

SOIL BORING AND MONITORING WELL LOG

JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NO. MW960101 WELL NO. MW960101
 PROJECT Ellsworth AFB South Dakota

Depth in Feet	Description of Material	Geologic Origin	Sample NO.	TYPE	hnu (ppm)	STANDPIPE ELEVATION
0	SURFACE ELEVATION					
0-5	SILTY CLAY WITH SAND AND GRAVEL , dark gray, moist, with organics (CL) calcium carbonate deposits yellowish brown	Coarse Alluvium	1	CS		Well Construction +3' Riser/4" Square Steel Pro-top 2" PVC Riser Pipe Concrete Seal Bentonite #16-30 Silica Sand Pack #10-20 Silica Sand Pack Flush Threaded 2" Stainless Steel Screen 0.010" Screen Size Bottom of Well Bottom of Borehole
5-10	SAND WITH COBBLES , yellowish brown, moist (SP) GRAVELLY SAND WITH SILT , light olive brown, wet (SM)		2	CS		
10-15	CLAYEY SAND , yellowish brown, wet (SP) SAND WITH GRAVEL , brown, wet (SP)	Pierre Shale	3	CS		
15-20	WEATHERED SHALE , (Textural Classification: FAT CLAY, dark grayish brown, moist (CH)) yellowish orange mottled		4	CS		
20-25	END OF BORING					



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WATER LEVEL MEASUREMENTS

START 9-16-96 COMPLETE 9-17-96

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	METHOD
						Pilot Boring - 6 1/4" HSA to 20'. ②
						CREW CHIEF: Ken Diers

MAXIM
Technologies, Inc.

SOIL BORING AND MONITORING WELL LOG

JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NO. MW960102 WELL NO. MW960102
 PROJECT Ellsworth AFB South Dakota

Depth in Feet	Description of Material SURFACE ELEVATION _____	Geologic Origin	Sample NO.	TYPE	hnu (ppm)	STANDPIPE ELEVATION _____ Well Construction
0	TOPSOIL - ORGANIC CLAYEY SILT WITH SAND, brown, moist (ML)	Topsoil	1	CS		+3' Riser/4" Square Steel Pro-top
5	SILTY CLAY WITH SAND AND GRAVEL, brown, moist (CL) white calcium carbonate deposits	Coarse Alluvium	2	CS		2" PVC Riser Pipe Concrete Seal Bentonite #16-30 Silica Sand Pack
10	SANDY SILTY CLAY, light olive brown, wet (CL) strong hydrocarbon odor	Pierre Shale	3	CS		#20 Silica Sand Pack
15	GRAVELLY CLAY, yellowish brown, waterbearing (CL) strong hydrocarbon odor		4	CS		Flush Threaded 2" PVC Screen 0.010" Screen Size
20	WEATHERED SHALE, (Textural Classification: FAT CLAY, gray, waterbearing (CH)) dark greenish gray					Bottom of Well Bottom of Borehole
20	END OF BORING					
25						
30						
35						
40						
45						
50						

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WATER LEVEL MEASUREMENTS						START <u>9-19-96</u>	COMPLETE <u>9-19-96</u>
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	METHOD	
						Pilot Boring - 6 1/4" HSA to 20'	⊙
						CREW CHIEF:	Ken Diers

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SOIL BORING AND MONITORING WELL LOG

JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NO. MW960103 WELL NO. MW960103
 PROJECT Ellsworth AFB South Dakota

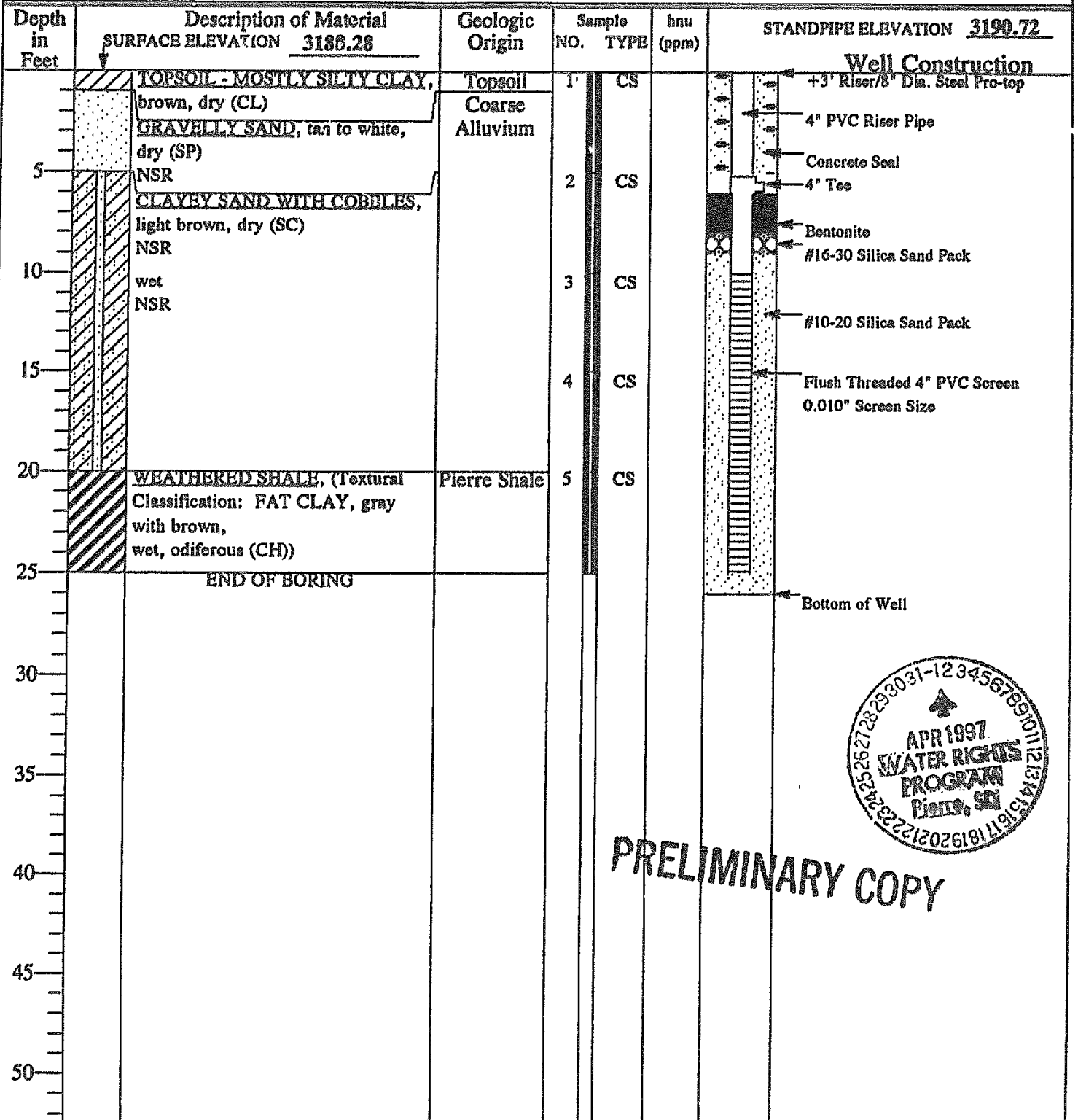
Depth in Feet	Description of Material	Geologic Origin	Sample NO.	TYPE	Inu (ppm)	STANDPIPE ELEVATION
	SURFACE ELEVATION _____					Well Construction
0	TOPSOIL - MOSTLY SILTY CLAY, (CL)	Topsoil	1	CS		+3' Riser/4" Square Steel Pro-top
5	LEAN CLAY, dark brown, moist (CL) calcium carbonate deposits	Fine Alluvium	2	CS		2" PVC Riser Pipe Concrete Seal Bentonite
10	CLAYEY GRAVEL WITH SAND AND SILT, light olive brown, waterbearing (GC)	Course Alluvium	3	CS		#16-30 Silica Sand Pack #10-20 Silica Sand Pack
15	GRAVELLY CLAY, light olive brown, waterbearing (CL)	Pierre Shale	4	CS		Flush Threaded 2" PVC Screen 0.010" Screen Size
15	WEATHERED SHALE, (Textural Classification: FAT CLAY, olive brown, waterbearing (CH))					
20	END OF BORING					Bottom of Well Bottom of Borehole

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WATER LEVEL MEASUREMENTS						START	COMPLETE
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	<u>9-17-96</u>	<u>9-17-96</u>
						METHOD Pilot Boring - 6 1/4" HSA to 17.5' ②	
						CREW CHIEF: Ken Diers	

SOIL BORING AND MONITORING WELL LOG

JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NO. SVE0101 WELL NO. SVE0101
 PROJECT Ellsworth AFB South Dakota



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WATER LEVEL MEASUREMENTS						START <u>9-11-96</u>	COMPLETE <u>9-20-96</u>
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	METHOD <u>Pilot Boring - 3 3/4" HSA to 25'. Well Boring - 16" SSA to 26'.</u>	
						CREW CHIEF: <u>Kent Benson</u>	

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SOIL BORING AND MONITORING WELL LOG

JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NOS SVE0102 WELL NO. SVE0102
 PROJECT Ellsworth AFB South Dakota

Depth in Feet	Description of Material	Geologic Origin	Sample NO.	TYPE	hnu (ppm)	STANDPIPE ELEVATION <u>3189.88</u>
	SURFACE ELEVATION <u>3187.23</u>					Well Construction
0	TOPSOIL - MOSTLY SILTY CLAY, brown, dry (CL) NSR	Topsoil	1	CS		+3' Riser/8" Dia. Steel Pro-top
5	NSR cobbles	Possible Coarse Alluvium	2	CS		4" PVC Riser Pipe
10	SILTY CLAY WITH COBBLES, brown, moist, gypsum deposits (CL-ML)		3	CS		Concrete Seal
15	SANDY CLAY WITH GRAVEL, brown, moist (CL) NSR					4" Tee
20	WEATHERED SHALE, (Textural Classification: FAT CLAY, olive green, moist (CH)) NSR brown, wet	Pierre Shale	4	CS		Bentonite
25	UNWEATHERED SHALE, (Textural Classification: FAT CLAY, olive gray, moist, iron oxide (CH)) END OF BORING		5	CS		#16-30 Silica Sand Pack
30						#10-20 Silica Sand Pack
35						Flush Threaded 4" PVC Screen 0.010" Screen Size
40						Bottom of Well

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WATER LEVEL MEASUREMENTS						START <u>9-10-96</u>	COMPLETE <u>9-21-96</u>
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	METHOD <u>Pilot Boring - 3 3/4" HSA to 25'. Well Boring - 16" SSA to 26.4'.</u>	
						CREW CHIEF: <u>Kent Benson</u>	

SOIL BORING AND MONITORING WELL LOG

JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NO. SVE0105 WELL NO. SVE0105
 PROJECT Ellsworth AFB South Dakota

Depth in Feet	Description of Material SURFACE ELEVATION <u>3187.13</u>	Geologic Origin	Sample NO.	TYPE	hau (ppm)	STANDPIPE ELEVATION <u>3190.01</u> Well Construction	
5	TOPSOIL - SILTY SAND WITH GRAVEL, light brown, dry, with organics (SM)	Topsoil Mixed Alluvium	1	CS		+3' Riser/8" Dia. Steel Pro-top 4" PVC Riser Pipe Concrete Seal 4" Tee Bentonite #16-30 Silica Sand Pack #10-20 Silica Sand Pack Flush Threaded 4" PVC Screen 0.010" Screen Size Bottom of Well	
	LEAN CLAY WITH SAND AND GRAVEL, brown, moist, stiff (CL)						
10	SILTY SAND WITH GRAVEL, brown, moist, loose (SM)	Coarse Alluvium	2	CS			
	SILTY GRAVEL WITH SAND AND COBBLES, brown, moist (GM) wet						
15				3	CS		
20		Pierre Shale	4	CS			
	WEATHERED SHALE, (Textural Classification: FAT CLAY, olive brown, wet to moist (CH))						
25	END OF BORING		5	CS			
30							
35							
40							
45							
50							

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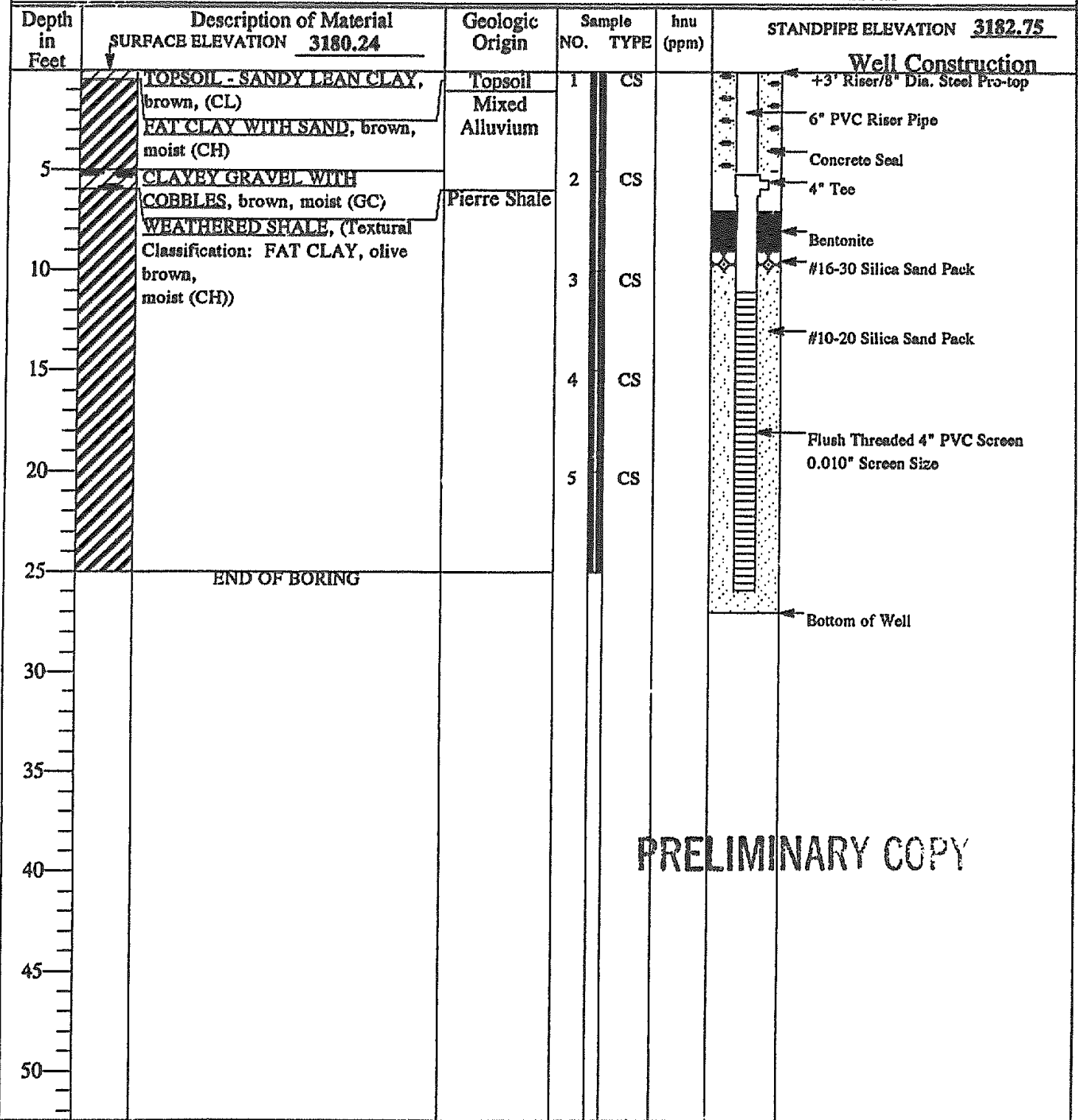
WATER LEVEL MEASUREMENTS

START 9-11-96 COMPLETE 9-20-96

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	METHOD
						Pilot Boring - 4 1/4" HSA to 25'. Well Boring - 16" SSA to 28'.
						CREW CHIEF: <u>Brent Thomas</u>

SOIL BORING AND MONITORING WELL LOG

JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NO. SVE0106 WELL NO. SVE0106
 PROJECT Ellsworth AFB South Dakota



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WATER LEVEL MEASUREMENTS						START <u>9-11-96</u>	COMPLETE <u>9-24-96</u>
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	METHOD <u>Pilot Boring - 4 1/4" HSA to 25'. Well Boring - 16" SSA to 27'.</u>	
						CREW CHIEF: <u>Brent Thomas</u>	

SOIL BORING AND MONITORING WELL LOG

JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NO. DW0105 WELL NO. DW0105
 PROJECT Ellsworth AFB South Dakota

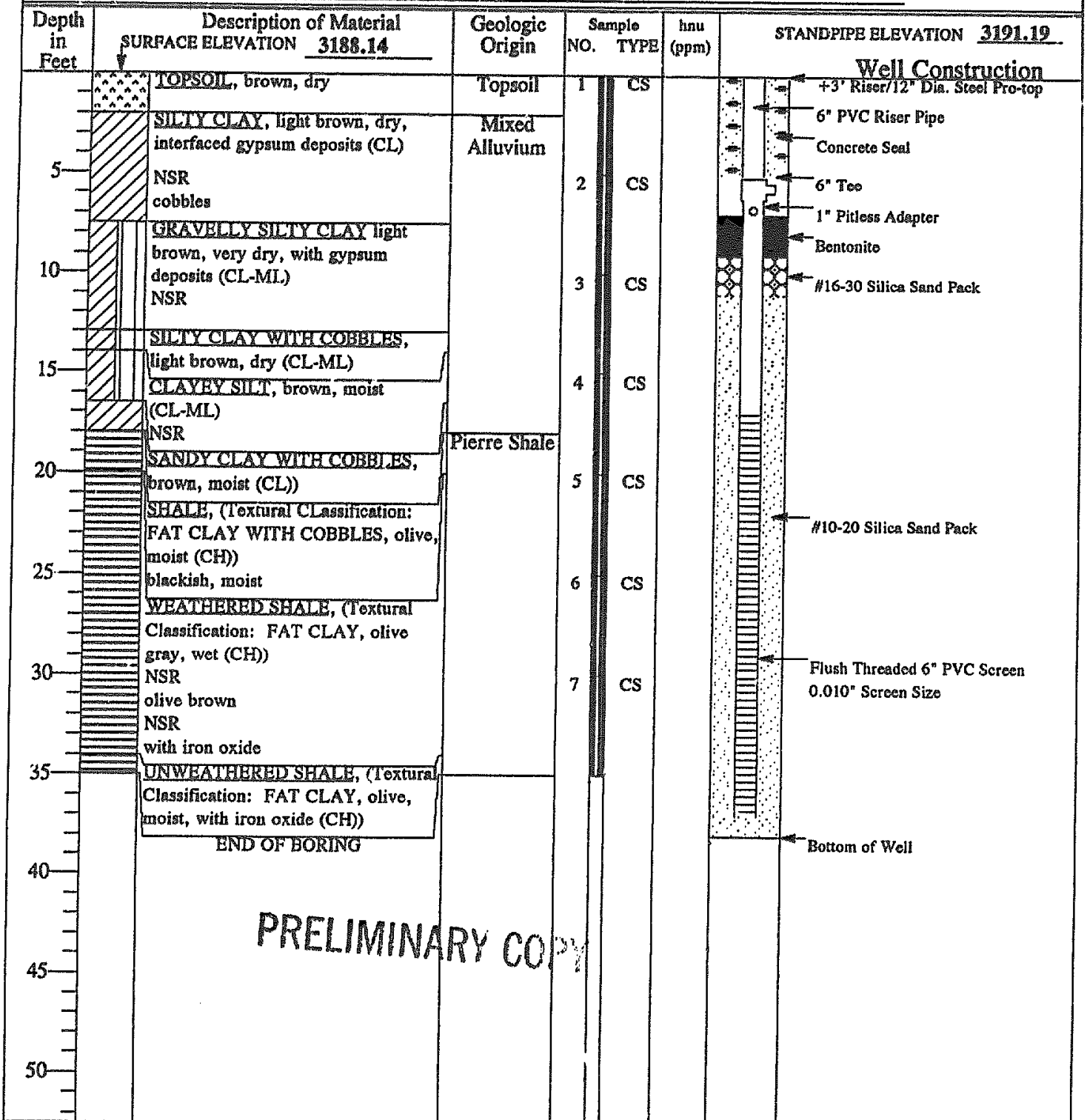
Depth in Feet	Description of Material	Geologic Origin	Sample NO.	TYPE	hnu (ppm)	STANDPIPE ELEVATION <u>3175.76</u>
	SURFACE ELEVATION <u>3173.23</u>					
0	TOPSOIL, chocolate brown, dry	Topsoil	1	CS		Well Construction +3' Riser/12" Dia. Steel Pro-top 6" PVC Riser Pipe Concrete Seal 6" Tee 1" Pitless Adapter Bentonite #16-30 Silica Sand Pack #10-20 Silica Sand Pack Flush Threaded 6" PVC Screen 0.010" Screen Size Bottom of Well
0-5	SILTY CLAY, brown, dry, gypsum deposits (CL-ML)	Terrace Deposits				
5	NSR - possible gravel or cobbles		2	CS		
5-10	WEATHERED SHALE, (Textural Classification: FAT CLAY, olive brown, moist (CH)) gray	Pierre Shale	3	CS		
10-15	NSR		4	CS		
15-20	olive gray NSR		5	CS		
20-25	with iron oxide wet		6	CS		
25-30	wet moist		7	CS		
30-35	FRACTURED SHALE, (Textural Classification: FAT CLAY, gray with iron oxide, moist (CH))					
35-40	UNWEATHERED SHALE (Textural Classification: FAT CLAY, gray, moist (CH), with iron oxide)					
40	END OF BORING					

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WATER LEVEL MEASUREMENTS						START <u>9-9-96</u>	COMPLETE <u>9-15-96</u>
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	METHOD <u>②</u> Pilot Boring - 3 3/4" HSA to 35'. Well Boring - 16" PVC to 43'.	
9/9/96				21.15			
						CREW CHIEF: <u>Kent Benson</u>	

SOIL BORING AND MONITORING WELL LOG

JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NO. DW0106 WELL NO. DW0106
 PROJECT Ellsworth AFB South Dakota



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WATER LEVEL MEASUREMENTS

WATER LEVEL MEASUREMENTS					START	COMPLETE
					<u>9-7-96</u>	<u>9-17-96</u>
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	METHOD
<u>9/7/96</u>				<u>15.1</u>		<u>Pilot Boring - 3 3/4" HSA to 35'. Well Boring - 16" PVC to 38'.</u>
					CREW CHIEF:	<u>Kent Benson</u>

SOIL BORING AND MONITORING WELL LOG

JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NO. DW0106 WELL NO. DW0106
 PROJECT Ellsworth AFB South Dakota

Depth in Feet	Description of Material	Geologic Origin	Sample NO.	TYPE	hnu (ppm)	STANDPIPE ELEVATION <u>3197.87</u>
	SURFACE ELEVATION <u>3188.94</u>					Well Construction
0	BASE COURSE	Fill	1	CS		+3' Riser/12" Dia. Steel Pro-top
0-5	SILTY GRAVEL WITH SAND AND COBBLES, brown, moist (GM)	Coarse Alluvium	2	CS		6" Black Carbon Steel Riser Pipe
5-10			3	CS		Concrete Seal
10-15			4	CS		6" Tee
15-20	wet		5	CS		1" Pitless Adapter
20-25	WEATHERED SHALE, (Textural Classification: FAT CLAY, olive brown, moist (CH))	Pierre Shale	6	CS		Bentonite
25-30			7	CS		#16-30 Silica Sand Pack
30-35			8	CS		
35-40						#10-20 Silica Sand Pack
40-45	END OF BORING					Flush Threaded 6" Stainless Steel Screen 0.010" Screen Size
45-50						Bottom of Well

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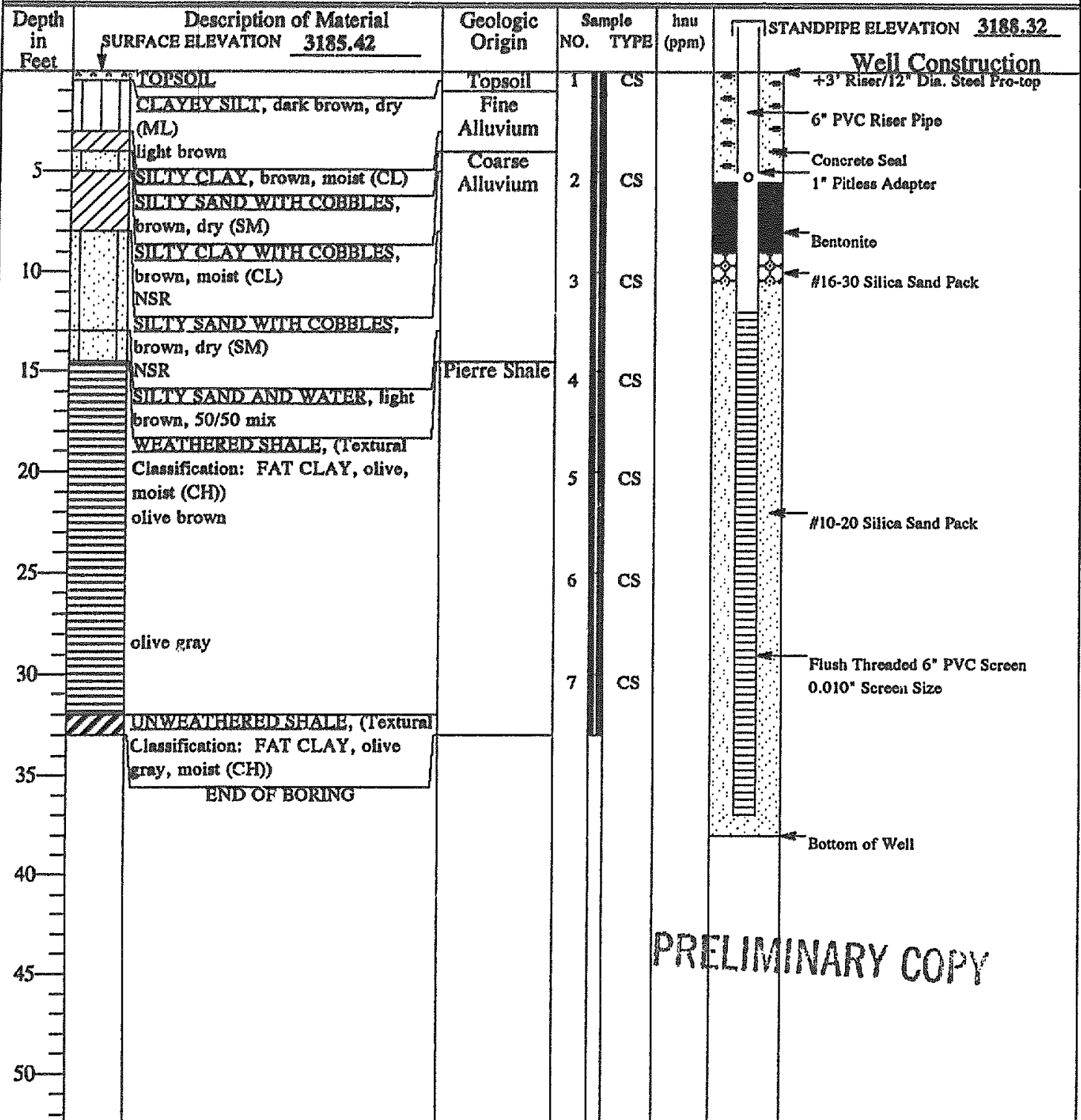
WATER LEVEL MEASUREMENTS

START 9-18-96 COMPLETE 9-26-96

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	METHOD
						Pilot Boring - 4 1/4 HSA to 39'. Well Boring - 16" SSA to 45'.
						CREW CHIEF: <u>Brent Thomas</u>

SOIL BORING AND MONITORING WELL LOG

JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NO. EW0103 WELL NO. EW0103
 PROJECT Ellsworth AFB South Dakota

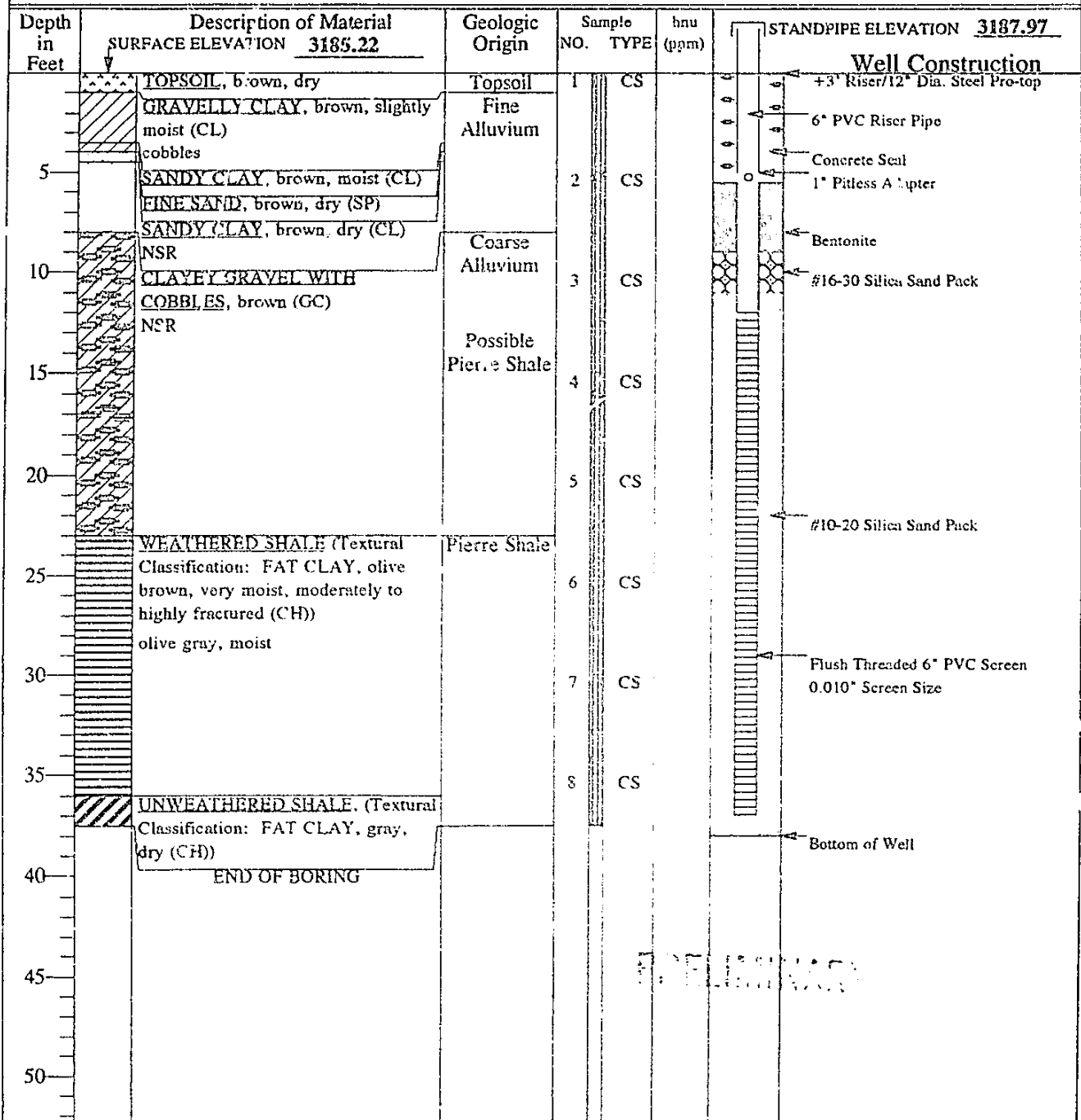


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WATER LEVEL MEASUREMENTS					START <u>9-8-96</u>	COMPLETE <u>9-21-96</u>
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	METHOD
9/9/96				12.2		Pilot Boring - 3 3/4" HSA to 33'. Well Boring - 16" SSA to 38'.
CREW CHIEF:					Kent Benson	

SOIL BORING AND MONITORING WELL LOG

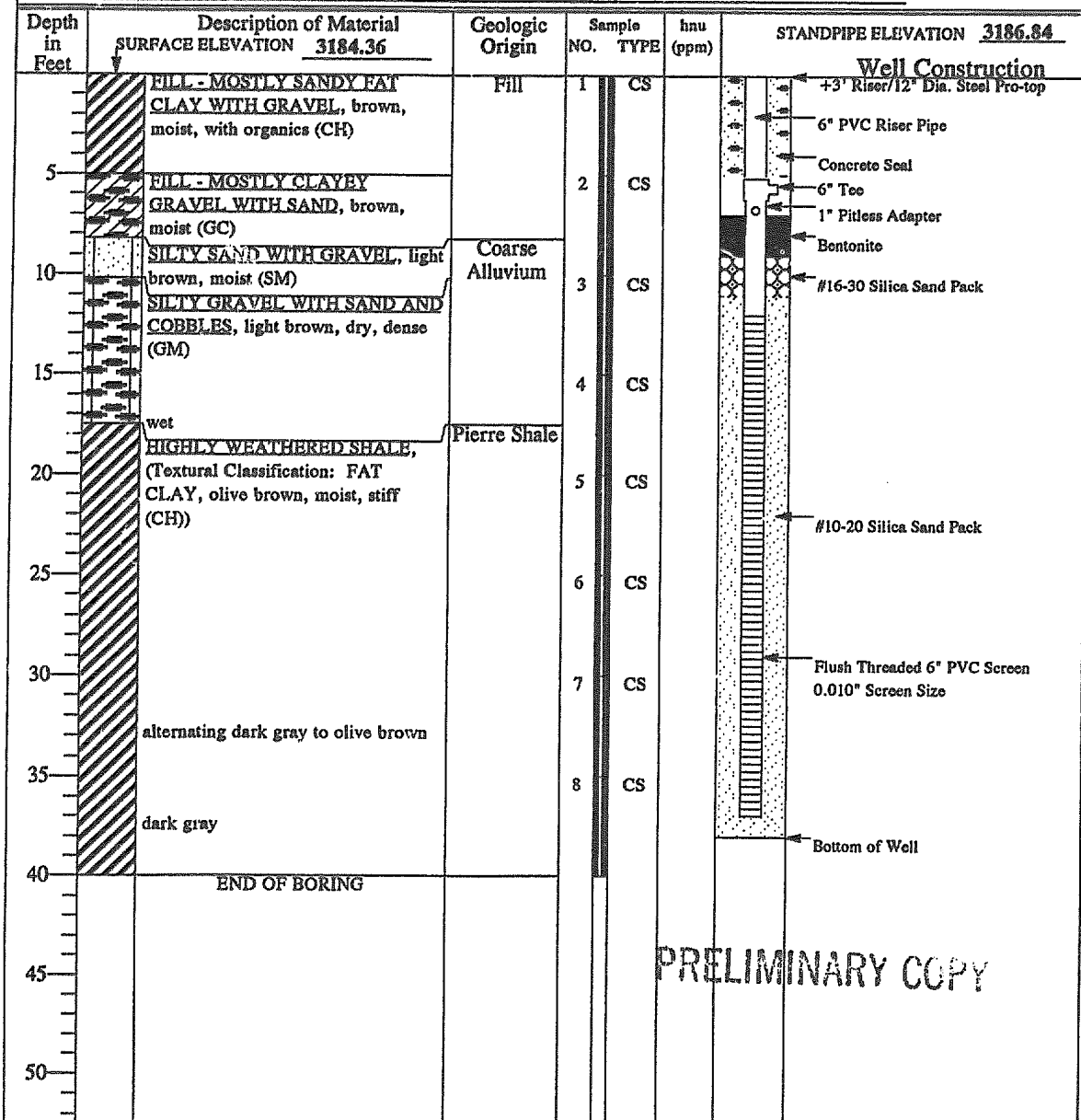
JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NO. EW0104 WELL NO. EW0104
 PROJECT Ellsworth AFB South Dakota



WATER LEVEL MEASUREMENTS						START	COMPLETE
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	9-7-96	9-22-96
9/8/96				11.9			
						CREW CHIEF:	Kent Benson

SOIL BORING AND MONITORING WELL LOG

JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NO. EW0105 WELL NO. EW0105
 PROJECT Ellsworth AFB South Dakota



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WATER LEVEL MEASUREMENTS						START <u>9-7-96</u>	COMPLETE <u>9-22-96</u>
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	METHOD <u>①</u> Pilot Boring - 4 1/4" HSA to 40'. Well Boring - 16" SSA to 38'.	
						CREW CHIEF: <u>Brent Thomas</u>	

SOIL BORING AND MONITORING WELL LOG

JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NO. EW0107 WELL NO. EW0107
 PROJECT Ellsworth AFB South Dakota

Depth in Feet	Description of Material SURFACE ELEVATION <u>3157.19</u>	Geologic Origin	Sample NO.	TYPE	lnu (ppm)	STANDPIPE ELEVATION <u>3159.80</u> Well Construction
0	TOPSOIL	Topsoil	1	CS		+3' Riser/12" Dia. Steel Pro-top
0-5	SILTY CLAY, brown, dry (CL) with cobbles black, very moist, hydrocarbon smell NSR	Fine Alluvium Possible Coarse Alluvium	2	CS		6" PVC Riser Pipe Concrete Seal 6" Tee 1" Pitless Adapter Bentonite
10	WEATHERED SHALE, (Textural Classification: FAT CLAY, brown to olive, moist, odiferous (CH))	Pierre Shale	3	CS		#16-30 Silica Sand Pack
15			4	CS		
20			5	CS		#10-20 Silica Sand Pack
25			6	CS		Flush Threaded 6" PVC Screen 0.010" Screen Size
30	END OF BORING					Bottom of Well

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WATER LEVEL MEASUREMENTS

START 9-4-96 COMPLETE 9-24-96

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	METHOD
9/4/96				4.9		Pilot Boring - 3 3/4" HSA to 30'. Well Boring - 16" SSA to 34'.

CREW CHIEF: Kent Benson

SOIL BORING AND MONITORING WELL LOG

JOB NO. 4209-6-03379 VERTICAL SCALE 1" = 7' BORING NO. EW0113 WELL NO. EW0113

PROJECT Ellsworth AFB South Dakota

Depth in Feet	Description of Material SURFACE ELEVATION <u>3184.38</u>	Geologic Origin	Sample NO.	TYPE	hnu (ppm)	STANDPIPE ELEVATION <u>3186.69</u> Well Construction
0	TOPSOIL - MOSTLY CLAYEY	Topsoil	1	CS		+3' Riser/12" Dia. Steel Pro-top
0-5	SILT , brown, dry, roots (CL-ML) SILTY CLAY , brown, dry, gypsum deposits (CL-ML)	Fine Alluvium				6" PVC Riser Pipe
5	SILT WITH GRAVEL , brown, dry (ML) with sand	Mixed Alluvium	2	CS		Concrete Seal 1" Pitless Adapter
5-10	NSR		3	CS		Bentonite
10-15						#16-30 Silica Sand Pack
15	WEATHERED SHALE , (Textural Classification: FAT CLAY, gray to brown, moist (CH))	Pierre Shale	4	CS		
15-20			5	CS		#10-20 Silica Sand Pack
20-25			6	CS		
25-30	gray		7	CS		Flush Threaded 6" PVC Screen 0.010" Screen
30-35	UNWEATHERED SHALE , (Textural Classification: FAT CLAY, gray, moist (CH))					
35	END OF BORING					Bottom of Well

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WATER LEVEL MEASUREMENTS

START 8-27-96 COMPLETE 9-24-96

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	WATER LEVEL	WATER ELEVATION	METHOD
						Pilot Boring - 3 3/4" HSA to 35'. Well Boring - 16" SSA to 33'.
						CREW CHIEF: <u>Kent Benson</u>

