sandy soil w/ gravel and cobbles. 2.5' x 5/8" strong brown. Dry, p.d. 1.0; 51 ft. no obs.
							1	ml	
							2	sm	No recovery, but due to proximity of OSB9-A, will use that information for 2-5 feet in OSB9.
							3		5.0-7.5 yellowish red soil, sandy, less cobbles but still gravelly; no staining, no odor.
						1245	4		dry
							5	sn	5.0-10.0 gravelly to silty sand 2 1/4 x 5/8 reddish yellow. trace old brick pieces, trace staining (staining 1 block, small, spotty).
Moss	5.0	2.5	5	2		1252	6		
							7		5.0-7.5 brown, clayey.
							8		7.5-10.0 gradually becoming clayey. At 10.0 brown soft clay sandy clay.
							9		p.d. 10.20, 2 1/4 x 5/8 strong brown, slightly moist. became clayey at 10.0. Above is for silty sand.
							10		
							11	cl	7.5-10 5/8 clay, strong brown, slightly moist.
							12		
							13		Terminate Boring at 12.0
							14		
							15		
							16		
							17		
							18		
							19		
							20		

DRILLING CONTR. T-21
 No. 16993
 John Spangler
 DATE 11-4-91
 CHK'D BY
 28.1 (3) (REV. 11-80)

Sampled
 9-12'
 1:15

Dames & Moore

199

LOCATION OF BORING

JOB NO.

CLIENT

LOCATION

06702-077

USA7HAMA

RAAP

DRILLING METHOD:

4 1/4 HSA

BORING NO.

05B 9(A)

SHEET

1 OF

DRILLING

START

FINISH

TIME

TIME

DATE

DATE

WATER LEVEL

TIME

DATE

CASING DEPTH

11:55

12:24

11/4/91

11/4/91

0587

Accessed to 0507

Alcohol to 11

DATUM

ELEVATION

SURFACE CONDITIONS:

Amk Air and

SAMPLER TYPE	INCHES DRIVEN	DEPTH OF CASING	SAMPLE NO.	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
1105	5.0 1.7	0	0-5		1155	0	MC
						1	
						2	SM
						3	
						4	
					1210	5	SM
1106	5.0 3.0	5	2 3-8		1212	6	
						7	MC
						8	CL
						9	
						10	
						11	
						12	
						13	
						14	
						15	
						16	
						17	
						18	
						19	
						20	

0-1.5: Very fine grained sandy silt, w/ gravel and cobbles, 2.5% ASK strong brown clay, stiff

Below 1.5 less cobbly silty sand, mg, 5% ASK yellowish red, no staining - clay, no phyl clay

At 5.0 10% gravel, 1% fg. silty sand, 7% ASK reddish yellow, some old black pieces, trace staining - black, small spots and 12

5.0-8.0: PID 4.8 sand to 6.0 very slight clay, trace black staining (small black streaks) at 6.0 became slightly sandy, clay, 1% low plasticity clay, constant increasing until becoming silty clay w/ 10% sand at 7.0 slightly more sand added 7.5, 1.5/8 strong brown

Boulder at 8.0 feet could not proceed further will attempt hole a few feet and try again

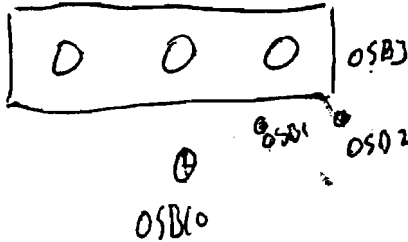
Terminate boring at 8.0'

DRILLING CONTR. E.D.T. No. 169930 T. Lynch, Phillips, D. Deland

DATE 11-4-91 CHK'D BY John Bengler

LOCATION OF BORING

N 77



JOB NO.

06702-077

CLIENT

USA THAMA

LOCATION

RAAP

DRILLING METHOD:

BORING NO.

05010

SHEET

1 OF 2

SAMPLING METHOD:

DRILLING

START FINISH

TIME TIME
11:34 1:30

WATER LEVEL

TIME

DATE

CASING DEPTH

DATE

DATE DATE
10/24/91 10/24

DATUM

ELEVATION

SURFACE CONDITIONS:

Ramp Air 0.5

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
SS	2.0 0.8		1-2		26.65 14.1	0	GM
SS	2.0 1.8		2-4		26.17 21.25	1	SL
SS	2.0 2.0		3-6		9.19 20.25	2	SL
SS	2.0 2.0		4-6		30.35 28.25	3	SL
SS	2.0 2.0		5-8		30.10 9.13	4	ML
SS	2.0 1.7		6-10		10.15 11.15	5	ML
SS	2.0 1.0		7-12		35.15 11.12	6	ML
SS	2.0		8-14		3.3 2.3	7	CL
SS	2.0		9-16		4.5 4.5	8	CL
			10		2.3 3.5	9	
						20	

104% d. Van gravel, silts, sands; fill, hard
penetration drilling (slow). No PID deflection, dry

No PID, moist, 54% yellowish red sandy
clayey sand, 25% clay, reddish; no matting,
odor, staining or bedding. No gravel, easy
drilling; slight resistance

4-6: Same; no deflection to 0.8. Color change
at 5.0' to 7.5% strong brown, with less
clay (10%). No particles; trace yellow matting

Same, at 7.7 becomes 8.5% brownish
yellow silt of 10-15% fine sand. Block staining
at 7.8, mottled or streaked; no PID at 8.0

No PID deflection at 8.0; same soil; no odor,
trace black staining; moist only

PID close to 30; same, less black staining

PID 25 strong but odor, more moist; 2.5%
light olive brown at 17.5. Continued silt
10-15% sand, w/ 5% rounded gravel

Stronger odor. Took chem. Sample 12:47
PID 30

Sandy silt PID 20 104% olive yellow
moist, ~~resistance~~ clay increasing; particles

~~PID 20~~ PID 70. Soft silty clay
2.5% light olive brown

DRILLING CONTR. EDT

Trench, B. Williams, d. d. d.

No. 167394

BY JOHN SPANGLER

DATE 10/24/91 CHK'D BY

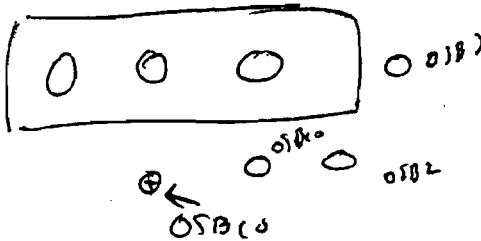
826.3 (3) (REV. 11-80)

Dames & Moore

201

LOCATION OF BORING

N ↑



JOB NO.

6702-077

CLIENT

THAMA

LOCATION

RAAP

DRILLING METHOD:

BORING NO.

05810

SHEET

2 of 2

SAMPLING METHOD:

DRILLING

START

FINISH

TIME

TIME

DATE

DATE

WATER LEVEL

TIME

DATE

CASING DEPTH

DATE

DATE

DATUM

ELEVATION

SAMPLER TYPE	INCHES DRIVEN INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH
SS	2.0 2.0		11	1, 2 4, 4		2.0	CL
SS	2.0 1.9		12	2, 1 3, 2		3.0	
SS	2.0 2.0		13	4, 1 2, 2		5.0	
SS	2.0 2.0		14	3, 2 2, 2		7.0	CL
SS	2.0 2.0		15	2, 2 3, 2		9.0	
SS	2.0 2.0		16	1, 1 2, 2		11.0	

SURFACE CONDITIONS:

Soft, silty clay 2.5 ft x 1/4 L. olivine, most
3" spoon. Approx less odor at 22, stronger
odor at 20.0. Slight deflection 22,
deflection at 20 = 11.4
22 = 2.2

same - odor is different, not
like fuel. will rise 3". No
24-26 + sample

11.5 PID 5.0 same clay, plastic
brown sand,

No PID; maybe very slight deflection
same clay, soft, plastic, slightly
silty

very strong odor again tip of spoon, but
not in 28" portion of spoon
At 29.8 is a saturated pocket, pocket is
not fuel, but very strong odor below.
color contrasts to the 2.5 ft x 1/4 L. olivine

30-32? Rock at 32. Approx to be
product at end of spoon. This
3" spoon was entirely saturated
Took chemical sample from

Draw 2" spoon behind the 3"
spoon and the spoon was full
of liquid that resembles
product of some sort

DRILLING CONTR. EOI

No. 167393

BY J. Spangler

CHK'D BY

DATE

25.1 (3) (REV. 11-80)

Dames & Moore

202

DRILLING CONTR. EPI
 Tom Lynch - Dudley, Kansas
 Dave Dolar

NO. 167401

BY: James O. Spencer
 DATE: 10-25-91 CHK'D BY:

LOCATION OF BORING				JOB NO.		CLIENT		LOCATION			
				06702-077		USA THAMA		RAAPVA SwMU 0'			
				DRILLING METHOD: H.S.A.						BORING NO. OSB 11	
				Continuous Flight						SHEET 1 OF 1	
				Mobile B-80							
				SAMPLING METHOD: Moss sampler							
5 ft continuous						DRILLING					
WATER LEVEL				START		FINISH					
TIME				TIME		TIME					
DATE				DATE		DATE					
CASING DEPTH				10-25-91		10-25-91					
DATUM				ELEVATION				SURFACE CONDITIONS:			
SAMPLER TYPE				INCHES DRIVEN				grassy field, level & Partly Sunny 70's			
INCHES RECOVERED				DEPTH OF CASING				winds 5 to 10 mph			
SAMPLE NO.				BLOWS/FT. SAMPLER				pid amb = .1			
SAMPLE DEPTH				NUMBER OF RINGS							
DEPTH IN FEET				SOIL GRAPH							
0				ML				organic surface layer with grass & many fine roots 0-2			
1				All				Encountered some difficulty due to cobble gravel			
2								brown 10 yr 5/3 silt, dry, friable 0 to 5 ft			
3								fill recovery of .9 ft very hard			
4								fragments of rock pid 0.0			
5				CL				1 ft brown 7.5 yr 6/3 to brown 5/3			
6								sandy clay (CL) with some silt very moist, mag			
7								staining and hematite staining (freq) (5.0 to 6.0)			
8				CH				light brown 7.5 yr 6/3 to brown 5/3			
9								sandy silt (ML) very moist			
10								mag & hematite staining (6.0 to 8.0)			
11								alternate horiz brownish yellow 10 yr 6/8 and light gray			
12				SM				w/ laminations pid 0.0			
13								10 yr 6/3			
14								pale brown to very pale brown 10 yr 7/3			
15								silty clay (CH), very moist, very plastic, sticky			
16								some thin brownish yellow 10 yr 6/8 layers			
17								within 8.0 ft to 11.0 ft. pid 0.0			
18								light olive brown 2.5 yr 6/8 with gray 2.5 yr NSI			
19								mottles throughout very moist to gravelly silty			
20								sand (SM) some cobbles encountered			
21								saturated at 12 to 13.0 ft			
22								auger refusal at 13.0 ft on rock			
23								environmental sample taken - OSB 11			
24								at 12 to 13 ft ss + sv			
25								faired pid readings 0.0			
26											
27											
28											
29											
30											